LAMONT - DOHERTY SURVEY OF THE WORLD OCEAN
General Editor, Maurice Ewing

VEMA 17 DATA

DECEMBER 1960 – SEPTEMBER 1961

Maurice Ewing, J. Lamar Worzel, Thomas D. Aitken



Lamont-Doherty Geological Observatory
Columbia University
Palisades, New York 10964

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JOHN FRANCIS HENNION, 1919 - 1961

This volume is dedicated to the memory of John Hennion, who was the victim of an accident on March 17, 1961, while VEMA was working off Talcahuano, Chile.



ACKNOWLEDGMENTS

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We wish to express our gratitude not only for the funding which made possible the programs on VEMA and the reduction and analysis of the data, but also for the friendships which have been built through the years with individuals in the cognizant agencies.

The Chief Scientist on each leg of VEMA has major responsibility for the success of the planned program and for taking advantage of unforeseen opportunities. We thank all of those who participated in VEMA-17. Special thanks are owed to Captain Henry C. Kohler, Master of VEMA, whose wise leadership is certainly a major factor in the productivity of VEMA.

Many persons at Lamont-Doherty Geological Observatory have participated in the reduction of the data.

The final navigation was completed under the supervision of Manik Talwani.

Core descriptions have been filed with the National Oceanographic Data Center, Rockville, Maryland, 20852. Other inquiries about cores, dredges or trawls should be directed to Roy Capo. Inquiries about the hydrographic program should be directed to Robert Gerard; about heat flow studies to Marcus Langseth; about plankton, Allan W. H. Bé; geochemical samples, Wallace Broecker; seismic reflection ahd refraction, John Ewing; magnetics, Walter Pitman III; bathymetry, Dennis Hayes; gravity, Manik Talwani or J. Lamar Worzel; and camera station Thomas Aitken or Maurice Ewing.

All of the above-mentioned may be contacted at Lamont-Doherty Geological Observatory except Maurice Ewing and J. Lamar Worzel, whose current addresses are given below.

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VEMA RESEARCH SERIES

Volume I ABYSSAL CRUSTACEA
J. Laurens Bernard, Robert J. Menzies, and Mihai C. Bacescu
Columbia University Press, New York and London, 1962
223 pages

Volume II STRATIFICATION AND CIRCULATION IN THE ANTILLEAN-CARIBBEAN BASINS
PART 1. SPREADING AND MIXING OF THE WATER TYPES
Georg Wüst with the assistance of Arnold Gordon
Columbia University Press, London and New York, 1964
201 pages

Volume III VEMA-17 DATA
Maurice Ewing, J. Lamar Worzel, Thomas D. Aitken
Columbia University Technical Report on Contract N00014-67-A-00108-004
No. 6-CU-6-72, 1972.
304 pages

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I N T R O D U C T I O N

VEMA-17 was a cruise of 10 months in which 40,025 miles of track were covered, ranging from 62°53'S to 60°45'N. Three major new marine geophysical techniques were evolved - seismic profiling, continuous gravity measurements, and ocean bottom seismometry. Cooperative work was done with four other vessels: HIDALGO from Texas A & M University; YELCHO, a corvette from the Chilean Navy; CAPITAN CANEPA from Argentina's Servicio de Hidrografia Naval; and SACKVILLE from the Atlantic Oceanographic Group, Canada.

VEMA is a small vessel, by present-day standards, for making world-wide voyages throughout which extensive research programs are maintained. She was built in 1923 and used as a yacht until World War II, when she was purchased by the government and extensively remodelled for housing and feeding students in the U.S. Merchant Marine Academy at Kings Point, N.Y. She suffered seriously from neglect during and for several years after the war, before being put into commission by a private owner.

Columbia University chartered her for her first research cruise, VEMA-1 in 1953, then purchased her and began the work of restoration and alteration to adapt the vessel for world-wide voyages of exploration.

In VEMA's first sixteen voyages of exploration, our experience in ship operation had gradually increased and much of the damage caused by years of neglect had been repaired. VEMA had become a very able vessel for general oceanographic research. Her accomplishments during this period, which included the very active program of the International Geophysical Year, may be inferred from the mere schedules of her voyages. Several of the later ones were almost a year in length and VEMA-16 was a circumnavigation in which the ice in both polar regions was reached.

Very extensive modifications were made in the annual overhaul period prior to this, the seventeenth voyage. The 1923 Burmeister and Wain diesel engine and "feathering" propeller were replaced by a Superior diesel with appropriate reduction gears and a fixed pitch propeller. The leaky wooden deck was replaced by a steel one. The after deckhouse was enlarged and rebuilt of steel to house the main laboratories. A new forward deckhouse and bridge were constructed, atop of which was installed a thwartship anti-roll tank, designed, when filled with fluid to a proper level, to damp the roll of the ship. The anti-roll tank was intended to stabilize the ship so that useful measurements of the force of gravity could be made continuously along all routes traversed by the ship. Its installation eliminated the possibility of sailing the vessel, so the bowsprit and some of the booms were removed, and parts of the standing rigging modified. This resulted in striking improvements in the amount and quality of the working and living spaces, as well as in the stability of the vessel as a platform for measurement of gravity.

VEMA-17 involved, then, the testing of a number of fundamental modifications and the reduction to

standard practice of several new exploration techniques.

The continuous surface ship method of gravity measurement had been pioneered on U.S.S. COMPASS ISLAND by J. L. Worzel in November of 1957, tested on VEMA-16, and on VEMA-17 was advanced to the status of a major tool for marine geophysical investigation. The anti-roll tank proved to be very effective and this installation became the prototype for those on most of the oceanographic research vessels built since 1960. Installation of the tank provided several unexpected assets. It steadied the ship when stopped on station as well as when underway. Furthermore, the tank could be used as an auxiliary fuel tank, an advantage which is very important for a small ship making long passages.

Various parts of the continuous seismic reflection profiling system had been tested on earlier voyages. This technique too was advanced to the status of a major tool for marine geophysical investigation by John Ewing in the Gulf of Mexico during the early part of VEMA-17. By use of this technique, a continuous record of the thickness and stratification of sediment on the sea floor can be made while the ship is underway at normal cruising speed.

The power of this technique was recognized at once, and arrangements were made to use it on a continuous basis for the remainder of the cruise. It has been the controlling factor in planning all subsequent marine geophysical work of the Lamont-Doherty Geological Observatory. It stimulated the Lamont-Doherty scientists to undertake a reconnaissance survey of the World Ocean which still continues. The seismic profiling technique has been widely adopted by other research groups.

Maurice Ewing
Palisades, New York
August 1972

CHRONOLOGY OF VEMA CRUISES

VEMA-1
Capt. L. Kenedy, Master

Leg 1, J. L. Worzel, Ch. Sci.		
	New York, N.Y.	April 11, 1953
	San Juan, Puerto Rico	April 19
*Leg 2, J. L. Worzel, Ch. Sci.		
	San Juan, Puerto Rico	April 24
	Guantanamo, Cuba	May 3
*Leg 3, J. L. Worzel Ch. Sci.		
	Guantanamo, Cuba	May 8
	Galveston, Texas	May 28
Leg 4, J. L. Worzel, Ch. Sci.		
	Galveston, Texas	May 28
	New York, N.Y.	June 25

*with ATLANTIS-185

VEMA-2
Capt. L. Kenedy, Master

Leg 1, B. C. Heezen, Ch. Sci.		
	New York, N.Y.	July 20, 1953
	St. John's, Newfoundland	August 10
Leg 2, B. C. Heezen, Ch. Sci.		
	St. John's, Newfoundland	August 23
	St. John's, Newfoundland	August 26
Leg 3, B. C. Heezen, Ch. Sci.		
	St. John's, Newfoundland	August 28
	New York, N.Y.	September 13
Leg 4, B. C. Heezen, Ch. Sci.		
	New York, N.Y.	September 18
	Lunenburg, Nova Scotia	Septebmer 22

VEMA-2 (cont'd)

*Leg 5, B. C. Heezen, Ch. Sci.		
	Lunenberg, Nova Scotia	December 16, 1953
	New York, N.Y.	December 20

*D.G. Gould, Master

VEMA-3
Capts. D. G. Gould and F. S. McMurray, Masters

+Leg 1, M. Ewing, Ch. Sci.		
	New York, N.Y.	January 8, 1954
	St. George's, Bermuda	January 14
Leg 2, J. L. Worzel, Ch. Sci.		
	St. George's, Bermuda	January 26
	San Juan, Puerto Rico	January 30
Leg 3, J. L. Worzel, Ch. Sci.		
	San Juan, Puerto Rico	February 1
	Tampa, Florida	February 12
Leg 4, M. Ewing, Ch. Sci.		
	Tampa, Florida	February 15
	Tampa, Florida	February 23
Leg 5, M. Ewing, Ch. Sci.		
	Tampa, Florida	February 25
	Pensacola, Florida	March 9
Leg 6, M. Ewing, Ch. Sci.		
	Pensacola, Florida	March 13
	Beaumont, Texas	March 23
Leg 7, M. Ewing, Ch. Sci.		
	Beaumont, Texas	April 3
	Galveston, Texas	April 18

+Four men overboard at 35°49'N 63°52'W. Three rescued.

Chronology of VEMA Cruises (cont'd)

VEMA-3 (cont'd)

Leg 8, M. Ewing, Ch. Sci.		
	Galveston, Texas	April 20, 1954
	Galveston, Texas	May 3
Leg 9, M. Ewing, Ch. Sci.		
	Galveston, Texas	May 5
	Havana, Cuba	May 20
Leg 10, M. Ewing, Ch. Sci.		
	Havana, Cuba	May 22
	New York, N.Y.	June 4

VEMA-4
Capt. D. G. Gould, Master

Leg 1, B. C. Heezen, Ch. Sci.		
	New York, N.Y.	July 9, 1954
	Ponta Delgada, Azores	July 29
Leg 2, B. C. Heezen, Ch. Sci.		
	Ponta Delgada, Azores	July 31
	Casablanca, Morocco	August 10
*Leg 3, B. C. Heezen, Ch. Sci.		
	Casablanca, Morocco	August 12
	Cadiz, Spain	August 17
Leg 4, B. C. Heezen, Ch. Sci.		
	Cadiz, Spain	August 19
	Lisbon, Portugal	August 23
Leg 5, B. C. Heezen, Ch. Sci.		
	Lisbon, Portugal	August 26
	New York, N.Y.	September 20

*Refraction, with whaleboat, 13 August-17 August.

VEMA-5
Capt. D. G. Gould, Master

Leg 1, W. Beckmann, Ch. Sci.		
	New York, N.Y.	November 4, 1954
	St. George's, Bermuda	November 9
Leg 2, G. Hamilton, Ch. Sci.		
	St. George's, Bermuda	November 12
	St. George's, Bermuda	November 16
Leg 3, G. Hamilton, Ch. Sci.		
	St. George's, Bermuda	November 17
	St. George's, Bermuda	November 20
Leg 4, G. Hamilton, Ch. Sci.		
	St. George's, Bermuda	November 23
	St. George's, Bermuda	November 27
Leg 5, G. Hamilton, Ch. Sci.		
	St. George's, Bermuda	November 30
	St. George's, Bermuda	December 5
Leg 6, G. Hamilton, Ch. Sci.		
	St. George's, Bermuda	December 9
	St. George's, Bermuda	December 10
Leg 7, G. Hamilton, Ch. Sci.		
	St. George's, Bermuda	December 12
	New York, N.Y.	December 20

VEMA-6
Capt. J. C. Kleinschmidt, Master

Leg 1, J. Nafe, Ch. Sci.		
	New York, N.Y.	January 18, 1955
	St. George's, Bermuda	January 22

Chronology of VEMA Cruises (cont'd)

VEMA-6 (cont'd)

Leg 2, J. Nafe, Ch. Sci.		
St. George's, Bermuda	January 23, 1955	
San Juan, Puerto Rico	February 3	
Leg 3, B. C. Heezen, Ch. Sci.		
San Juan, Puerto Rico	February 7	
San Juan, Puerto Rico	February 8	
Leg 4, B. C. Heezen, Ch. Sci.		
San Juan, Puerto Rico	February 8	
San Juan, Puerto Rico	February 14	
Leg 5, M. Ewing, Ch. Sci.		
San Juan, Puerto Rico	February 14	
San Juan, Puerto Rico	February 22	
*Leg 6, M. Ewing, Ch. Sci.		
San Juan, Puerto Rico	February 28	
Charleston, South Carolina	March 11	
Leg 7, M. Ewing, Ch. Sci.		
Charleston, South Carolina	March 14	
Charleston, South Carolina	March 22	
Leg 8, M. Ewing, Ch. Sci.		
Charleston, South Carolina	March 23	
Settlement Point, Bahamas	April 1	
Leg 9, J. Nafe, Ch. Sci.		
Settlement Point, Bahamas	April 5	
New York, N.Y.	April 11	

*With Woods Hole Oceanographic Institution R.V. BEAR

VEMA-7
Capt. L. Brack, Master

Leg 1, J. L. Worzel, Ch. Sci.	
New York, N.Y.	May 24, 1955
Nassau, Bahamas	June 6
Leg 2, B. C. Heezen, Ch. Sci.	
Nassau, Bahamas	June 10
St. George's, Bermuda	June 30
Leg 3, B. C. Heezen, Ch. Sci.	
St. George's Bermuda	July 7
St. George's Bermuda	July 31
Leg 4, E. T. Miller, Ch. Sci.	
St. George's, Bermuda	August 4
St. George's, Bermuda	August 26
Leg 5, M. Ewing, Ch. Sci.	
St. George's, Bermuda	August 31
New York, N.Y.	September 19

VEMA-8
Capt. F. S. Usher, Master

Leg 1, J. L. Worzel, Ch. Sci.	
New York, N.Y.	October 29, 1955
St. George's Bermuda	November 2
Leg 2, J. L. Worzel, Ch. Sci.	
St. George's, Bermuda	November 2
Nassau, Bahamas	November 6

Chronology of VEMA Cruises (cont'd)

VEMA-8 (cont'd)

*Leg 3, J. L. Worzel, Ch. Sci.		
	Nassau, Bahamas	November 7, 1955
	Mayaguez, Puerto Rico	November 16
*Leg 4, J. L. Worzel, Ch. Sci.		
	Mayaguez, Puerto Rico	November 16
	Mayaguez, Puerto Rico	November 21
*Leg 5, J. L. Worzel, Ch. Sci.		
	Mayaguez, Puerto Rico	November 22
	Colon, Panama	December 2
*Leg 6, M. Ewing, Ch. Sci.		
	Colon, Panama	December 6
	Port Esqueville, Jamaica	December 12
*Leg 7, M. Ewing, Ch. Sci.		
	Port Esqueville, Jamaica	December 13
	Guantanamo Bay, Cuba	December 27
*Leg 8, M. Ewing, Ch. Sci.		
	Guantanamo Bay, Cuba	December 30
	San Juan, Puerto Rico	January 9, 1956

*with WISSAMA

VEMA-9
Capt. F. S. Usher, Master

Leg 1, W. Beckmann, Ch. Sci.		
	San Juan, Puerto Rico	January 23, 1956
	Recife, Brazil	February 21
Leg 2, G. Hamilton, Ch. Sci.		
	Recife, Brazil	February 29
	Natal, Brazil	March 23

VEMA-9 (cont'd)

Leg 3, G. Hamilton, Ch. Sci.		
	Natal, Brazil	March 27, 1956
	St. George's, Bermuda	April 20
Leg 4, G. Hamilton, Ch. Sci.		
	St. George's, Bermuda	April 20
	New York, N.Y.	April 25

VEMA-10
Capt. F. S. Usher, Master

Leg 1, J. Nafe, Ch. Sci.		
	New York, N.Y.	May 30, 1956
	Funchal, Madeira	June 20
[1]Leg 2, J. Nafe, Ch. Sci.		
	Funchal, Madeira	June 21
	Algeciras, Spain	June 28
Leg 3, M. Ewing, Ch. Sci.		
	Ceuta, Morocco	June 30
	Civitavecchia, Italy	July 5
Leg 4, M. Ewing, Ch. Sci.		
	Civitavecchia, Italy	July 6
	Naples, Italy	July 10
Leg 5, M. Ewing, Ch. Sci.		
	Naples, Italy	July 12
	Astakos, Greece	July 16
Leg 6, M. Ewing, Ch. Sci.		
	Astakos, Greece	July 17
	Patras, Greece	July 21

1. with THETA

Chronology of VEMA Cruises (cont'd)

VEMA-10 (cont'd)

Leg 7, M. Ewing, Ch. Sci.		
	Patras, Greece	July 22, 1956
	Piraeus, Greece	July 28
Leg 8, M. Ewing, Ch. Sci.		
	Piraeus, Greece	July 31
	Izmir, Turkey	August 7
[2]Leg 9, M. Ewing, Ch. Sci.		
	Izmir, Turkey	August 2
	Antalya, Turkey	Auguat 13
Leg 10, M. Ewing, Ch. Sci.		
	Antalya, Turkey	August 14
	Naples, Italy	August 21
Leg 11, M. Talwani, Ch. Sci.		
	Naples, Italy	August 27
	Ceuta, Morocco	September 3
Leg 12, B. C. Heezen, Ch. Sci.		
	Ceuta, Morocco	September 3
	Las Palmas, Canary Islands	September 6
[1]Leg 13, B. C. Heezen, Ch. Sci.		
	Las Palmas, Canary Islands	September 8
	New York, N.Y.	October 1

1. with THETA
2. with ARAR

VEMA-11
Capt. F. S. Usher, Master

Leg 1, B. Luskin, Ch. Sci.		
	New York, N.Y.	November 6, 1956
	Lunenburg, Nova Scotia	November 13

VEMA-11 (cont'd)

Leg 2, B. Luskin, Ch. Sci.		
	Lunenburg, Nova Scotia	November 15, 1956
	Lunenburg, Nova Scotia	November 18
Leg 3, B. Luskin, Ch. Sci.		
	Lunenburg, Nova Scotia	December 4
	New York, N.Y.	December 7

VEMA-12
Capt. F. S. Usher, Master, Legs 1-2
Capt. W. J. Smith, Master, Legs 3-4
Capt. V. R. Sinclair, Master, Legs 5-10
Capt. J. F. Doyle, Master, Legs 11-13

Leg 1, M. Davidson, Ch. Sci.		
	New York, N.Y.	December 13, 1956
	St. George's, Bermuda	December 18
Leg 2, M. Davidson, Ch. Sci.		
	St. George's, Bermuda	December 19
	Recife, Brazil	January 10, 1957
Leg 3, M. Davidson, Ch. Sci.		
	Recife, Brazil	January 18
	Buenos Aires, Argentina	February 5
[1]Leg 4, M. Ewing, Ch. Sci.		
	Buenos Aires, Argentina	February 12
	Puerto Belgrano, Argentina	February 22
Leg 5, M. Ewing, Ch. Sci.		
	Puerto Belgrano, Argentina	February 26
	Puerto Belgrano, Argentina	March 8

1. with A.R.A. BAHIA BLANCA

Chronology of VEMA Cruises (cont'd)

VEMA-12 (cont'd)

Leg 6, W. Pitman III, Ch. Sci.		
Puerto Belgrano, Argentina	March 13, 1957	
Puerto Belgrano, Argentina	March 27	
Leg 7, W. Beckmann, Ch. Sci.		
Puerto Belgrano, Argentina	March 31	
Cape Town, South Africa	April 24	
Leg 8, R. Menzies, Ch. Sci.		
Cape Town, South Africa	April 28	
Luanda, Angola	May 15	
Leg 9, R. Menzies, Ch. Sci.		
Luanda, Angola	May 18	
Recife, Brazil	June 15	
[2] Leg 10, J. Ewing, Ch. Sci.		
Recife, Brazil	June 21	
Port of Spain, Trinidad	July 8	
Leg 11, B. C. Heezen, Ch. Sci.		
Port of Spain, Trinidad	July 10	
Guantanamo, Cuba	July 13	
[1] Leg 12, C. L. Drake, Ch. Sci.		
Guantanamo, Cuba	August 4	
Port Everglades, Florida	August 13	
[1] Leg 13, C. L. Drake, Ch. Sci.		
Port Everglades, Florida	August 14	
Piermont, N.Y.	August 26	

1. with A.R.A. BAHIA BLANCA
2. with THETA

VEMA-13
Capt. H. C. Kohler, Master

Leg 1, J. L. Worzel, Ch. Sci.	
New York, N.Y.	October 19, 1957
New York, N.Y.	November 3

VEMA-14
Capt. H. C. Kohler, Master

Leg 1, A. Stockel, Ch. Sci.	
New York, N.Y.	November 8, 1957
St. George's, Bermuda	November 14
Leg 2, A. Stockel, Ch. Sci.	
St. George's, Bermuda	November 15
Recife, Brazil	December 12
Leg 3, A. Stockel, Ch. Sci.	
Recife, Brazil	December 15
Salvador, Brazil	December 19
Leg 4, W. Ludwig, Ch. Sci.	
Salvador, Brazil	December 20
Rio de Janeiro, Brazil	December 29
Leg 5, W. Ludwig, Ch. Sci.	
Rio de Janeiro, Brazil	January 2, 1958
Buenos Aires, Argentina	January 10
[1] Leg 6, M. Ewing, Ch. Sci.	
Buenos Aires, Argentina	January 16
Puerto Belgrano, Argentina	January 26

1. with A.R.A. SANAVIRON

VEMA-14 (cont'd)

[1]Leg 7, M. Ewing, Ch. Sci.		
Puerto Belgrano, Argentina		January 29, 1958
Ushuaia, Argentina		February 14
[1]Leg 8, M. Ewing, Ch. Sci.		
Ushuaia, Argentina		February 17
Saunders Is., So. Sandwich Is.		March 13
Leg 9, H.C. Kohler & T. Takahashi, Co-Ch. Sci.		
Saunders Is, So. Sandwich Is.		March 14
Cape Town, South Africa		April 7
[2]Leg 10, J. Nafe, Ch. Sci.		
Cape Town, South Africa		April 14
Durban, South Africa		April 23
[2]Leg 11, J. Nafe, Ch. Sci.		
Durban, South Africa		April 23
Port Louis, Mauritius		May 8
[3]Leg 12, J. Nafe, Ch. Sci.		
Port Louis, Mauritius		May 11
Aden		June 7
[3]Leg 13, C. L. Drake, Ch. Sci.		
Aden		June 9
Port Said, Egypt		June 30
[3]Leg 14, C. L. Drake, Ch. Sci.		
Port Said, Egypt		July 1
Alexandria, Egypt		July 4

1. with A.R.A. SANAVIRON
2. with URYSTAAD
3. with ATLANTIS

VEMA-14 (cont'd)

[3]Leg 15, C. L. Drake, Ch. Sci.		
Alexandria, Egypt		July 6, 1958
Naples, Italy		July 18
[3]Leg 16, C. L. Drake, Ch. Sci.		
Naples, Italy		July 23
Cadiz, Spain		August 5
Leg 17, C. Kershaw, Ch. Sci.		
Cadiz, Spain		August 7
Ponta Delgada, Azores		August 13
Leg 18, C. Kershaw, Ch. Sci.		
Ponta Delgada, Azores		August 13
Halifax, Nova Scotia		August 24
Leg 19, C. Kershaw, Ch. Sci.		
Halifax, Nova Scotia		September 5
New York, N.Y.		September 9

3. with ATLANTIS

VEMA-15

Leg 1, J. L. Worzel, Ch. Sci.		
New York, N.Y.		October 17, 1958
Savannah, Georgia		October 25
Leg 1A, J. L. Worzel, Ch. Sci.		
Savannah, Georgia		October 29
Charleston, South Carolina		October 30
Leg 2, J. L. Worzel, Ch. Sci.		
Charleston, South Carolina		October 30
Cristobal, Canal Zone		November 11

Chronology of VEMA Cruises (cont'd)

VEMA-15 (cont'd)

Leg 2A, J. L. Worzel, Ch. Sci.		
	Cristobal, Canal Zone	November 12, 1958
	Balboa, Canal Zone	November 12
Leg 3, J. L. Worzel, Ch. Sci.		
	Balboa, Canal Zone,	November 13
	Callao, Peru	December 13
Leg 4, R. Menzies, Ch. Sci.		
	Callao, Peru	December 16
	Valparaiso, Chile	January 2, 1959
[1]Leg 5, M. Ewing, Ch. Sci.		
	Valparaiso, Chile	January 6
	Talcahuano, Chile	January 14
[1]Leg 6, M. Ewing, Ch. Sci.		
	Talcahuano, Chile	January 16
	Puerto Montt, Chile	January 21
Leg 7, M. Ewing, Ch. Sci.		
	Puerto Montt, Chile	January 22
	Punta Arenas, Chile	February 2
[1]Leg 8, J. Ewing, Ch. Sci.		
	Punta Arenas, Chile	February 4
	Punta Arenas, Chile	February 7
Leg 8A, M. Ewing, Ch. Sci.		
	Punta Arenas, Chile	February 7
	Punta Arenas, Chile	February 14

1. with CASMA

VEMA-15 (cont'd)

[2]Leg 10, M. Ewing, Ch. Sci.		
	Puerto Gallegos, Argentina	February 23, 1959
	Ushuaia, Argentina	March 9
Leg 11, M. Ewing, Ch. Sci.		
	Ushuaia, Argentina	March 12
	Mar del Plata, Argentina	April 5
[2]Leg 12, M. Ewing, Ch. Sci.		
	Mar del Plata, Argentina	April 5
	Buenos Aires, Argentina	April 8
Leg 12A, R. Gerard, Ch. Sci.		
	Buenos Aires, Argentina	April 18
	Montevideo, Uruguay	April 19
Leg 13, R. Gerard, Ch. Sci.		
	Montevideo, Uruguay	April 19
	Recife, Brazil	May 4
Leg 14, R. Gerard, Ch. Sci.		
	Recife, Brazil	May 4
	San Juan, Puerto Rico	May 22
Leg 15, J. Nafe, Ch. Sci.		
	San Juan, Puerto Rico	May 25
	Roosevelt Roads, Puerto Rico	May 26
[3]Leg 16, J. Nafe, Ch. Sci.		
	Roosevelt Roads, Puerto Rico	May 27
	Charlotte Amalie, St. Thomas	June 14
[3]Leg 17, J. Nafe, Ch. Sci.		
	Charlotte Amalie, St. Thomas	June 16
	Miami, Florida	June 25

2. with A.R.A. SANAVIRON
3. with HIDALGO, BEAR, GIBBS

Chronology of VEMA Cruises (cont'd)

VEMA-15 (cont'd)

[4]Leg 18, J. Nafe, Ch. Sci.		
	Miami, Florida	June 26, 1959
	New York, N.Y.	July 15

4. with STATE STAR and GOLDBERGER

VEMA-16
Capt. H. C. Kohler, Master

[1]Leg 1, J. Ewing, Ch. Sci.		
	New York, N.Y.	October 1, 1959
	St. George's Bermuda	October 17
[1]Leg 2, J. Ewing, Ch. Sci.		
	St. George's Bermuda	October 20
	San Juan, Puerto Rico	October 30
Leg 3, R. Gerard, Ch. Sci.		
	San Juan, Puerto Rico	November 2
	Recife, Brazil	November 20
Leg 4, R. Gerard, Ch. Sci.		
	Recife, Brazil	November 22
	Cape Town, South Africa	December 21
Leg 5, C. Fray, Ch. Sci.		
	Cape Town, South Africa	December 27
	Port Louis, Mauritius	January 22, 1960
Leg 6, C. Fray, Ch. Sci.		
	Port Louis, Mauritius	January 25
	Fremantle, Australia	February 22
[2]Leg 7, J. Nafe, Ch. Sci.		
	Fremantle, Australia	February 26
	Adelaide, Australia	March 14

1. with SIR HORACE LAMB
2. with DIAMANTINA

VEMA-16 (cont'd)

Leg 8, J. Nafe, Ch. Sci.		
	Adelaide, Australia	March 16, 1960
	Wellington, New Zealand	April 7
[3]Leg 9, C. L. Drake, Ch. Sci.		
	Wellington, New Zealand	April 11
	Ushuaia, Argentina	May 12
Leg 10, M. Ewing, Ch. Sci.		
	Ushuaia, Argentina	May 14
	Buenos Aires, Argentina	June 10
[3]Leg 11, M. Ewing, Ch. Sci.		
	Buenos Aires, Argentina	June 15
	Rio de Janeiro, Brazil	June 30
Leg 12, R. Gerard, Ch. Sci.		
	Rio de Janeiro, Brazil	July 2
	Lunenburg, Nova Scotia	August 1
Leg 12A, R. Gerard, Ch. Sci.		
	Lunenburg, Nova Scotia	August 4
	Halifax, Nova Scotia	August 4
[4]Leg 13, C. L. Drake, Ch. Sci.		
	Halifax, Nova Scotia	August 8
	Argentia, Newfoundland	August 12
[4]Leg 14, C. L. Drake, Ch. Sci.		
	Argentia, Newfoundland	August 12
	Julianehaab, Greenland	August 22
[4]Leg 15, C. L. Drake, Ch. Sci.		
	Julianehaab, Greenland	August 25
	St. Pierre Island	September 9

3. with CAPITAN CANEPA
4. with SACKVILLE

Chronology of VEMA Cruises (cont'd)

VEMA-16 (cont'd)

Leg 16, C. L. Drake, Ch. Sci.		
	St. Pierre Island	September 9, 1960
	Lunenburg, Nova Scotia	September 12
Leg 17, C. L. Drake, Ch. Sci.		
	Lunenberg, Nova Scotia	September 15
	New York, N.Y.	September 22

VEMA-17
Capt. H. C. Kohler, Master

Leg 1, J. L. Worzel, Ch. Sci.		
	New York, N.Y.	December 9, 1960
	St. George's, Bermuda	December 13
Leg 2, J. L. Worzel, Ch. Sci.		
	St. George's, Bermuda	December 14
	Key West, Florida	December 24
[1] Leg 3, J. L. Worzel,, Ch. Sci.		
	Key West, Florida	December 27
	Galveston, Texas	January 9, 1961
[1] Leg 4, J. L. Worzel, Ch. Sci.		
	Galveston, Texas	January 11
	Cristobal, Panama	February 14
Leg 5, J. R. Heirtzler, Ch. Sci.		
	Balboa, Panama	February 18
	Valparaiso, Chile	March 9
Leg 6, J. Hennion, Ch. Sci.		
	Valparaiso, Chile	March 11
	Talcahuano, Chile	March 18
Leg 7, W. Pitman III, Ch. Sci.		
	Talcahuano, Chile	March 20
	Punta Arenas, Chile	March 30

1. with HIDALDO

VEMA-17 (cont'd)

[2] Leg 8, W. Pitman III, Ch. Sci.		
	Punta Arenas, Chile	April 1, 1961
	Punta Arenas, Chile	April 5
[2] Leg 9, M. Ewing, Ch. Sci.		
	Punta Arenas, Chile	April 11
	Puerto Williams, Chile	April 29
[3] Leg 10, M. Ewing, Ch. Sci.		
	Ushuaia, Argentina	May 4
	Puerto Belgrano, Argentina	May 19
[3] Leg 11, M. Ewing, Ch. Sci.		
	Puerto Belgrano, Argentina	May 22
	Buenos Aires, Argentina	June 21
Leg 12, M. Talwani, Ch. Sci.		
	Buenos Aires, Argentina	June 26
	Dakar, Senegal	July 18
Leg 13, M. Talwani, Ch. Sci.		
	Dakar, Senegal	July 19
	Halifax, Nova Scotia	August 6
[4] Leg 14, C. L. Drake, Ch. Sci.		
	Halifax, Nova Scotia	August 11
	Halifax, Nova Scotia	August 15
[4] Leg 15, C. L. Drake, Ch. Sci.		
	Halifax, Nova Scotia	August 18
	Argentia, Newfoundland	August 25
Leg 16, C. L. Drake, Ch. Sci.		
	Argentia, Newfoundland	August 25
	Halifax, Nova Scotia	September 17

2. with YELCHO
3. with CAPITAN CANEPA
4. with SACKVILLE

Chronology of VEMA Cruises (cont'd)

VEMA-17 (cont'd)

Leg 17, J. L. Worzel, Ch. Sci.		
	Halifax, Nova Scotia	September 23, 1961
	New York, New York	September 30

VEMA - 17 CREW LIST

	NAME	POSITION	LEG NUMBERS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	H. Kohler	Master	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2.	B. Amirault	Ch. Off.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.	H. Dutin	2nd Off.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.	M. O'Connor	3rd Off.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5.	P. Rafuse	W.T.O.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6.	L. Longue	Bosun	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7.	C. Tanner	A.B.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8.	A. Antle	A.B.	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
9.	A. Johnson	A.B.	X	X	X	X	X	X	X	X	X	X	X	X	X				
10.	S. Dagley	O.S.	X	X	X	X	X	X	X	X	X	X	X	X	X				
11.	J. Ritcey	O.S.	X	X	X	X	X	X	X	X	X	X	X	X	X				
12.	P. Crouse	O.S.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13.	H. Skjerding	Ch. Eng.	X	X	X											1			X
14.	C. Pentz	2nd Eng.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15.	R. Beck	3rd Eng.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16.	B. Tanner	Wiper	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
17.	W. Corson	Ch. Stew.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18.	R. Bonc	Cook	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
19.	K. Tanner	Messman	X	X	X	X	X	X	X	X	X	X	X	X	X				
20.	W. Demone	Messman	X	X	X	X	X	X	X	X	X	X	X	X	X				
21.	J. Worzel	Ch. Sci.	X	X	X	X													X
22.	S. Gereben	SOS	X	X															
23.	M. Hawkins	SOS	X	X															
24.	B. Loncarevic	SOS	X	X															
25.	W. Pitman	SOS	X	X	X	X	X	X	2	2	2	X	X	X	X	X	X	X	
26.	J. Mills	SOS	X	X															
27.	E. Thebis	SOS	X	X	X														
28.	P. Dehlinger	SOS	X	X															
29.	J. Houtermans	SOS	X	X	X	X	X	X	X	X	X								
30.	C. Windisch	SOS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3	3	X

1. On Leg 14, H. Skjerding's position was SOS.
2. On Legs 7, 8, and 9, W. Pitman's position was Ch. Scientist.
3. On Canadian vessel Sackville.

VEMA - 17 CREW LIST

	NAME	POSITION	LEG NUMBERS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
31.	A. Corney	Core Bos.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
32.	E. Lewis	Core A.B.	X	X	X	X	X	X	X	X	7	X	X	X	X	X	X	X	X
33.	R. Stevens	Core O.S.	X	X	X	X	X	X	X	X	X	X	X	X	X				
34.	P. Centeno	SOS	X	X	X	X	X	X	X	X	X	X	X						
35.	E. Kohler	Stwdss.	X	X	X	X				X									
36.	J. Ewing	SOS			X	4													X
37.	G. Tirey	SOS			X	4													
38.	S. Gerber	SOS			X	4													
39.	B. Marsh	SOS			X	X	X												
40.	G. Cobb	SOS			X														
41.	S. Yungul	SOS			X														
42.	D. Koelsch	SOS			X	4													
43.	J. Coffill	Ch. Engineer				X	X	X	X	X	X	X	X	X	X	X	X	X	
44.	J. Zaiane	SOS				X													
45.	A. Correa	SOS				X													
46.	E. Zwirba	SOS				X	X	X	X	X	X	X	X	X	X	X	X	X	X
47.	H. Iglesias	SOS				5	X	X											
48.	S. Friedman	SOS				5													
49.	K. Turekian	SOS				5													
50.	J. Heirtzler	Ch. Scientist					X												
51.	J. Hennion	Ch. Scientist					6	X											
52.	C. Buchanan	SOS						X	X	7	7	8	8	X					
53.	Tom Dow	SOS						X	X	X	X	X	X	X	X	X	X	X	
54.	M. Jones	SOS						X	X										
55.	D. Kemerer	SOS						X											
56.	A. Lonardi	SOS						X	X	X	X	X	X						X
57.	H. Seiver	SOS						X											
58.	T. Willis	SOS								X	7	8	8	X	X	X	X	X	X
59.	G. Wolski	SOS								X	X	X							
60.	M. Sepulveda	SOS									X								

4. Got off at Grand Cayman
5. Got on at Grand Cayman
6. On Leg 5, J. Hennion's position was SOS
7. On Chilean vessel Yelcho
8. On Argentine vessel Capitan Canepa

VEMA - 17 CREW LIST

	NAME	POSITION	LEG NUMBERS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
61.	M. Ewing	Ch. Scientist										X	X						
62.	L. Dawson	SOS										X	X	X	X				
63.	A. Hubbard	SOS										X	X	X	X				
64.	D. Squires	SOS										X	X						
65.	M. Talwani	Ch. Scientist												X	X				
66.	D. Prentiss	SOS										8	8	X	X				
67.	P. Grim	SOS												X	X	X	X	X	
68.	E. Egas	SOS												X	X				
69.	S. Mangione	SOS												X	X				
70.	A. Be	SOS													X				
71.	J. Eisenhauer	A.B.														X	X	X	X
72.	J. Lamb	O.S.														X	X	X	X
73.	G. Morash	O.S.														X	X	X	X
74.	D. Conrad	Messman														X	X	X	X
75.	M. Knickle	Messman														X	X	X	X
76.	C. Drake	Ch. Scientist														X	X	X	
77.	E. Zurflueth	SOS														X	X		
78.	E. Dahlberg	SOS														X	X	X	
79.	P. Hannams	SOS														X	X	X	X
80.	D. Hayes	SOS														X	X	X	
81.	T. Dow	SOS														X	X	X	X
82.	S. Lewis	SOS														X	X	X	
83.	L. Fruth	SOS														X	X	X	X
84.	M. Langseth	SOS														X	X	X	X
85.	C. Reid	A.B.															X	X	X
86.	G. Sanders	SOS															X	X	
87.	E. Anthony	SOS															X	9	
88.	V. Sinclair	Master																	X
89.	G. Peter	SOS								7	7	8	8						X
90.	J. Bastin	SOS																	X
91.	R. Capo	SOS.																	X
92.	R. Zaunere	SOS																	X
93.	L. O'Connor	Stwdss																	X
94.	J. Nafe	SOS															9	9	

9. Got off at Julianehaab

VEMA - 17 CREW LIST

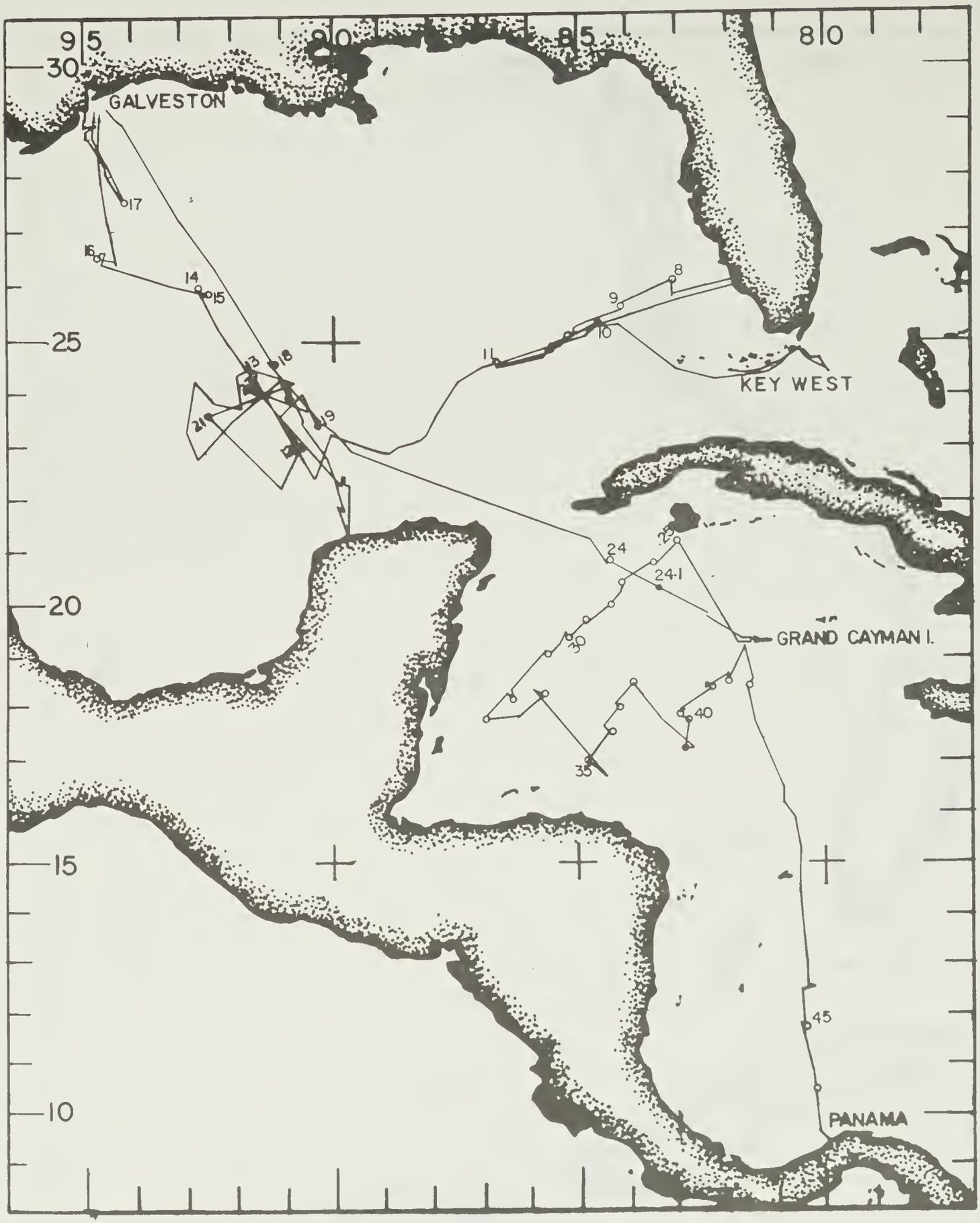
	NAME	POSITION	LEG NUMBERS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
61.	M. Ewing	Ch. Scientist										X	X						
62.	L. Dawson	SOS										X	X	X	X				
63.	A. Hubbard	SOS										X	X	X	X				
64.	D. Squires	SOS										X	X						
65.	M. Talwani	Ch. Scientist												X	X				
66.	D. Prentiss	SOS										8	8	X	X				
67.	P. Grim	SOS												X	X	X	X	X	
68.	E. Egas	SOS												X	X				
69.	S. Mangione	SOS												X	X				
70.	A. Be	SOS													X				
71.	J. Eisenhauer	A.B.														X	X	X	X
72.	J. Lamb	O.S.														X	X	X	X
73.	G. Morash	O.S.														X	X	X	X
74.	D. Conrad	Messman														X	X	X	X
75.	M. Knickle	Messman														X	X	X	X
76.	C. Drake	Ch. Scientist														X	X	X	
77.	E. Zurflueth	SOS														X	X		
78.	E. Dahlberg	SOS														X	X	X	
79.	P. Hannams	Core O.S.														X	X	X	X
80.	D. Hayes	SOS														X	X	X	
81.	Tim Dow	SOS														X	X	X	X
82.	S. Lewis	SOS														X	X	X	
83.	L. Fruth	SOS														X	X	X	X
84.	M. Langseth	SOS														X	X	X	X
85.	C. Reid	A.B.															X	X	X
86.	G. Sanders	SOS															X	X	
87.	E. Anthony	SOS															X	9	
88.	V. Sinclair	Master																	X
89.	G. Peter	SOS								7	7	8	8						X
90.	J. Bastin	SOS																	X
91.	R. Capo	SOS																	X
92.	R. Zaunere	SOS																	X
93.	L. O'Connor	Stwdss																	X
94.	J. Nafe	SOS															3	3	

9. Got off at Julianehaab


90
60
30
0
60
30
0
30
60
VEMA-17
DEC. 9, 1960 —
SEPT. 30, 1961



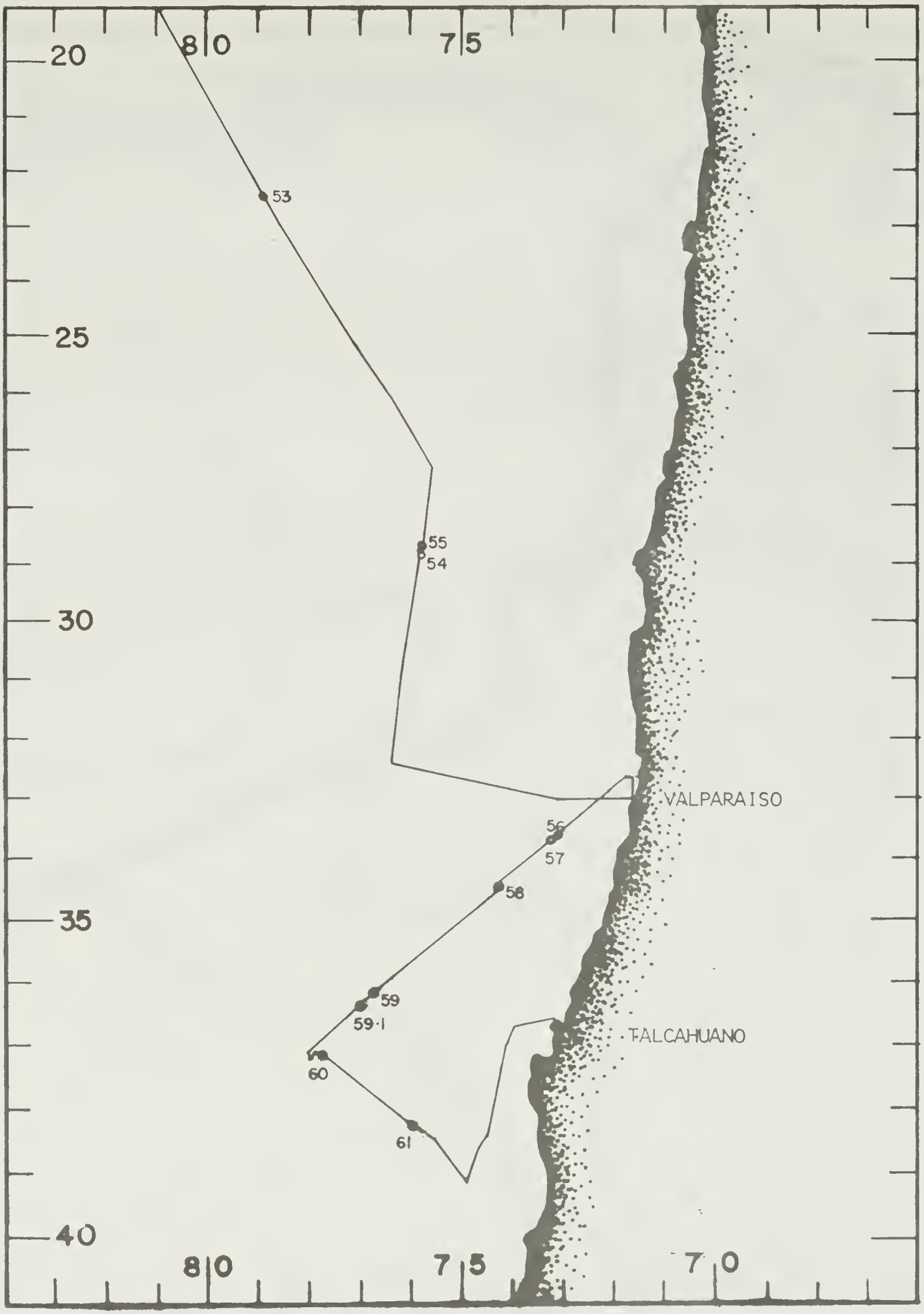
LEGS 1 AND 2


95
90
85
80
30
25
20
15
10
GALVESTON
KEY WEST
GRAND CAYMAN I.
PANAMA
17
16
14
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24-1
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45

LEGS 3, 4, AND 5

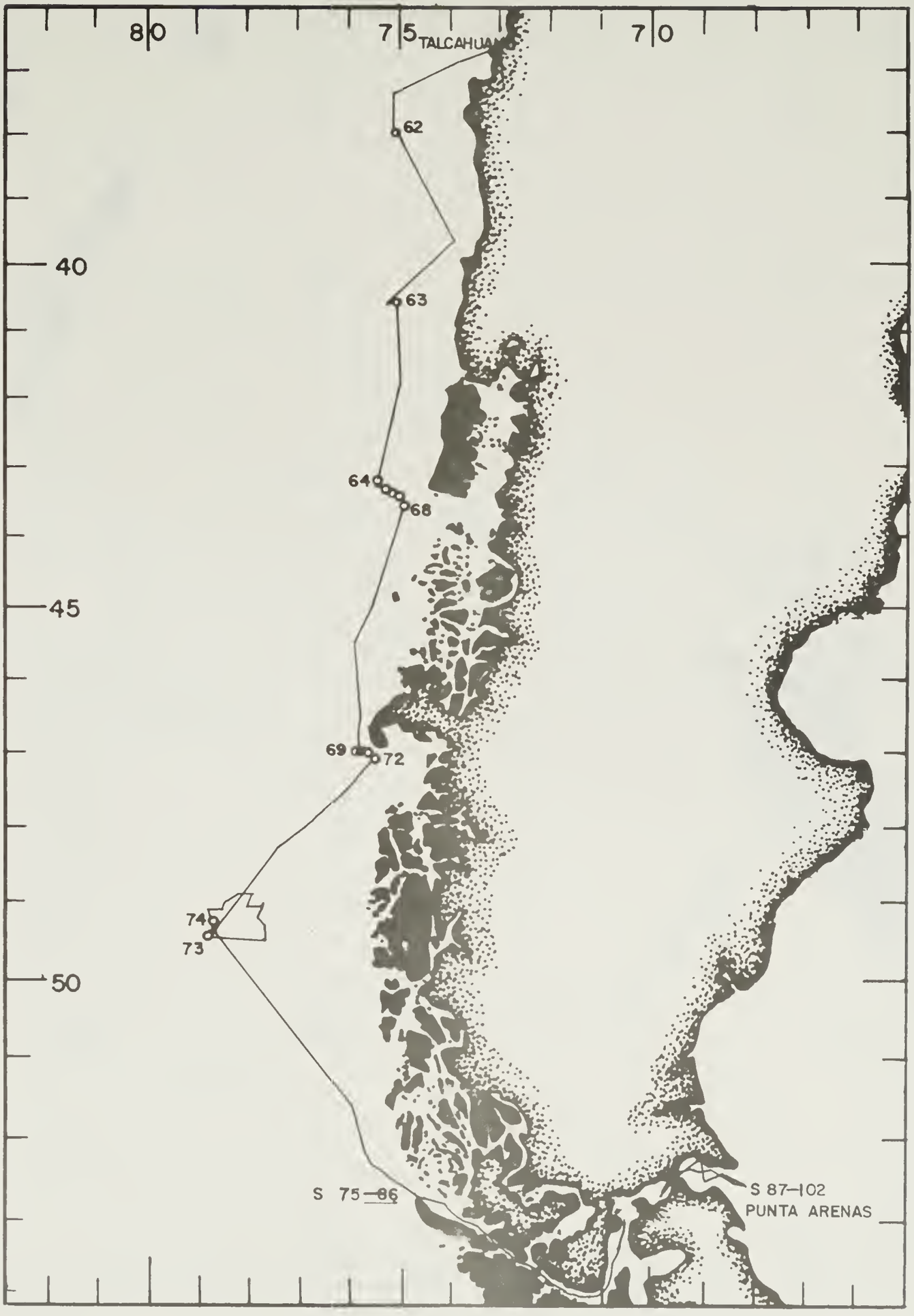


FIRST PART OF LEG 6

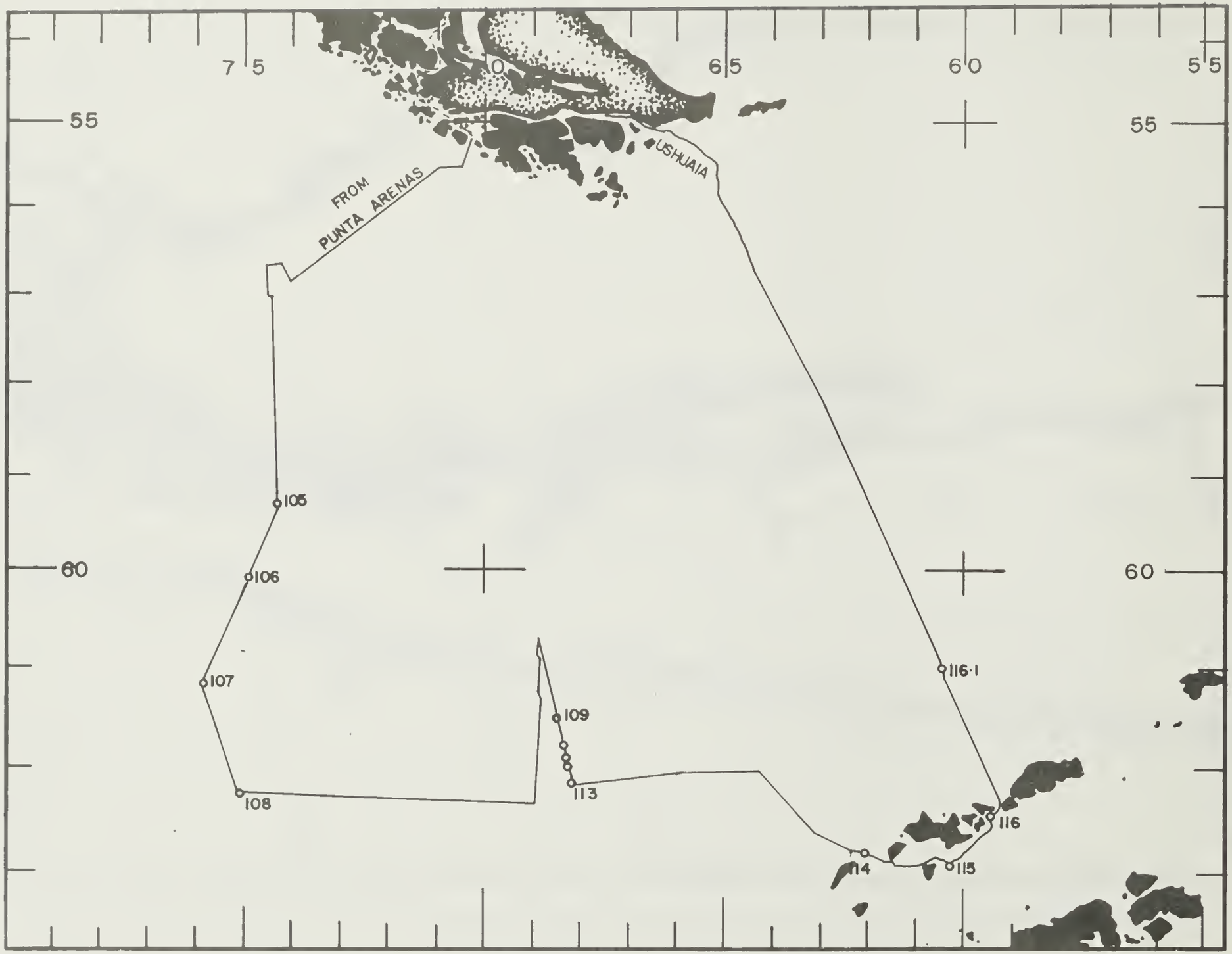


LAST PART OF LEG 6

LEG 7A

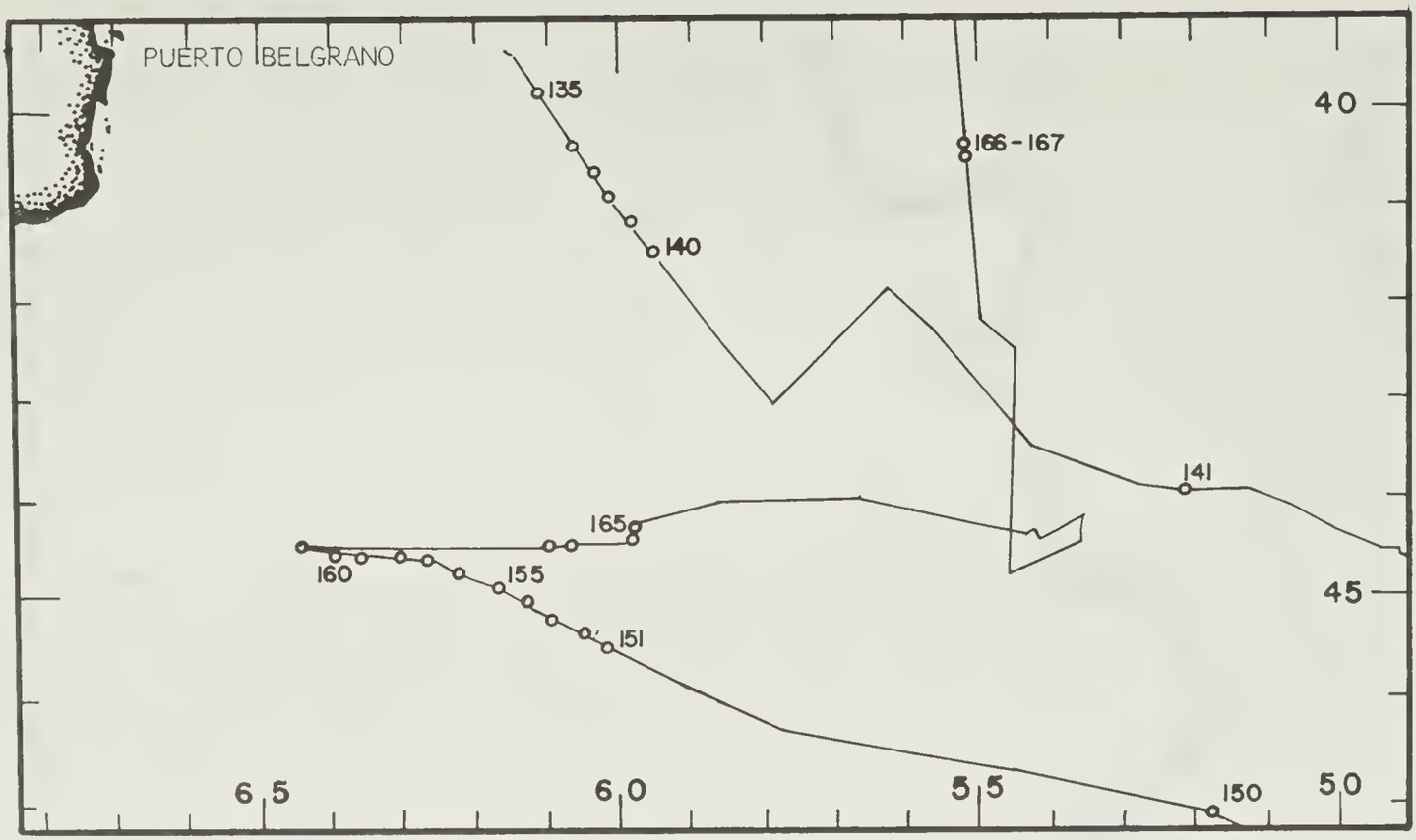

80
75
TALCAHUANO
70
62
40
63
64
68
45
69
72
74
73
50
S 75—86
S 87—102
PUNTA ARENAS

LEGS 7B AND 8

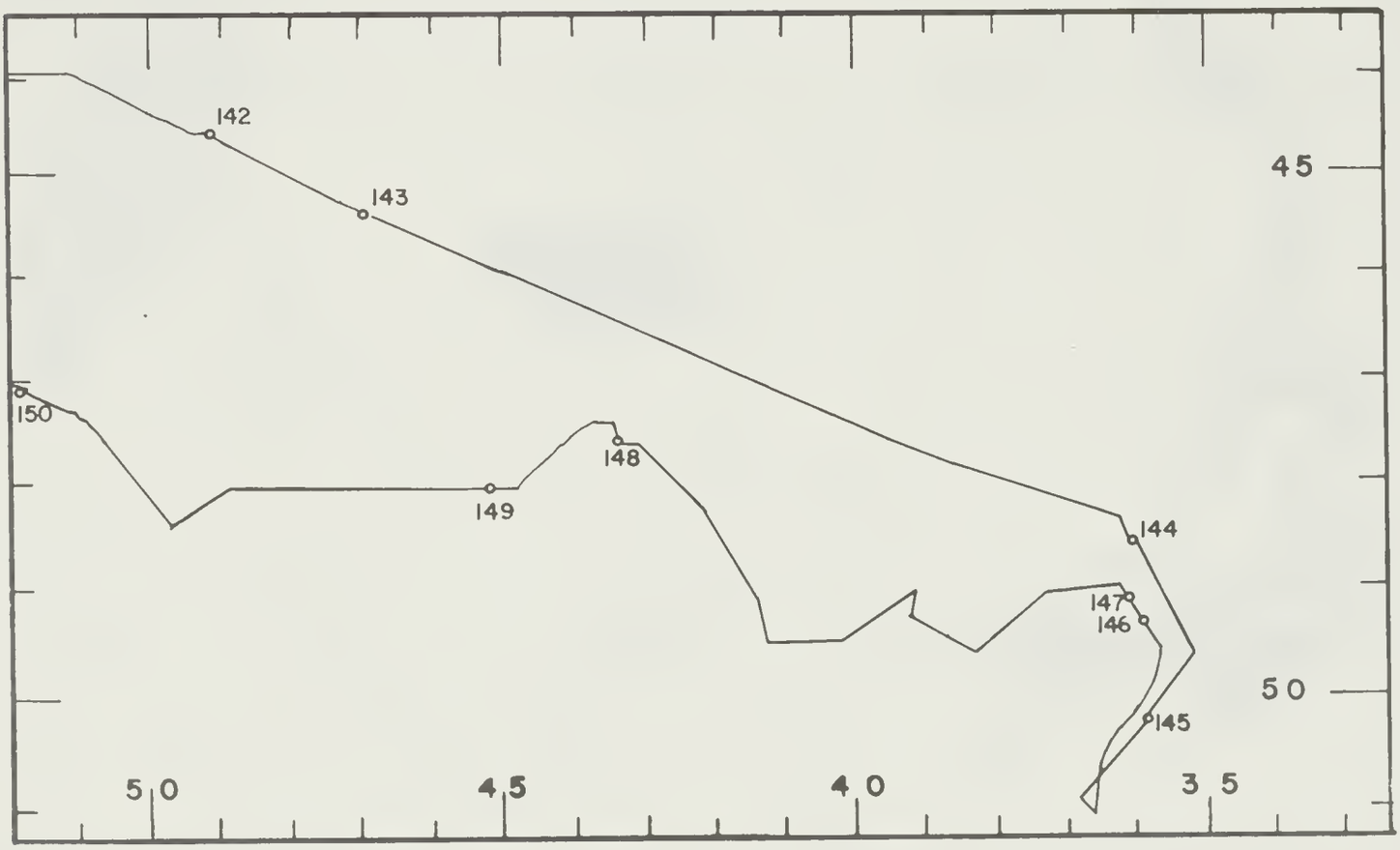

7 5
0
6 5
6 0
5 5
55
55
60
60
FROM
PUNTA ARENAS
USHUAIA
105
106
107
108
109
113
114
115
116
116·1

LEG 9

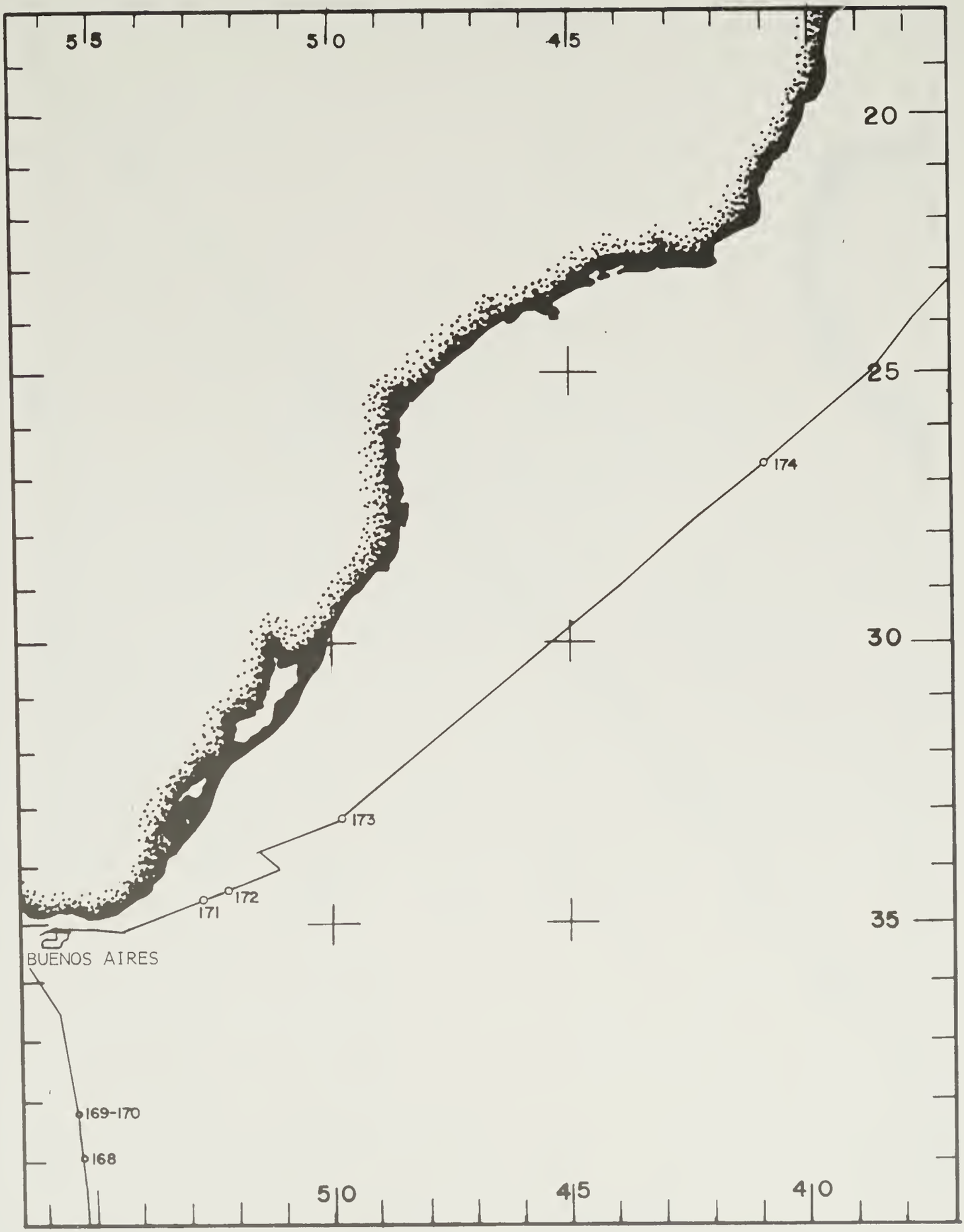

7 0
6 5
6 0
5 5
40
45
50
55
134
PUERTO BELGRANO
130
128
S87-102
125
126
120
123
FROM USHUAIA
124



FIRST PART OF LEG 11

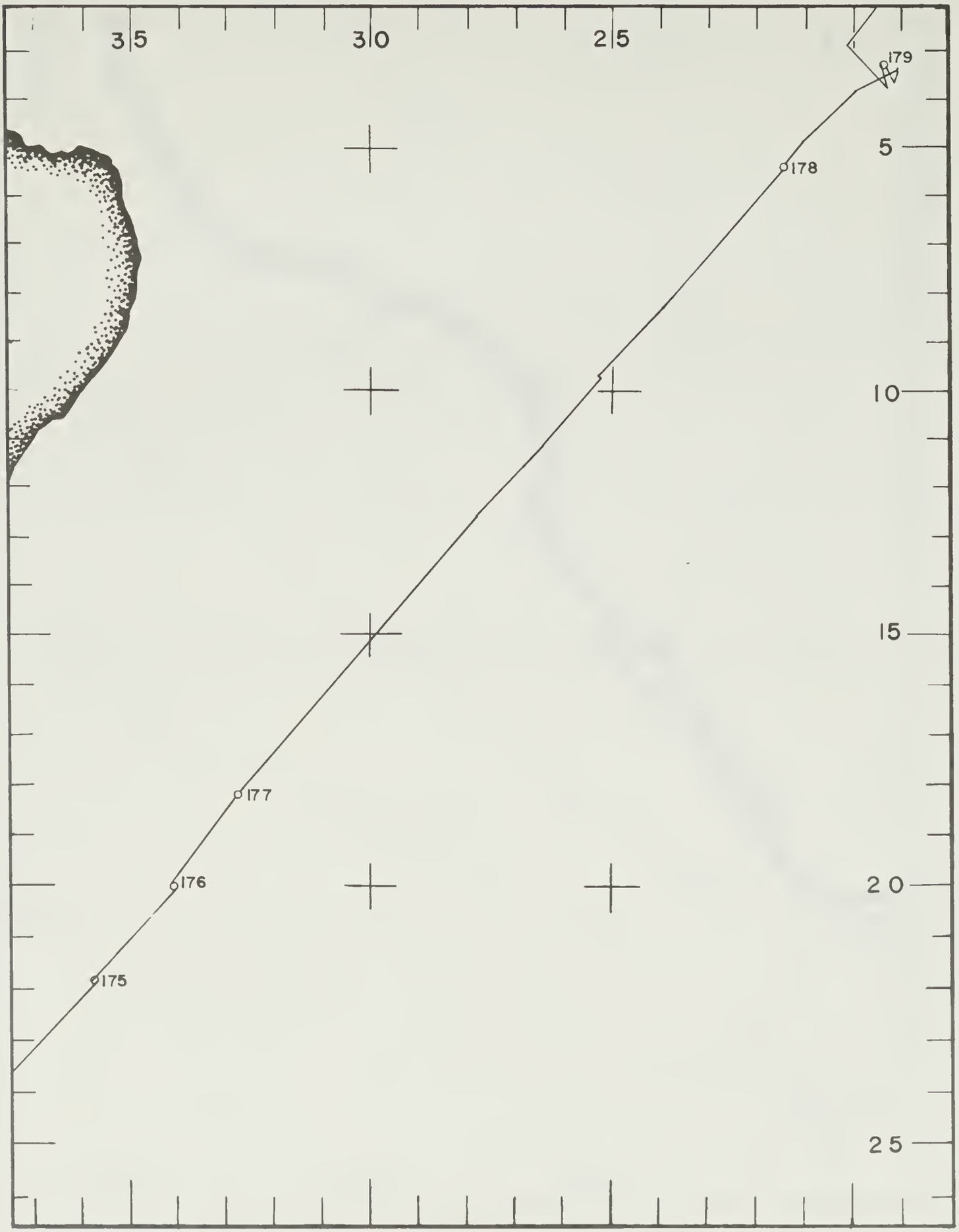


SECOND PART OF LEG 11

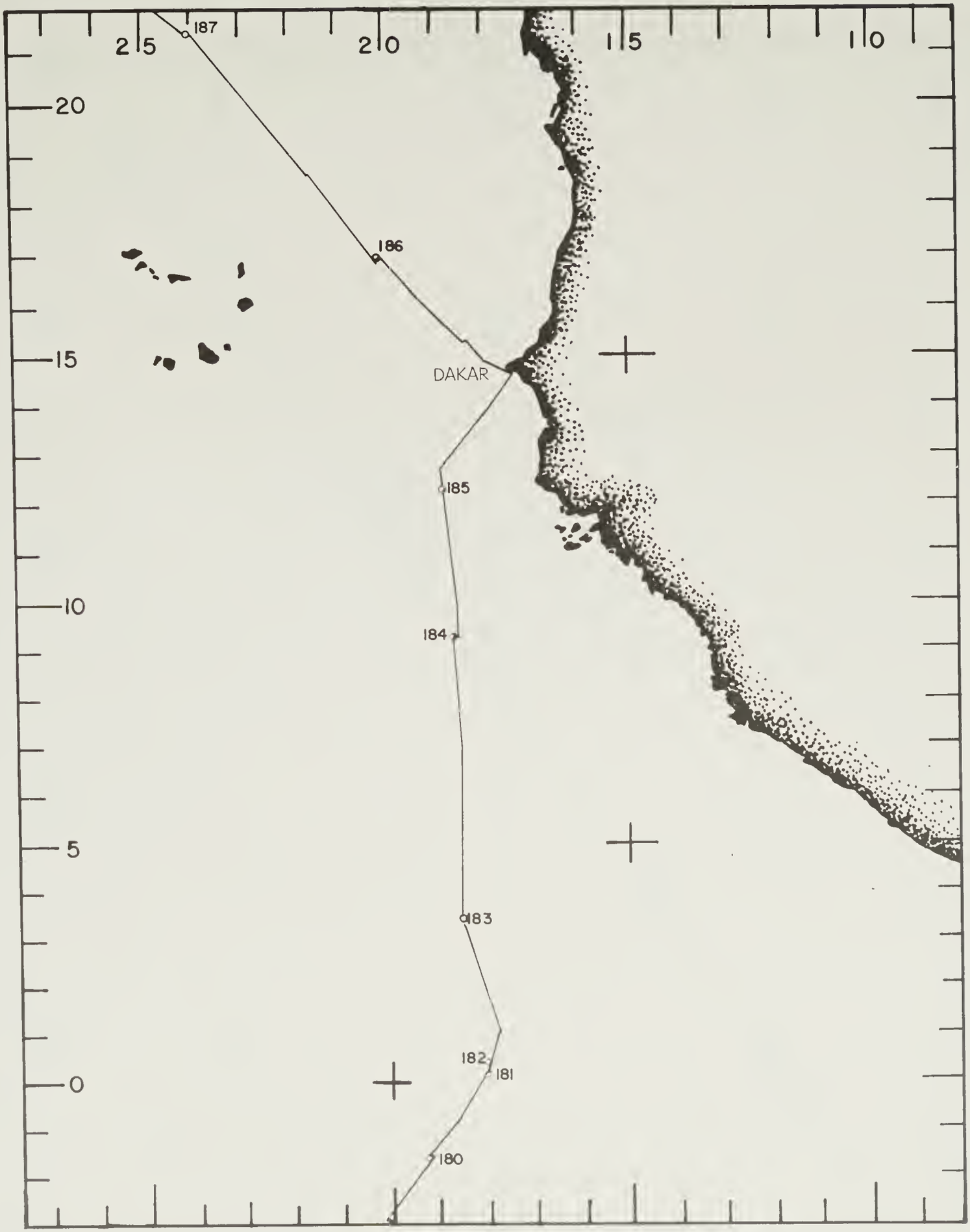


LAST PART OF LEG 11

FIRST PART OF 3 OF LEG 12

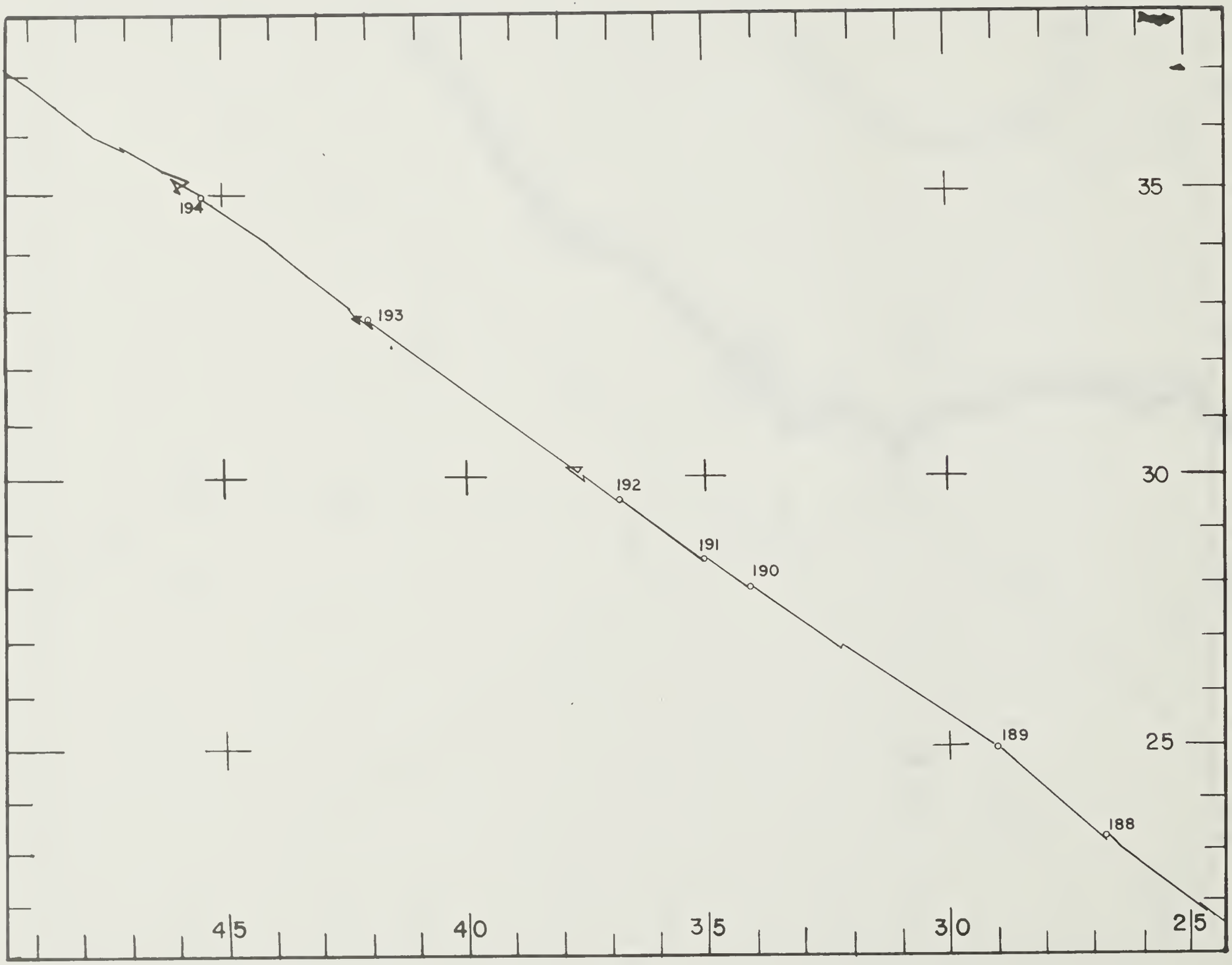


SECOND PART OF LEG 12

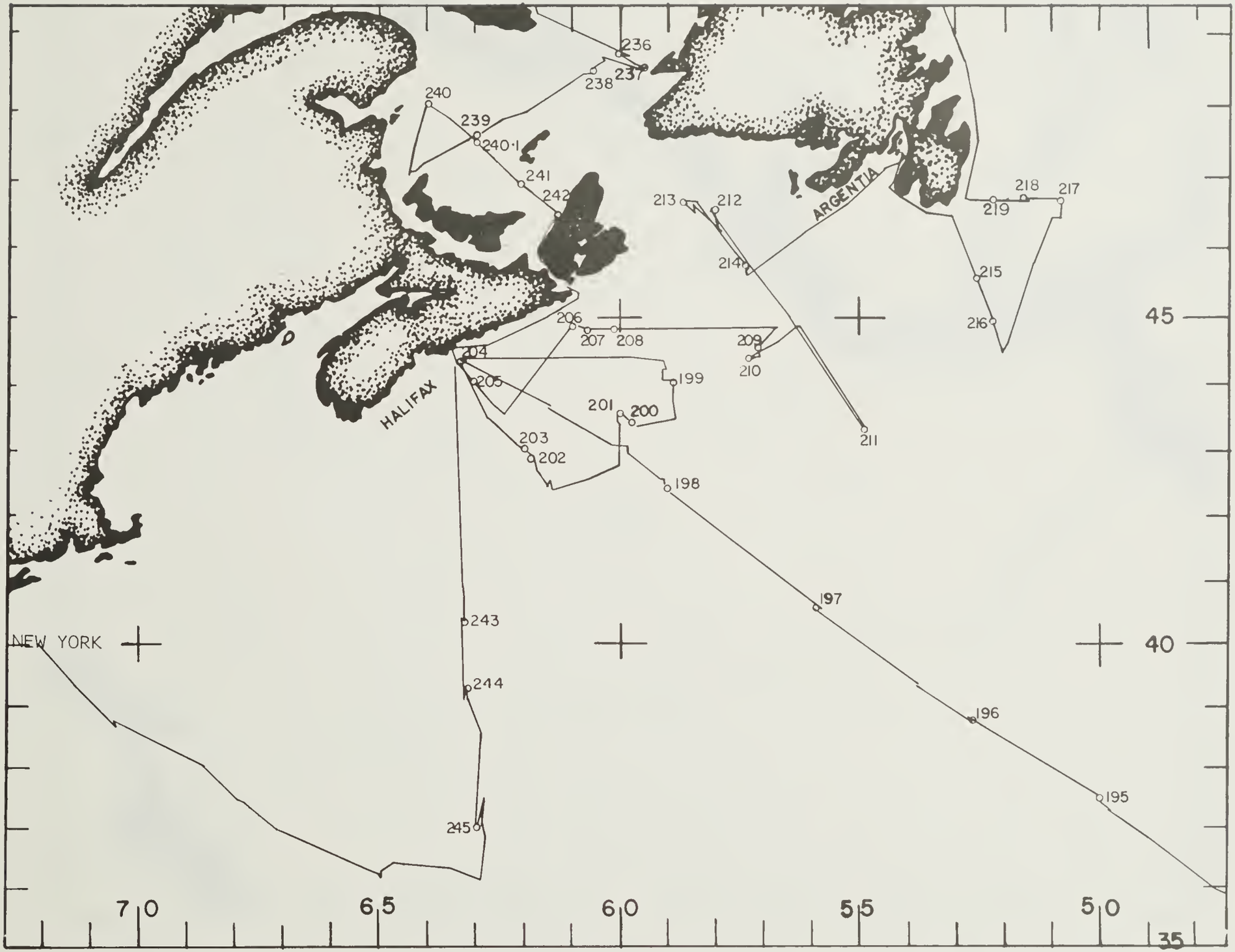


LAST PART OF LEG 12

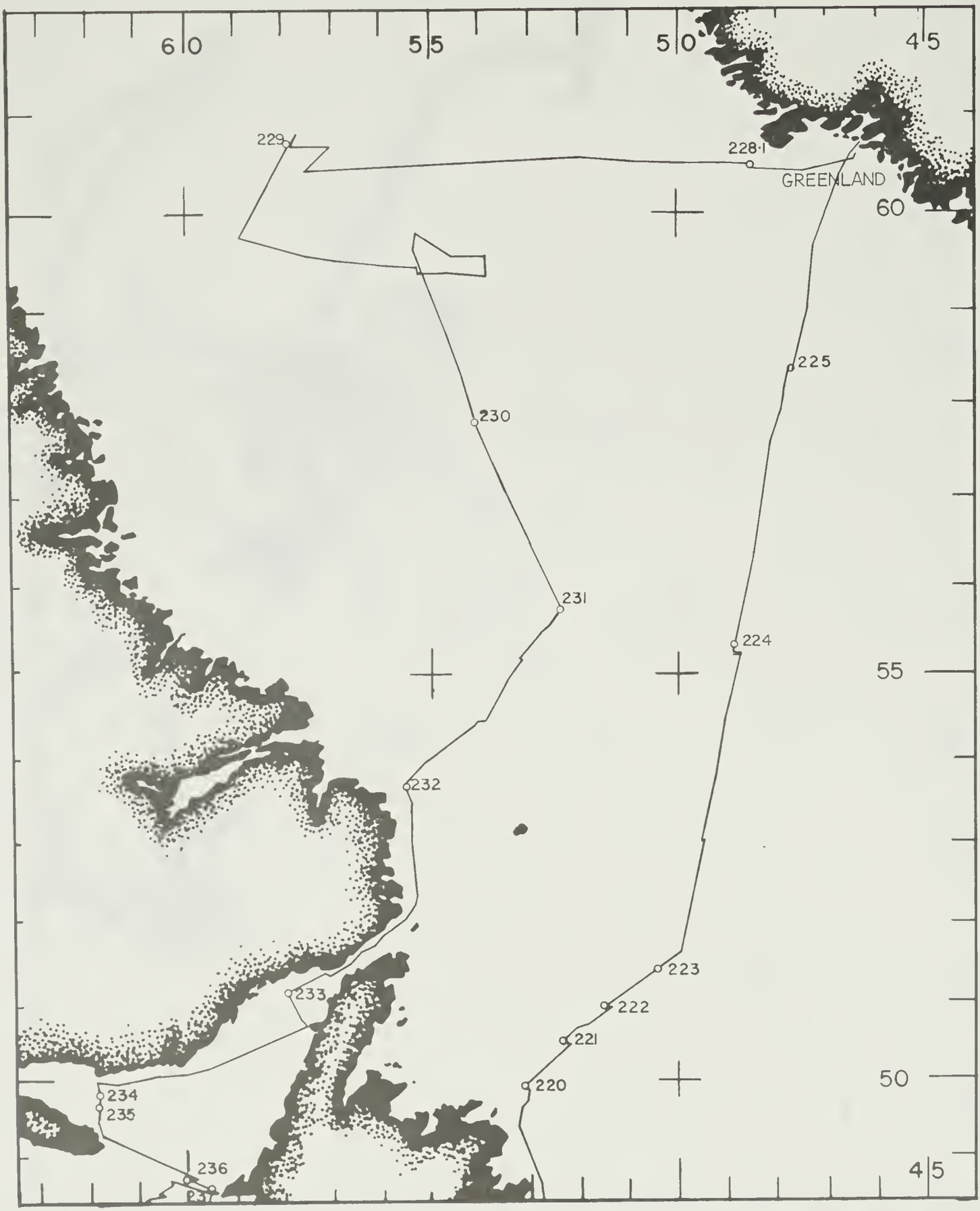
FIRST PART OF 3 OF LEG 13



SECOND PART OF LEG 13



LAST PART OF LEG 13, LEGS 14 AND 15, FIRST PART OF LEG 16, LAST PART OF LEG 16, AND LEG 17



MIDDLE OF LEG 16

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
9	12	1960	5.0	1458	40 27.0	-73 50.0	0.0	12.5	90	56601.
9	12	1960	5.0	16 0	40 27.0	-73 33.0	12.9	11.8	92	56553.
9	12	1960	5.0	1733	40 26.5	-73 9.0	31.2	10.2	142	56482.
9	12	1960	5.0	2057	39 59.0	-72 41.0	66.0	8.4	169	56240.
9	12	1960	5.0	2126	39 55.0	-72 40.0	70.1	10.8	92	56214.
9	12	1960	5.0	2230	39 54.5	-72 25.0	81.6	11.2	180	56166.
9	12	1960	5.0	23 5	39 48.0	-72 25.0	88.1	6.6	255	56128.
9	12	1960	5.0	2323	39 47.5	-72 27.5	90.1	5.2	235	56132.
10	12	1960	5.0	055	39 43.0	-72 36.0	98.1	10.8	146	56131.
10	12	1960	5.0	830	38 35.0	-71 37.5	179.8	10.6	151	55538.
10	12	1960	5.0	1112	38 10.0	-71 20.0	208.3	11.3	136	55325.
10	12	1960	5.0	1515	37 37.0	-70 40.0	254.0	11.0	125	54985.
10	12	1960	5.0	17 0	37 26.0	-70 20.0	273.3	13.4	128	54848.
10	12	1960	5.0	19 7	37 8.5	-69 52.0	301.6	11.7	144	54639.
10	12	1960	5.0	21 5	36 50.0	-69 35.0	324.6	11.0	145	54458.
11	12	1960	5.0	815	35 9.5	-68 8.0	447.3	11.8	148	53456.
11	12	1960	5.0	10 6	34 51.0	-67 54.0	469.0	11.2	139	53273.
11	12	1960	5.0	12 0	34 35.0	-67 36.8	490.4	7.4	139	53094.
11	12	1960	5.0	1325	34 27.0	-67 28.5	500.9	1.4	5	53005.
11	12	1960	5.0	1645	34 31.5	-67 28.0	505.4	3.3	132	53037.
11	12	1960	5.0	1726	34 30.0	-67 26.0	507.6	9.9	138	53018.
11	12	1960	5.0	2025	34 8.0	-67 2.0	537.3	10.0	139	52768.
11	12	1960	5.0	2129	34 0.0	-66 53.5	547.9	9.6	136	52677.
11	12	1960	5.0	2325	33 46.5	-66 38.0	566.6	8.2	144	52518.
12	12	1960	5.0	755	32 50.5	-65 49.0	635.9	6.6	140	51906.
12	12	1960	5.0	8 7	32 49.5	-65 48.0	637.2	7.3	19	51894.
12	12	1960	5.0	912	32 57.0	-65 45.0	645.2	6.7	344	51941.
12	12	1960	5.0	940	33 0.0	-65 46.0	648.3	9.1	0	51967.
12	12	1960	5.0	10 3	33 3.5	-65 46.0	651.8	0.5	180	51994.
12	12	1960	5.0	12 0	33 2.5	-65 46.0	652.8	4.1	351	51987.
12	12	1960	5.0	1322	33 8.0	-65 47.0	658.3	9.0	102	52033.
12	12	1960	5.0	17 0	33 1.0	-65 9.0	690.9	8.1	113	51831.
12	12	1960	5.0	1942	32 52.5	-64 45.0	712.8	3.3	107	51670.
12	12	1960	5.0	2118	32 51.0	-64 39.0	718.1	10.2	12	51635.
12	12	1960	5.0	2230	33 3.0	-64 36.0	730.3	6.2	16	51714.
12	12	1960	5.0	2245	33 4.5	-64 35.5	731.9	5.4	292	51724.
12	12	1960	5.0	23 0	33 5.0	-64 37.0	733.2	6.1	172	51734.
13	12	1960	5.0	0 0	32 59.0	-64 36.0	739.3	5.8	170	51684.
13	12	1960	4.0	430	32 39.0	-64 32.0	759.6	7.2	166	51514.
13	12	1960	4.0	7 0	32 21.5	-64 27.0	777.6	5.5	282	51358.
13	12	1960	4.0	820	32 23.0	-64 35.5	784.9			51404.

VEMA 1702 BERMUDA - KEY WEST

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
14	12	1960	4.0	1122	32 21.5	-64 36.8	0.0	11.9	186	51397.
14	12	1960	4.0	12 0	32 14.0	-64 37.7	7.5	10.1	185	51342.
14	12	1960	4.0	2018	30 50.5	-64 46.5	91.4	10.2	185	50708.
15	12	1960	4.0	115	30 0.0	-64 52.0	142.1	8.9	186	50311.
15	12	1960	4.0	1130	28 29.0	-65 3.0	233.6	0.0	90	49573.
15	12	1960	4.0	12 0	28 29.0	-65 3.0	233.6	1.8	41	49573.
15	12	1960	4.0	1245	28 30.0	-65 2.0	234.9	9.1	184	49578.
15	12	1960	4.0	20 7	27 23.0	-65 7.0	302.1	9.3	184	49000.
15	12	1960	4.0	2236	27 0.0	-65 9.0	325.1	9.7	188	48799.
16	12	1960	4.0	0 0	26 46.5	-65 11.0	338.8	10.7	189	48683.
16	12	1960	4.0	810	25 20.5	-65 26.5	425.9	10.7	190	47937.
16	12	1960	4.0	1021	24 57.5	-65 31.0	449.2	1.1	193	47733.
16	12	1960	4.0	1218	24 55.5	-65 31.5	451.3	0.8	241	47716.
16	12	1960	4.0	1340	24 55.0	-65 32.5	452.3	10.0	182	47714.
16	12	1960	4.0	1710	24 20.0	-65 34.0	487.4	10.3	189	47383.
16	12	1960	4.0	18 3	24 11.0	-65 35.5	496.5	10.1	190	47301.
16	12	1960	4.0	20 7	23 50.5	-65 39.5	517.3	10.0	212	47114.
16	12	1960	4.0	2146	23 36.5	-65 49.0	533.8	10.4	190	47008.
16	12	1960	4.0	2346	23 16.0	-65 53.0	554.6	10.9	188	46818.
17	12	1960	4.0	115	23 0.0	-65 55.5	570.8	10.7	188	46667.
17	12	1960	4.0	645	22 1.5	-66 4.5	629.8	10.8	179	46108.
17	12	1960	4.0	1220	21 1.0	-66 3.0	690.4	10.5	180	45488.
17	12	1960	4.0	1810	20 0.0	-66 3.0	751.4	6.0	180	44858.
17	12	1960	4.0	1820	19 59.0	-66 3.0	752.4	10.6	179	44847.
17	12	1960	4.0	2240	19 13.0	-66 2.5	798.4	11.4	178	44365.
18	12	1960	4.0	230	18 29.5	-66 0.5	841.9	10.6	314	43902.
18	12	1960	4.0	613	18 57.0	-66 30.5	881.4	10.9	316	44273.
18	12	1960	4.0	8 5	19 11.5	-66 45.5	901.7	10.9	316	44466.
18	12	1960	4.0	10 0	19 26.5	-67 1.0	922.7	9.6	317	44665.
18	12	1960	4.0	1227	19 43.8	-67 18.0	946.2	10.5	318	44891.
18	12	1960	4.0	1315	19 50.0	-67 24.0	954.6	1.7	242	44972.
18	12	1960	4.0	1821	19 46.0	-67 32.0	963.2	1.4	137	44950.
18	12	1960	4.0	2017	19 44.0	-67 30.0	965.9	9.8	0	44924.
18	12	1960	4.0	21 0	19 51.0	-67 30.0	972.9	0.7	242	44998.
18	12	1960	4.0	2354	19 50.0	-67 32.0	975.0	8.0	133	44992.
19	12	1960	4.0	111	19 43.0	-67 24.0	985.3	9.6	348	44898.
19	12	1960	4.0	3 0	20 0.0	-67 28.0	1002.7	9.4	347	45087.
19	12	1960	4.0	6 3	20 28.0	-67 35.0	1031.5	10.4	180	45399.
19	12	1960	4.0	845	20 0.0	-67 35.0	1059.5	11.5	178	45105.
19	12	1960	4.0	1227	19 17.6	-67 33.5	1101.9	10.3	185	44653.
19	12	1960	4.0	16 0	18 41.0	-67 37.0	1138.7	9.6	177	44272.
19	12	1960	4.0	2024	17 59.0	-67 35.0	1180.7	9.8	270	43817.
19	12	1960	4.0	2255	17 59.0	-68 1.0	1205.4	9.2	1	43878.
20	12	1960	4.0	822	19 26.0	-68 0.0	1292.4	7.0	353	44807.
20	12	1960	4.0	1118	19 46.5	-68 2.5	1313.1	5.0	235	45031.
20	12	1960	4.0	1227	19 43.2	-68 7.5	1318.8	7.6	0	45008.
20	12	1960	4.0	1352	19 54.0	-68 7.5	1329.6	1.2	227	45123.
20	12	1960	4.0	1840	19 50.0	-68 12.0	1335.4	2.4	223	45091.
20	12	1960	4.0	1915	19 49.0	-68 13.0	1336.8	7.8	180	45083.
20	12	1960	4.0	2047	19 37.0	-68 13.0	1348.8	9.6	266	44956.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
20	12	1960	4.0	2221	19 36.0	-68 29.0	1363.9	9.8	279	44983.
20	12	1960	4.0	23 2	19 37.0	-68 36.0	1370.6	12.2	257	45010.
21	12	1960	4.0	111	19 31.0	-69 3.0	1396.7	10.8	287	45006.
21	12	1960	4.0	130	19 32.0	-69 6.5	1400.2	10.1	290	45025.
21	12	1960	4.0	6 0	19 47.5	-69 52.0	1445.7	11.1	285	45288.
21	12	1960	4.0	10 0	19 59.0	-70 37.5	1490.0	10.5	281	45503.
21	12	1960	4.0	1030	20 0.0	-70 43.0	1495.3	10.8	279	45525.
21	12	1960	4.0	12 0	20 2.5	-71 0.0	1511.5	10.3	278	45584.
21	12	1960	4.0	1643	20 9.5	-71 51.0	1559.9	10.9	282	45750.
21	12	1960	4.0	2252	20 23.0	-73 1.0	1626.9	10.9	281	46007.
22	12	1960	4.0	016	20 26.0	-73 17.0	1642.2	1.2	257	46063.
22	12	1960	4.0	350	20 25.0	-73 21.5	1646.5	9.9	220	46059.
22	12	1960	4.0	728	19 57.5	-73 46.0	1682.4	3.1	260	45789.
22	12	1960	4.0	823	19 57.0	-73 49.0	1685.3	0.3	90	45787.
22	12	1960	4.0	1016	19 57.0	-73 48.5	1685.7	10.3	317	45787.
22	12	1960	4.0	11 0	20 2.5	-73 54.0	1693.3	9.8	316	45855.
22	12	1960	4.0	1239	20 14.0	-74 6.0	1709.4	9.4	308	45997.
22	12	1960	4.0	1530	20 30.5	-74 28.5	1736.1	10.3	308	46206.
22	12	1960	4.0	17 0	20 40.0	-74 41.5	1751.6	10.8	297	46326.
22	12	1960	4.0	1848	20 49.0	-75 0.0	1771.1	10.9	299	46446.
22	12	1960	4.0	23 0	21 11.0	-75 43.0	1816.9	10.1	299	46734.
22	12	1960	4.0	2355	21 15.5	-75 51.7	1826.1	10.5	299	46792.
23	12	1960	4.0	7 0	21 51.5	-77 2.0	1900.8	11.0	297	47251.
23	12	1960	4.0	947	22 5.5	-77 31.5	1931.5	10.1	322	47427.
23	12	1960	4.0	1237	22 28.0	-77 50.5	1960.1	10.7	301	47688.
23	12	1960	4.0	1414	22 37.0	-78 0.5	1977.4	11.1	294	47797.
23	12	1960	4.0	16 0	22 45.0	-78 26.0	1997.1	10.3	294	47896.
23	12	1960	4.0	1933	23 0.0	-79 2.0	2033.5	14.5	281	48080.
23	12	1960	4.0	21 0	23 4.0	-79 24.5	2054.5	10.4	288	48133.
24	12	1960	5.0	311	23 27.0	-80 41.5	2128.9	12.0	306	48408.
24	12	1960	5.0	650	23 53.0	-81 20.0	2172.7	9.3	324	48699.
24	12	1960	5.0	710	23 55.5	-81 22.0	2175.8	10.0	311	48727.
24	12	1960	5.0	819	24 3.0	-81 31.5	2187.3	8.0	335	48810.
24	12	1960	5.0	10 3	24 15.5	-81 38.0	2201.1	9.5	333	48948.
24	12	1960	5.0	1035	24 20.0	-81 40.5	2206.2			48997.

VEMA 17C3 KEY WEST - GALVESTON

DAY	MCN	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
27	12	1960	5.0	1939	24 25.5	-81 49.5	C.C	13.4	119	49C57.
27	12	1960	5.0	2030	24 2C.0	-81 38.5	11.4	10.2	73	48996.
27	12	1960	5.0	22 0	24 24.5	-81 22.5	26.7	1C.4	67	49044.
27	12	1960	5.0	23 0	24 28.5	-81 12.C	37.0	9.3	59	49087.
28	12	1960	5.0	C 0	24 33.3	-81 3.3	46.3	10.3	59	49138.
28	12	1960	5.0	2 0	24 44.0	-8C 44.C	66.9	10.4	61	49250.
28	12	1960	5.0	3 C	24 49.0	-8C 34.C	77.2	9.4	13C	49302.
28	12	1960	5.0	4 0	24 43.0	-8C 26.0	86.6	9.5	125	49235.
28	12	1960	5.0	428	24 4C.5	-8C 22.C	91.0	9.9	118	49206.
28	12	1960	5.0	725	24 27.C	-79 53.5	12C.3	1C.4	321	49050.
28	12	1960	5.0	832	24 36.0	-8C 1.5	131.8	13.8	320	49151.
28	12	1960	5.0	9 3	24 41.5	-8C 6.5	139.0	8.3	276	49212.
28	12	1960	5.0	936	24 42.C	-8C 11.5	143.6	7.1	261	49219.
28	12	1960	5.0	1C30	24 41.0	-8C 18.5	150.0	8.5	285	49211.
28	12	1960	5.0	1115	24 42.7	-8C 25.3	156.4	9.0	312	49231.
28	12	1960	5.0	1210	24 48.2	-8C 32.C	164.6	9.2	244	49292.
28	12	1960	5.0	1243	24 46.0	-8C 37.0	169.6	9.4	250	49270.
28	12	1960	5.0	1320	24 44.0	-8C 43.0	175.4	10.3	244	49250.
28	12	1960	5.0	14 0	24 41.C	-8C 49.8	182.3	9.4	236	49219.
28	12	1960	5.0	16 0	24 30.5	-81 7.0	2C1.2	8.7	243	49108.
28	12	1960	5.0	17 0	24 26.5	-81 15.5	209.9	9.1	249	49066.
28	12	1960	5.0	1928	24 18.5	-81 38.5	232.3	7.6	272	48980.
28	12	1960	5.0	2036	24 18.8	-81 48.0	241.0	8.3	270	48983.
28	12	1960	5.0	2155	24 18.8	-82 C.0	251.9	8.4	265	48983.
28	12	1960	5.0	23 0	24 18.C	-82 10.C	261.0	10.C	260	48974.
28	12	1960	5.0	2336	24 17.0	-82 16.5	267.0	7.0	282	48963.
29	12	1960	5.0	1 0	24 19.0	-82 27.0	276.8	10.2	286	48984.
29	12	1960	5.0	41C	24 28.C	-83 1.C	3C9.1	11.5	3C8	49077.
29	12	1960	5.0	810	24 56.5	-83 41.0	355.2	10.8	309	49381.
29	12	1960	5.0	10 0	25 9.0	-83 58.0	375.1	10.9	305	49513.
29	12	1960	5.0	1135	25 19.C	-84 13.5	392.3	10.9	263	49617.
29	12	1960	5.0	14 0	25 16.C	-84 42.5	418.7	9.2	73	49572.
29	12	1960	5.0	1810	25 27.0	-84 2.0	456.9	10.8	70	49708.
29	12	1960	5.0	21 0	25 37.5	-83 3C.C	487.6	1C.3	75	49831.
30	12	1960	5.0	C 0	25 45.5	-82 57.0	518.4	10.0	76	49923.
30	12	1960	5.0	448	25 57.0	-82 5.C	566.6	5.4	72	50047.
30	12	1960	5.0	653	26 C.5	-81 53.C	578.0	7.4	126	50083.
30	12	1960	5.0	756	25 56.0	-81 46.0	585.7	8.8	336	50035.
30	12	1960	5.0	841	26 2.0	-81 49.0	592.3	0.2	346	50099.
31	12	1960	5.0	C21	26 5.5	-81 5C.C	595.9	7.2	256	50136.
31	12	1960	5.0	149	26 3.0	-82 1.5	6C6.5	7.6	258	50111.
31	12	1960	5.0	4 0	25 59.5	-82 19.5	623.1	6.2	259	50074.
31	12	1960	5.0	520	25 58.C	-82 28.5	631.3	1C.3	255	50C58.
31	12	1960	5.0	617	25 55.5	-82 39.C	641.1	8.1	241	50031.
31	12	1960	5.0	640	25 54.C	-82 42.0	644.1	6.6	261	50015.
31	12	1960	5.0	956	25 5C.5	-83 5.5	665.6	6.6	9C	49976.
31	12	1960	5.0	1C 0	25 5C.5	-83 5.C	666.C	C.2	270	49976.
31	12	1960	5.0	1235	25 5C.5	-83 5.5	666.5	1.2	94	49976.
31	12	1960	5.0	1846	25 5C.C	-82 57.C	674.1	6.C	325	49972.
31	12	1960	5.0	21 0	26 1.0	-83 5.5	687.5	1.C	42	50088.

VIMA 1703 KEY WEST - GALVESTON

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
31	12	1960	5.0	2259	26 2.5	-83 4.0	689.6	9.2	252	50104.
1	1	1961	5.0	240	25 52.0	-83 40.0	723.6	4.9	244	49986.
1	1	1961	5.0	620	25 44.0	-83 58.0	741.7	2.4	241	49895.
1	1	1961	5.0	712	25 43.0	-84 0.0	743.7	8.2	246	49883.
1	1	1961	5.0	730	25 42.0	-84 2.5	746.2	9.0	252	49871.
1	1	1961	5.0	814	25 40.0	-84 9.5	752.8	5.3	200	49847.
1	1	1961	5.0	820	25 39.5	-84 9.7	753.3	0.6	137	49842.
1	1	1961	5.0	19 0	25 35.0	-84 5.0	759.5	0.0	90	49795.
1	1	1961	5.0	2343	25 35.0	-84 5.0	759.5	0.6	138	49795.
2	1	1961	5.0	053	25 34.5	-84 4.5	760.2	10.8	257	49789.
2	1	1961	5.0	129	25 33.0	-84 11.5	766.7	0.6	110	49771.
2	1	1961	5.0	4 3	25 32.5	-84 10.0	768.1	10.2	252	49766.
2	1	1961	5.0	755	25 20.0	-84 51.5	807.6	11.6	248	49612.
2	1	1961	5.0	858	25 15.5	-85 4.0	819.8	1.9	198	49556.
2	1	1961	5.0	12 4	25 10.0	-85 6.0	825.6	11.1	275	49494.
2	1	1961	5.0	1236	25 10.5	-85 12.5	831.5	7.4	236	49496.
2	1	1961	5.0	1258	25 9.0	-85 15.0	834.2	6.9	204	49478.
2	1	1961	5.0	1443	24 58.0	-85 20.5	846.3	3.4	204	49354.
2	1	1961	5.0	16 0	24 54.0	-85 22.5	850.7	9.3	246	49308.
2	1	1961	5.0	1720	24 49.0	-85 35.0	863.1	5.0	80	49245.
2	1	1961	5.0	1753	24 49.5	-85 32.0	865.8	3.5	237	49253.
2	1	1961	5.0	1840	24 48.0	-85 34.5	868.6	9.8	255	49234.
2	1	1961	5.0	1926	24 46.0	-85 42.5	876.1	12.5	257	49207.
2	1	1961	5.0	21 0	24 41.5	-86 3.5	895.7	13.0	255	49143.
2	1	1961	5.0	2336	24 33.0	-86 39.5	929.5	10.0	83	49020.
3	1	1961	5.0	414	24 39.0	-85 49.0	975.8	3.5	20	49125.
3	1	1961	5.0	545	24 44.0	-85 47.0	981.1	8.4	42	49182.
3	1	1961	5.0	8 0	24 58.0	-85 33.0	1000.0	10.1	71	49346.
3	1	1961	5.0	10 0	25 4.5	-85 12.0	1020.1	9.2	66	49430.
3	1	1961	5.0	12 0	25 12.0	-84 53.4	1038.6	9.0	64	49523.
3	1	1961	5.0	1430	25 22.0	-84 31.0	1061.2	1.2	190	49643.
3	1	1961	5.0	1640	25 19.5	-84 31.5	1063.7	11.1	233	49615.
3	1	1961	5.0	1842	25 6.0	-84 51.5	1086.3	12.6	256	49458.
3	1	1961	5.0	1942	25 3.0	-85 5.0	1098.9	11.6	263	49418.
3	1	1961	5.0	21 2	25 1.0	-85 22.0	1114.4	12.1	246	49386.
3	1	1961	5.0	2151	24 57.0	-85 32.0	1124.3	12.8	232	49336.
3	1	1961	5.0	2218	24 53.5	-85 37.0	1130.0	13.6	252	49294.
4	1	1961	5.0	248	24 35.0	-86 41.0	1191.0	9.0	260	49041.
4	1	1961	5.0	328	24 34.0	-86 47.5	1197.0	2.4	255	49024.
4	1	1961	5.0	635	24 32.0	-86 55.5	1204.6	14.4	236	48994.
4	1	1961	5.0	757	24 21.0	-87 13.5	1224.3	11.3	234	48855.
4	1	1961	5.0	815	24 19.0	-87 16.5	1227.7	11.7	234	48830.
4	1	1961	5.0	9 7	24 13.0	-87 25.5	1237.9	12.3	222	48753.
4	1	1961	5.0	930	24 9.5	-87 29.0	1242.6	10.2	211	48711.
4	1	1961	5.0	1256	23 39.5	-87 48.5	1277.5	9.6	210	48351.
4	1	1961	5.0	15 9	23 21.0	-88 0.0	1298.8	10.0	210	48128.
4	1	1961	5.0	1615	23 11.5	-88 6.0	1309.8	8.8	241	48013.
4	1	1961	5.0	17 5	23 8.0	-88 13.0	1317.1	10.1	252	47965.
4	1	1961	5.0	1935	23 0.0	-88 39.0	1342.3	10.2	243	47844.
4	1	1961	5.0	21 0	22 53.5	-88 53.0	1356.8	7.0	262	47753.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
4	1	1961	5.0	22 0	22 52.5	-89 0.5	1363.7	9.7	296	47732.
4	1	1961	5.0	2345	23 0.0	-89 17.0	1380.7	9.3	289	47798.
5	1	1961	5.0	415	23 14.0	-90 0.0	1422.6	10.1	287	47903.
5	1	1961	5.0	435	23 15.0	-90 3.5	1426.0	9.0	202	47909.
5	1	1961	5.0	623	23 0.0	-90 10.0	1442.2	9.1	201	47728.
5	1	1961	5.0	1016	22 27.0	-90 23.5	1477.4	8.9	333	47328.
5	1	1961	5.0	1228	22 44.5	-90 33.0	1497.0	12.4	329	47517.
5	1	1961	5.0	1355	23 0.0	-90 43.0	1515.0	14.9	322	47682.
5	1	1961	5.0	1413	23 3.5	-90 46.0	1519.5	0.0	90	47718.
5	1	1961	5.0	15 7	23 3.5	-90 46.0	1519.5	0.7	241	47718.
5	1	1961	5.0	1633	23 3.0	-90 47.0	1520.5	8.2	334	47710.
5	1	1961	5.0	1750	23 12.5	-90 52.0	1531.1	5.1	333	47813.
5	1	1961	5.0	2247	23 35.0	-91 4.5	1556.3	4.8	333	48053.
6	1	1961	5.0	657	24 9.5	-91 24.0	1595.2	7.4	325	48418.
6	1	1961	5.0	9 5	24 22.5	-91 34.0	1611.1	1.6	232	48552.
6	1	1961	5.0	1133	24 20.0	-91 37.5	1615.1	4.4	333	48518.
6	1	1961	5.0	1313	24 26.6	-91 41.2	1622.5	5.7	327	48587.
6	1	1961	5.0	2358	25 18.0	-92 17.5	1683.6	5.3	331	49113.
7	1	1961	5.0	653	25 50.0	-92 37.0	1720.1	6.1	340	49442.
7	1	1961	5.0	822	25 58.5	-92 40.5	1729.1	9.2	146	49531.
7	1	1961	5.0	925	25 50.5	-92 34.5	1738.8	0.9	98	49451.
7	1	1961	5.0	1316	25 50.0	-92 30.5	1742.4	0.5	90	49452.
7	1	1961	5.0	1616	25 50.0	-92 29.0	1743.8	8.0	288	49455.
7	1	1961	5.0	1838	25 56.0	-92 49.0	1762.7	7.7	287	49490.
7	1	1961	5.0	2247	26 5.5	-93 23.0	1794.7	10.1	286	49539.
8	1	1961	6.0	0 0	26 11.5	-93 47.0	1817.1	10.0	287	49564.
8	1	1961	6.0	5 5	26 26.5	-94 41.0	1867.8	10.6	40	49634.
8	1	1961	6.0	6 8	26 35.0	-94 33.0	1878.9	8.7	318	49744.
8	1	1961	6.0	622	26 36.5	-94 34.5	1880.9	8.6	281	49758.
8	1	1961	6.0	641	26 37.0	-94 37.5	1883.6	12.0	206	49758.
8	1	1961	6.0	7 6	26 32.5	-94 40.0	1888.7	8.4	119	49703.
8	1	1961	6.0	728	26 31.0	-94 37.0	1891.7	6.2	222	49692.
8	1	1961	6.0	754	26 29.0	-94 39.0	1894.4	1.1	57	49666.
8	1	1961	6.0	1125	26 31.0	-94 35.5	1898.1	9.6	95	49695.
8	1	1961	6.0	1235	26 30.0	-94 23.0	1909.4	7.5	350	49707.
8	1	1961	6.0	23 0	27 47.5	-94 38.0	1988.0	6.0	0	50536.
8	1	1961	6.0	2345	27 52.0	-94 38.0	1992.5	8.2	356	50585.
9	1	1961	6.0	333	28 23.0	-94 40.5	2023.6	8.9	1	50919.
9	1	1961	6.0	813	29 4.5	-94 40.0	2065.1			51368.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
12	1	1961	6.0	240	29 11.0	-94 50.0	0.0	5.9	192	51419.
12	1	1961	6.0	322	29 7.0	-94 51.0	4.1	4.3	270	51374.
12	1	1961	6.0	334	29 7.0	-94 52.0	5.0	10.0	187	51372.
12	1	1961	6.0	5 5	28 52.0	-94 54.0	20.1	12.4	0	51207.
12	1	1961	6.0	517	28 54.5	-94 54.0	22.6	11.4	192	51234.
12	1	1961	6.0	6 0	28 46.5	-94 56.0	30.8	8.1	82	51144.
12	1	1961	6.0	719	28 48.0	-94 44.0	41.4	0.0	90	51182.
12	1	1961	6.0	1211	28 48.0	-94 44.0	41.4	11.6	246	51182.
12	1	1961	6.0	13 8	28 43.5	-94 55.5	52.4	0.6	157	51113.
13	1	1961	6.0	7 0	28 34.0	-94 51.0	62.7	9.6	148	51018.
13	1	1961	6.0	839	28 20.5	-94 41.5	78.6	6.4	328	50889.
13	1	1961	6.0	850	28 21.5	-94 42.2	79.8	11.1	140	50898.
13	1	1961	6.0	936	28 15.0	-94 36.0	88.2	7.3	319	50839.
13	1	1961	6.0	947	28 16.0	-94 37.0	89.6	0.0	90	50848.
13	1	1961	6.0	10 1	28 16.0	-94 37.0	89.6	11.8	139	50848.
13	1	1961	6.0	1020	28 13.2	-94 34.2	93.3	11.8	172	50823.
13	1	1961	6.0	1057	28 6.0	-94 33.0	100.6	6.6	161	50746.
13	1	1961	6.0	1145	28 1.0	-94 31.0	105.9	6.6	148	50695.
13	1	1961	6.0	1246	27 55.3	-94 26.9	112.6	0.0	90	50641.
13	1	1961	6.0	1255	27 55.3	-94 26.9	112.6	5.7	145	50641.
13	1	1961	6.0	1318	27 53.5	-94 25.5	114.8	0.0	90	50623.
13	1	1961	6.0	1334	27 53.5	-94 25.5	114.8	11.0	146	50623.
13	1	1961	6.0	1430	27 45.0	-94 18.9	125.1	4.6	145	50542.
13	1	1961	6.0	1438	27 44.5	-94 18.5	125.8	10.3	145	50537.
13	1	1961	6.0	1518	27 38.9	-94 14.0	132.6	0.9	299	50484.
13	1	1961	6.0	1545	27 39.1	-94 14.4	133.0	8.4	329	50485.
13	1	1961	6.0	1630	27 44.5	-94 18.0	139.3	9.8	149	50538.
13	1	1961	6.0	1655	27 41.0	-94 15.6	143.4	0.0	90	50504.
13	1	1961	6.0	1710	27 41.0	-94 15.6	143.4	10.0	155	50504.
13	1	1961	6.0	1720	27 39.5	-94 14.8	145.1	9.4	328	50489.
13	1	1961	6.0	1754	27 44.0	-94 18.0	150.4	10.2	147	50533.
13	1	1961	6.0	1845	27 36.7	-94 12.6	159.1	0.9	117	50462.
13	1	1961	6.0	23 4	27 35.0	-94 8.9	162.8	10.5	332	50450.
14	1	1961	6.0	625	28 43.5	-94 50.0	240.3	10.7	21	51123.
14	1	1961	6.0	7 7	28 50.5	-94 47.0	247.8	9.7	6	51204.
14	1	1961	6.0	836	29 4.8	-94 45.2	262.2	1.7	127	51361.
14	1	1961	6.0	21 5	28 52.0	-94 26.0	283.3	10.3	145	51257.
15	1	1961	6.0	757	27 21.0	-93 12.5	395.0	7.1	141	50393.
15	1	1961	6.0	1751	26 26.3	-92 22.5	465.6	6.9	150	49870.
16	1	1961	6.0	739	25 4.0	-91 29.0	560.9	9.7	326	49029.
16	1	1961	6.0	754	25 6.0	-91 30.5	563.4	12.6	153	49049.
16	1	1961	6.0	8 9	25 3.2	-91 28.9	566.5	6.4	148	49020.
16	1	1961	6.0	1340	24 33.2	-91 8.5	601.8	0.8	175	48710.
16	1	1961	6.0	1632	24 31.0	-91 8.3	604.0	8.0	321	48686.
16	1	1961	6.0	17 1	24 34.0	-91 11.0	607.9	7.2	147	48716.
16	1	1961	6.0	1757	24 28.4	-91 7.0	614.5	6.0	142	48658.
16	1	1961	6.0	23 6	24 4.0	-90 46.1	645.5	9.5	330	48410.
16	1	1961	6.0	2328	24 7.0	-90 48.0	649.0	6.9	144	48442.
17	1	1961	6.0	015	24 2.6	-90 44.5	654.4	8.3	337	48397.
17	1	1961	6.0	030	24 4.5	-90 45.4	656.5	7.2	143	48417.

VEMA 1704 GALVESTON - PANAMA

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
17	1	1961	6.0	455	23 39.3	-90 24.4	688.1	8.3	333	48159.
17	1	1961	6.0	525	23 43.0	-90 26.5	692.3	7.9	142	48198.
17	1	1961	6.0	626	23 36.7	-90 21.1	700.3	6.1	323	48133.
17	1	1961	6.0	725	23 41.5	-90 25.0	706.3	7.1	147	48183.
17	1	1961	6.0	948	23 27.4	-90 15.0	723.1	0.6	246	48035.
17	1	1961	6.0	1320	23 26.5	-90 17.2	725.3	8.3	329	48022.
17	1	1961	6.0	1719	23 55.0	-90 35.9	758.6	5.8	228	48322.
17	1	1961	6.0	23 0	23 32.9	-91 2.7	791.6	4.3	148	48030.
18	1	1961	6.0	8 2	23 0.0	-90 40.0	830.6	6.0	317	47685.
18	1	1961	6.0	824	23 1.6	-90 41.6	832.7	0.5	289	47701.
18	1	1961	6.0	1114	23 2.1	-90 43.2	834.3	11.2	201	47705.
18	1	1961	6.0	1543	22 15.5	-91 3.0	884.3	11.5	316	47137.
18	1	1961	6.0	18 5	22 35.0	-91 23.5	911.5	5.4	316	47332.
19	1	1961	6.0	030	23 0.0	-91 49.5	946.2	5.0	316	47580.
19	1	1961	6.0	1035	23 36.3	-92 27.8	996.7	10.6	140	47936.
19	1	1961	6.0	1057	23 33.3	-92 25.1	1000.6	1.0	321	47906.
19	1	1961	6.0	1326	23 35.2	-92 26.8	1003.1	5.7	63	47925.
19	1	1961	6.0	19 2	23 49.4	-91 55.9	1034.7	4.3	65	48138.
19	1	1961	6.0	1912	23 49.7	-91 55.2	1035.4	5.9	71	48142.
20	1	1961	6.0	627	24 11.9	-90 46.5	1102.0	5.3	287	48499.
20	1	1961	6.0	16 0	24 26.7	-91 39.8	1152.8	5.3	246	48589.
20	1	1961	6.0	1933	24 19.0	-91 58.5	1171.5	7.3	174	48472.
20	1	1961	6.0	2340	23 49.0	-91 54.8	1201.6	5.4	278	48135.
21	1	1961	6.0	430	23 52.5	-92 22.9	1227.6	5.7	306	48130.
21	1	1961	6.0	930	24 9.0	-92 48.1	1255.9	5.9	188	48277.
21	1	1961	6.0	18 0	23 19.2	-92 55.3	1306.1	5.3	157	47693.
21	1	1961	6.0	2155	23 0.0	-92 46.6	1326.9	5.5	157	47486.
22	1	1961	6.0	0 0	22 49.4	-92 41.8	1338.4	0.0	90	47372.
22	1	1961	6.0	0 5	22 49.4	-92 41.8	1338.4	8.8	40	47372.
22	1	1961	6.0	140	23 0.0	-92 32.0	1352.3	9.9	43	47511.
22	1	1961	6.0	6 0	23 31.5	-92 0.0	1395.4	10.5	48	47926.
22	1	1961	6.0	8 5	23 46.1	-91 42.2	1417.3	10.1	52	48121.
22	1	1961	6.0	1216	24 12.0	-91 5.7	1459.5	2.1	39	48472.
22	1	1961	6.0	1245	24 12.8	-91 5.0	1460.6	6.4	32	48483.
22	1	1961	6.0	1353	24 19.0	-91 0.8	1467.9	7.0	154	48559.
22	1	1961	6.0	19 8	23 46.0	-90 42.8	1504.7	0.7	340	48209.
23	1	1961	6.0	7 5	23 54.3	-90 46.1	1513.6	10.3	334	48299.
23	1	1961	6.0	823	24 6.3	-90 52.5	1526.9	8.6	150	48427.
23	1	1961	6.0	1246	23 33.7	-90 32.0	1564.5	4.9	172	48083.
23	1	1961	6.0	14 0	23 27.7	-90 31.1	1570.6	8.1	150	48015.
23	1	1961	6.0	18 4	22 59.2	-90 13.0	1603.6	0.4	314	47713.
24	1	1961	6.0	013	23 1.0	-90 15.0	1606.1	5.0	323	47731.
24	1	1961	6.0	031	23 2.2	-90 16.0	1607.7	9.0	152	47743.
24	1	1961	6.0	256	22 43.0	-90 5.0	1629.4	5.5	163	47537.
24	1	1961	6.0	4 7	22 36.8	-90 3.0	1635.8	6.7	153	47468.
24	1	1961	6.0	555	22 26.1	-89 57.1	1647.8	10.5	161	47352.
24	1	1961	6.0	947	21 47.7	-89 42.9	1688.4	0.8	291	46926.
24	1	1961	6.0	2036	21 50.9	-89 51.8	1697.3	10.0	160	46952.
24	1	1961	6.0	2345	21 21.3	-89 40.0	1728.9	11.4	90	46623.
24	1	1961	6.0	2350	21 21.3	-89 39.0	1729.8	11.3	358	46625.

VEMA 17C4 GALVESTCN - PANAMA

DAY	MCN	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
25	1	1961	6.C	438	22 15.5	-89 40.6	1784.0	C.6	11	47252.
25	1	1961	6.0	530	22 16.0	-89 40.5	1784.5	0.5	301	47258.
25	1	1961	6.C	723	22 16.5	-89 41.4	1785.5	4.0	270	47262.
25	1	1961	6.C	8 6	22 16.5	-89 44.5	1788.4	8.3	274	47258.
25	1	1961	6.C	9 5	22 17.1	-89 53.3	1796.5	0.C	90	47254.
25	1	1961	6.0	930	22 17.1	-89 53.3	1796.5	11.0	1	47254.
25	1	1961	6.C	11 0	22 33.6	-89 53.1	1813.0	0.6	274	47445.
25	1	1961	6.C	132C	22 33.7	-89 54.5	1814.3	9.C	182	47444.
25	1	1961	6.0	1429	22 23.3	-89 54.8	1824.7	11.7	318	47323.
25	1	1961	6.C	1756	22 53.5	-9C 24.0	1865.2	11.6	320	47632.
25	1	1961	6.C	1840	23 C.0	-9C 30.0	1873.7	10.9	321	47698.
26	1	1961	6.C	2 6	24 3.0	-91 26.2	1955.1	0.0	194	48339.
28	1	1961	6.C	1913	24 C.0	-91 27.0	1958.2	10.9	109	48303.
29	1	1961	6.C	C 6	23 42.3	-9C 32.2	2011.4	11.1	132	48180.
29	1	1961	6.C	340	23 15.7	-9C C.C	2051.1	10.8	132	47919.
29	1	1961	6.C	550	23 0.C	-89 41.0	2074.6	12.0	131	47764.
29	1	1961	6.C	628	22 55.0	-89 34.8	2082.2	10.5	110	47715.
29	1	1961	6.C	1C20	22 41.C	-88 53.6	2122.7	10.8	112	47605.
29	1	1961	6.0	20 7	22 1.2	-87 8.1	2228.0	10.5	108	47262.
29	1	1961	6.C	2052	21 58.8	-87 0.0	2235.9	10.2	110	47242.
30	1	1961	6.0	553	21 27.0	-85 26.9	2328.1	8.4	112	46955.
30	1	1961	6.C	1C3C	21 12.6	-84 48.C	2367.1	5.4	136	46816.
30	1	1961	6.0	1329	21 1.0	-84 36.1	2383.1	5.0	133	46690.
30	1	1961	6.C	1826	2C 43.9	-84 16.7	2408.0	0.6	350	46504.
30	1	1961	6.C	211C	2C 45.5	-84 17.0	2409.7	11.5	314	46522.
30	1	1961	6.C	2125	2C 47.5	-84 19.2	2412.5	2.1	106	46544.
30	1	1961	6.0	22 7	2C 47.1	-84 17.7	2414.0	5.2	117	46540.
31	1	1961	5.0	1135	2C 17.8	-83 16.3	2478.5	5.2	285	46234.
31	1	1961	5.0	1144	2C 18.0	-83 17.1	2479.3	6.5	117	46236.
31	1	1961	5.C	1430	2C 1C.0	-83 0.0	2497.2	6.5	116	46150.
31	1	1961	5.C	1628	2C 4.4	-82 47.7	2510.1	0.6	235	46C91.
31	1	1961	5.C	17 1	2C 4.2	-82 48.0	2510.4	5.9	116	46088.
31	1	1961	5.C	1838	2C 0.0	-82 38.8	2520.0	5.8	122	46043.
31	1	1961	5.0	2135	19 51.0	-82 23.3	2537.1	2.0	280	45944.
31	1	1961	5.C	23 0	19 51.5	-82 26.2	2539.9	6.0	125	45949.
1	2	1961	5.0	216	19 4C.2	-82 9.0	2559.7	6.3	127	45824.
1	2	1961	5.C	7 0	19 22.4	-81 43.8	2589.3	5.6	95	45624.
1	2	1961	5.C	830	19 21.7	-81 34.9	2597.8	10.4	92	45618.
1	2	1961	5.C	9 C	19 21.5	-81 29.4	2603.0	6.4	124	45617.
1	2	1961	5.0	934	19 19.5	-81 26.2	2606.6	0.6	118	45595.
1	2	1961	5.C	15 6	19 18.0	-81 23.2	2609.8	8.4	272	45578.
1	2	1961	5.C	1525	19 18.1	-81 26.C	2612.4	10.C	278	45578.
1	2	1961	5.0	1556	19 18.8	-81 31.4	2617.6	9.1	279	45585.
1	2	1961	5.C	18 0	19 21.7	-81 51.0	2636.3	8.9	330	45614.
2	2	1961	5.C	811	21 1C.8	-82 59.C	2762.7	6.7	330	46852.
2	2	1961	5.C	844	21 14.C	-83 1.0	2766.4	0.5	134	46888.
2	2	1961	5.0	1530	21 11.5	-82 58.2	2770.0	10.0	225	46860.
2	2	1961	5.C	1835	2C 49.7	-83 21.7	2800.9	6.4	227	46600.
2	2	1961	5.C	1922	2C 46.3	-83 25.6	2805.9	0.8	318	46559.
3	2	1961	5.C	C57	2C 49.7	-83 28.9	2810.5	9.3	238	46596.

VEMA 1704 GALVESTON - PANAMA

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
3	2	1961	5.C	5 0	2C 3C.C	-84 3.0	2848.0	0.3	291	46351.
3	2	1961	5.C	1C28	2C 3C.5	-84 4.4	2849.4	8.3	193	46356.
3	2	1961	5.C	12 C	2C 18.1	-84 7.4	2862.1	6.5	217	46211.
3	2	1961	5.C	1522	2C C.8	-84 21.4	2883.8	C.4	234	46001.
3	2	1961	5.C	2041	19 59.7	-84 23.0	2885.7	8.0	233	45987.
4	2	1961	5.C	C48	19 39.9	-84 51.2	2918.8	0.5	331	45738.
4	2	1961	5.C	455	19 41.8	-84 52.3	2921.C	6.6	222	45759.
4	2	1961	5.C	6 6	19 36.0	-84 57.9	2928.8	7.4	228	45687.
4	2	1961	5.C	835	19 23.7	-85 12.3	2947.1	0.7	335	45533.
4	2	1961	5.C	1736	19 29.4	-85 15.1	2953.4	8.7	214	45597.
4	2	1961	5.C	1958	19 12.4	-85 27.4	2974.0	9.5	227	45389.
4	2	1961	5.C	2110	19 4.6	-85 36.3	2985.5	6.1	215	45290.
4	2	1961	5.C	2159	19 C.5	-85 39.3	2990.4	1.3	343	45240.
5	2	1961	5.0	250	19 6.5	-85 41.2	2996.7	9.2	229	45308.
5	2	1961	5.0	354	19 0.0	-85 49.0	3006.5	8.8	229	45224.
5	2	1961	5.C	443	18 55.3	-85 54.7	3013.7	9.6	224	45164.
5	2	1961	5.0	547	18 47.9	-86 2.2	3023.9	9.3	224	45071.
5	2	1961	5.0	833	18 29.3	-86 20.9	3049.6	9.1	181	44836.
5	2	1961	5.C	920	18 22.2	-86 21.0	3056.7	1.1	347	44752.
5	2	1961	5.C	13 3	18 26.2	-86 22.0	3060.8	9.2	223	44798.
5	2	1961	5.C	1819	17 51.C	-86 57.0	3109.3	C.4	270	44350.
5	2	1961	5.C	2330	17 51.0	-86 59.C	3111.2	8.2	84	44348.
6	2	1961	5.C	510	17 56.1	-86 1C.2	3157.9	9.3	66	44456.
6	2	1961	5.C	612	18 C.0	-86 1.0	3167.5	8.7	55	44510.
6	2	1961	5.C	7 0	18 4.0	-85 55.0	3174.4	8.7	49	44563.
6	2	1961	5.C	827	18 12.3	-85 45.0	3187.0	1.8	313	44669.
6	2	1961	5.C	1533	18 21.3	-85 55.C	32CC.1	8.4	139	44766.
7	2	1961	5.C	627	16 46.2	-84 29.C	3325.7	11.2	316	43720.
7	2	1961	5.0	810	17 0.0	-84 43.0	3344.9	0.8	297	43871.
7	2	1961	5.C	1122	17 1.1	-84 45.3	3347.4	9.8	37	43882.
7	2	1961	5.C	1519	17 31.9	-84 21.C	3385.9	1.C	3CC	44261.
7	2	1961	5.C	22 0	17 35.2	-84 26.9	3392.5	10.1	34	44295.
8	2	1961	5.C	1 2	18 C.7	-84 9.C	3423.1	0.9	299	44606.
8	2	1961	5.C	650	18 3.2	-84 13.8	3428.3	9.6	39	44632.
8	2	1961	5.C	917	18 21.5	-83 58.3	3451.8	1.4	294	44856.
8	2	1961	5.0	1330	18 23.9	-84 4.0	3457.7	8.8	102	44881.
8	2	1961	5.C	1415	18 22.5	-83 57.2	3464.4	9.2	135	44869.
8	2	1961	5.C	1838	17 54.1	-83 26.8	35C4.9	9.C	138	44554.
9	2	1961	5.C	C50	17 12.5	-82 48.0	356C.5	1.5	278	44088.
9	2	1961	5.C	4 6	17 13.2	-82 53.0	3565.4	9.7	7	44093.
9	2	1961	5.C	554	17 3C.5	-82 5C.9	3582.8	9.3	10	44297.
9	2	1961	5.0	750	17 48.2	-82 47.7	3600.7	1.1	276	44505.
9	2	1961	5.C	1743	17 49.2	-82 58.6	3611.2	8.9	14	44511.
9	2	1961	5.C	1820	17 54.5	-82 57.2	3616.6	8.7	53	44574.
9	2	1961	5.C	19 C	17 58.0	-82 52.3	3622.5	1.4	291	44617.
9	2	1961	5.C	2115	17 59.1	-82 55.3	3625.5	8.5	58	44629.
10	2	1961	5.C	2 8	18 2C.8	-82 18.3	3666.8	0.7	261	44897.
10	2	1961	5.C	537	18 20.0	-82 23.7	3672.0	8.8	51	44886.
10	2	1961	5.0	1310	18 39.8	-81 58.3	37C3.2	0.6	2C6	45125.
10	2	1961	5.C	2231	18 34.7	-82 0.9	37C8.9	9.4	29	45065.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
11	2	1961	5.0	338	19 16.9	-81 36.0	3757.2	11.3	180	45561.
11	2	1961	5.0	5 0	19 1.5	-81 36.0	3772.6	10.3	163	45383.
11	2	1961	5.0	611	18 49.9	-81 32.2	3784.7	6.5	164	45249.
11	2	1961	5.0	840	18 34.4	-81 27.6	3800.8	0.4	228	45070.
11	2	1961	5.0	1945	18 31.1	-81 31.5	3805.8	6.6	172	45031.
12	2	1961	5.0	234	17 46.5	-81 24.6	3850.9	9.4	157	44514.
12	2	1961	5.0	854	16 51.8	-81 0.0	3910.4	8.4	157	43883.
12	2	1961	5.0	1030	16 39.4	-80 54.5	3923.9	8.1	176	43740.
12	2	1961	5.0	1339	16 14.0	-80 52.7	3949.3	8.5	147	43443.
12	2	1961	5.0	1546	15 59.0	-80 42.4	3967.3	9.2	169	43270.
12	2	1961	5.0	2025	15 17.0	-80 33.6	4010.1	9.7	183	42784.
13	2	1961	5.0	110	14 31.0	-80 35.9	4056.2	11.1	177	42249.
13	2	1961	5.0	232	14 15.8	-80 35.0	4071.4	10.2	173	42074.
13	2	1961	5.0	4 6	14 0.0	-80 33.0	4087.3	10.6	174	41891.
13	2	1961	5.0	553	13 41.2	-80 31.0	4106.2	10.7	177	41675.
13	2	1961	5.0	9 0	13 7.8	-80 29.2	4139.7	10.5	171	41290.
13	2	1961	5.0	1012	12 55.4	-80 27.1	4152.2	10.8	178	41148.
13	2	1961	5.0	13 7	12 24.0	-80 25.8	4183.7	8.7	91	40789.
13	2	1961	5.0	14 0	12 23.9	-80 17.9	4191.4	11.9	270	40789.
13	2	1961	5.0	15 1	12 24.0	-80 30.3	4203.5	10.9	172	40788.
13	2	1961	5.0	1837	11 45.0	-80 24.9	4242.9	0.7	288	40345.
13	2	1961	5.0	2244	11 45.9	-80 27.8	4245.8	10.4	166	40354.
14	2	1961	5.0	4 0	10 52.8	-80 14.2	4300.6	11.0	174	39757.
14	2	1961	5.0	6 0	10 31.0	-80 11.9	4322.5	10.7	175	39513.
14	2	1961	5.0	11 2	9 37.1	-80 7.3	4376.6	11.9	131	38914.
14	2	1961	5.0	12 0	9 29.5	-79 58.5	4388.1			38831.

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DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
18	2	1961	5.0	1435	8 51.0	-79 28.8	0.0	9.0	138	38410.
18	2	1961	5.0	1529	8 45.0	-79 23.3	8.1	7.0	140	38345.
18	2	1961	5.0	1625	8 40.0	-79 19.0	14.7	0.5	315	38290.
18	2	1961	5.0	1642	8 40.1	-79 19.1	14.8	6.7	192	38291.
18	2	1961	5.0	2022	8 16.0	-79 24.2	39.4	7.2	194	38029.
19	2	1961	5.0	653	7 2.2	-79 42.8	115.5	0.8	243	37240.
19	2	1961	5.0	710	7 2.1	-79 43.0	115.7	7.5	192	37239.
19	2	1961	5.0	1011	6 40.0	-79 47.8	138.3	4.5	15	37007.
19	2	1961	5.0	1043	6 42.3	-79 47.2	140.7	0.8	233	37031.
19	2	1961	5.0	1155	6 41.7	-79 48.0	141.7	7.1	186	37024.
19	2	1961	5.0	1457	6 20.2	-79 50.3	163.3	4.0	248	36800.
19	2	1961	5.0	15 5	6 20.0	-79 50.8	163.8	7.5	184	36798.
19	2	1961	5.0	1635	6 8.7	-79 51.5	175.2	1.0	229	36681.
19	2	1961	5.0	1738	6 8.0	-79 52.3	176.2	5.7	197	36674.
19	2	1961	5.0	18 0	6 6.0	-79 52.9	178.3	1.5	185	36653.
19	2	1961	5.0	1848	6 4.8	-79 53.0	179.5	6.8	359	36641.
19	2	1961	5.0	1928	6 9.3	-79 53.1	184.0	1.1	226	36687.
20	2	1961	5.0	013	6 5.5	-79 57.0	189.4	7.8	201	36648.
20	2	1961	5.0	158	5 52.8	-80 2.0	203.1	1.0	228	36517.
20	2	1961	5.0	437	5 51.0	-80 4.0	205.8	5.8	81	36498.
20	2	1961	5.0	1320	5 58.5	-79 13.8	256.3	1.1	241	36575.
20	2	1961	5.0	16 1	5 57.0	-79 16.5	259.3	8.0	245	36560.
20	2	1961	5.0	1840	5 48.0	-79 35.8	280.5	7.3	246	36468.
20	2	1961	5.0	2021	5 43.0	-79 47.0	292.8	1.8	135	36417.
20	2	1961	5.0	2035	5 42.7	-79 46.7	293.2	6.0	243	36414.
20	2	1961	5.0	22 0	5 38.8	-79 54.3	301.7	0.6	162	36374.
21	2	1961	5.0	124	5 37.0	-79 53.7	303.6	6.7	243	36356.
21	2	1961	5.0	227	5 33.8	-80 0.0	310.6	1.8	194	36323.
21	2	1961	5.0	255	5 33.0	-80 0.2	311.5	7.3	242	36315.
21	2	1961	5.0	4 6	5 28.9	-80 7.8	320.1	1.8	193	36273.
21	2	1961	5.0	436	5 28.0	-80 8.0	321.0	13.8	235	36264.
21	2	1961	5.0	445	5 26.8	-80 9.7	323.1	6.2	217	36251.
21	2	1961	5.0	556	5 21.0	-80 14.1	330.3	7.2	216	36193.
21	2	1961	5.0	8 0	5 9.0	-80 23.0	345.2	7.6	221	36071.
21	2	1961	5.0	1538	4 24.8	-81 1.2	403.6	1.4	217	35630.
21	2	1961	5.0	1622	4 24.0	-81 1.8	404.6	7.3	225	35622.
21	2	1961	5.0	18 6	4 15.0	-81 10.8	417.3	10.9	181	35534.
21	2	1961	5.0	1851	4 6.8	-81 11.0	425.5	10.6	180	35454.
21	2	1961	5.0	2227	3 28.6	-81 10.8	463.7	10.4	356	35087.
21	2	1961	5.0	2252	3 32.9	-81 11.1	468.0	0.3	225	35128.
22	2	1961	5.0	331	3 32.0	-81 12.0	469.3	9.9	179	35119.
22	2	1961	5.0	453	3 18.5	-81 11.8	482.8	5.6	180	34991.
22	2	1961	5.0	559	3 12.3	-81 11.8	489.0	0.4	207	34932.
22	2	1961	5.0	8 0	3 11.5	-81 12.2	489.9	7.3	228	34925.
22	2	1961	5.0	1022	3 0.0	-81 25.0	507.1	6.7	226	34817.
22	2	1961	5.0	2143	2 6.9	-82 20.0	583.5	0.8	307	34329.
22	2	1961	5.0	23 1	2 7.5	-82 20.8	584.5	6.5	226	34335.
23	2	1961	5.0	228	1 52.0	-82 37.0	606.9	0.3	315	34196.
23	2	1961	5.0	636	1 53.0	-82 38.0	608.3	7.5	233	34205.
23	2	1961	5.0	824	1 44.8	-82 48.8	621.8	2.8	315	34132.

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DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
23	2	1961	5.0	830	1 45.0	-82 49.0	622.1	6.5	234	34134.
23	2	1961	5.0	1115	1 34.5	-83 3.5	640.0	2.7	297	34042.
23	2	1961	5.0	1120	1 34.6	-83 3.7	640.3	6.9	236	34043.
23	2	1961	5.0	17 8	1 11.9	-83 36.9	680.5	0.4	315	33846.
23	2	1961	5.0	1730	1 12.0	-83 37.0	680.6	7.6	232	33847.
23	2	1961	5.0	19 0	1 5.0	-83 46.0	692.0	6.9	238	33787.
23	2	1961	5.0	1953	1 1.8	-83 51.2	698.1	7.2	222	33760.
24	2	1961	5.0	6 4	0 7.0	-84 40.5	771.8	5.9	218	33309.
24	2	1961	5.0	7 2	0 2.5	-84 44.0	777.5	2.4	315	33273.
24	2	1961	5.0	720	0 3.0	-84 44.5	778.2	7.1	220	33277.
24	2	1961	5.0	8 6	0 -1.2	-84 48.0	783.7	5.9	188	33243.
24	2	1961	5.0	1634	0-51.0	-84 55.0	834.0	10.0	185	32856.
24	2	1961	5.0	1916	-1 18.0	-84 57.5	861.1	9.8	183	32654.
25	2	1961	5.0	0 0	-2 4.5	-85 0.0	907.7	10.0	185	32317.
25	2	1961	5.0	611	-3 6.0	-85 5.8	969.4	9.4	187	31896.
25	2	1961	5.0	8 0	-3 23.0	-85 7.9	986.6	10.6	180	31785.
25	2	1961	5.0	9 8	-3 35.0	-85 8.0	998.6	0.8	14	31708.
25	2	1961	5.0	1140	-3 33.0	-85 7.5	1000.6	5.8	189	31720.
25	2	1961	5.0	1537	-3 55.8	-85 11.1	1023.7	4.4	21	31577.
25	2	1961	5.0	16 0	-3 54.2	-85 10.5	1025.4	5.9	190	31587.
25	2	1961	5.0	17 0	-4 0.0	-85 11.5	1031.3	6.0	182	31551.
25	2	1961	5.0	19 2	-4 12.2	-85 12.0	1043.5	7.4	196	31476.
25	2	1961	5.0	20 8	-4 20.0	-85 14.3	1051.6	6.6	3	31429.
25	2	1961	5.0	2040	-4 16.5	-85 14.1	1055.1	7.0	191	31451.
26	2	1961	5.0	556	-5 20.1	-85 26.6	1120.0	7.0	192	31084.
26	2	1961	5.0	1229	-6 5.0	-85 36.0	1165.8	9.4	190	30848.
26	2	1961	5.0	16 0	-6 37.5	-85 41.8	1198.8	9.9	190	30686.
26	2	1961	5.0	1921	-7 10.0	-85 47.8	1231.9	0.6	263	30534.
27	2	1961	5.0	040	-7 10.4	-85 51.0	1235.1	5.6	195	30535.
27	2	1961	5.0	120	-7 14.0	-85 52.0	1238.8	10.0	191	30519.
27	2	1961	5.0	614	-8 2.2	-86 1.5	1287.9	9.6	193	30313.
27	2	1961	5.0	1258	-9 5.0	-86 16.7	1352.5	9.2	193	30077.
27	2	1961	5.0	14 5	-9 15.0	-86 19.0	1362.7	9.1	155	30043.
27	2	1961	5.0	1547	-9 29.0	-86 12.3	1378.2	6.5	153	29983.
27	2	1961	5.0	1915	-9 49.0	-86 2.0	1400.7	7.0	153	29899.
27	2	1961	5.0	2150	-10 5.2	-85 53.8	1418.8	10.3	153	29833.
28	2	1961	5.0	350	-11 0.0	-85 25.0	1480.4	10.8	152	29616.
28	2	1961	5.0	434	-11 7.0	-85 21.2	1488.4	6.8	153	29589.
28	2	1961	5.0	535	-11 13.1	-85 18.0	1495.2	10.5	154	29566.
28	2	1961	5.0	6 1	-11 17.2	-85 16.0	1499.8	9.5	150	29551.
28	2	1961	5.0	1311	-12 16.2	-84 40.8	1568.1	6.8	150	29330.
28	2	1961	5.0	1914	-12 51.8	-84 19.5	1609.3	6.5	152	29204.
1	3	1961	5.0	553	-13 52.7	-83 46.0	1678.4	6.5	152	29004.
1	3	1961	5.0	1321	-14 35.7	-83 22.0	1727.3	9.2	151	28872.
1	3	1961	5.0	16 0	-14 57.0	-83 10.0	1751.5	8.8	151	28808.
1	3	1961	5.0	20 0	-15 28.0	-82 52.5	1786.8	9.1	152	28719.
2	3	1961	5.0	010	-16 1.7	-82 34.1	1824.9	0.9	290	28628.
2	3	1961	5.0	315	-16 0.8	-82 36.7	1827.6	8.3	152	28635.
2	3	1961	5.0	8 0	-16 35.5	-82 17.2	1867.0	9.0	152	28544.
2	3	1961	5.0	1353	-17 22.1	-81 51.3	1919.8	6.6	156	28429.

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DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
2	3	1961	5.0	1452	-17 28.0	-81 48.5	1926.2	5.1	154	28417.
2	3	1961	5.0	1856	-17 46.8	-81 38.9	1947.2	5.4	154	28375.
2	3	1961	5.0	2140	-18 0.0	-81 32.0	1961.9	5.7	150	28346.
3	3	1961	5.0	0 0	-18 11.4	-81 25.0	1975.1	5.7	152	28319.
3	3	1961	5.0	952	-19 0.5	-80 57.0	2030.9	10.1	151	28213.
3	3	1961	5.0	12 0	-19 19.3	-80 46.0	2052.4	10.0	151	28173.
3	3	1961	5.0	16 0	-19 54.0	-80 25.3	2092.2	10.1	151	28102.
3	3	1961	5.0	1925	-20 24.0	-80 7.5	2126.5	9.4	152	28044.
3	3	1961	5.0	21 0	-20 37.2	-80 0.0	2141.5	9.6	151	28021.
4	3	1961	5.0	0 0	-21 2.5	-79 45.0	2170.4	9.7	150	27975.
4	3	1961	5.0	4 0	-21 36.2	-79 24.2	2209.3	9.7	150	27914.
4	3	1961	5.0	8 0	-22 10.0	-79 3.4	2248.2	10.1	149	27857.
4	3	1961	5.0	920	-22 21.5	-78 55.8	2261.7	0.3	312	27837.
4	3	1961	5.0	15 3	-22 20.5	-78 57.0	2263.2	6.4	149	27840.
4	3	1961	5.0	1920	-22 44.0	-78 42.0	2290.5	10.0	148	27802.
5	3	1961	5.0	0 0	-23 23.8	-78 15.3	2337.2	9.8	148	27735.
5	3	1961	5.0	420	-24 0.0	-77 50.7	2379.9	10.9	148	27678.
5	3	1961	5.0	8 0	-24 34.0	-77 27.8	2419.8	10.4	148	27628.
5	3	1961	5.0	1255	-25 17.5	-76 57.7	2471.1	6.5	146	27567.
5	3	1961	5.0	19 3	-25 50.5	-76 33.0	2510.9	6.5	149	27516.
5	3	1961	5.0	23 4	-26 12.8	-76 18.2	2536.9	10.1	148	27492.
6	3	1961	5.0	634	-27 17.3	-75 33.5	2612.7	9.5	186	27424.
6	3	1961	5.0	1540	-28 43.0	-75 44.2	2699.0	0.7	349	27633.
6	3	1961	5.0	1854	-28 40.7	-75 44.7	2701.3	1.1	302	27630.
6	3	1961	5.0	2010	-28 40.0	-75 46.0	2702.6	10.6	189	27633.
7	3	1961	5.0	0 0	-29 20.0	-75 53.0	2743.1	10.1	189	27753.
7	3	1961	5.0	4 0	-30 0.0	-76 0.0	2783.6	10.3	188	27884.
7	3	1961	5.0	8 0	-30 40.7	-76 7.0	2824.7	9.2	209	28027.
7	3	1961	5.0	815	-30 42.7	-76 8.3	2827.0	14.7	305	28038.
7	3	1961	5.0	830	-30 40.6	-76 11.8	2830.7	10.4	36	28046.
7	3	1961	5.0	845	-30 38.5	-76 10.0	2833.3	13.6	130	28033.
7	3	1961	5.0	9 0	-30 40.7	-76 7.0	2836.7	10.2	188	28027.
7	3	1961	5.0	1130	-31 6.0	-76 11.0	2862.2	8.1	213	28119.
7	3	1961	5.0	1145	-31 7.7	-76 12.3	2864.2	11.5	297	28130.
7	3	1961	5.0	12 0	-31 6.4	-76 15.3	2867.1	7.0	23	28139.
7	3	1961	5.0	1215	-31 4.8	-76 14.5	2868.9	12.9	112	28130.
7	3	1961	5.0	1230	-31 6.0	-76 11.0	2872.1	10.6	187	28119.
7	3	1961	5.0	1850	-32 12.8	-76 20.8	2939.4	10.4	186	28380.
7	3	1961	5.0	20 8	-32 26.2	-76 22.5	2952.9	6.9	103	28434.
8	3	1961	5.0	0 0	-32 32.0	-75 51.5	2979.7	6.8	102	28319.
8	3	1961	5.0	4 0	-32 37.7	-75 20.1	3006.7	6.7	103	28204.
8	3	1961	5.0	8 0	-32 43.7	-74 49.2	3033.4	6.7	101	28093.
8	3	1961	5.0	12 8	-32 49.2	-74 16.8	3061.2	6.9	101	27975.
8	3	1961	5.0	1544	-32 54.0	-73 47.9	3086.0	6.6	104	27871.
8	3	1961	5.0	20 8	-33 1.0	-73 14.1	3115.2	7.2	92	27756.
8	3	1961	5.0	2133	-33 1.3	-73 1.9	3125.4	0.4	40	27707.
8	3	1961	5.0	2152	-33 1.2	-73 1.8	3125.5	6.6	86	27706.
8	3	1961	5.0	22 5	-33 1.1	-73 0.1	3127.0	0.3	40	27699.
8	3	1961	5.0	2232	-33 1.0	-73 0.0	3127.1	6.5	90	27698.
9	3	1961	4.0	557	-33 0.8	-72 10.0	3169.0	6.5	89	27496.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
9	3	1961	4.0	9 0	-33 0.5	-71 46.2	3189.0	6.2	87	27401.
9	3	1961	4.0	952	-33 0.2	-71 39.8	3194.4	6.2	93	27375.
9	3	1961	4.0	1013	-33 0.3	-71 37.2	3196.5			27365.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
11	3	1961	4.0	2057	-32 59.1	-71 37.8	0.0	7.6	2	27362.
11	3	1961	4.0	23 8	-32 42.5	-71 37.1	16.6	6.5	37	27304.
12	3	1961	4.0	0 0	-32 38.0	-71 33.0	22.3	7.5	268	27274.
12	3	1961	4.0	047	-32 38.2	-71 40.0	28.2	7.2	230	27301.
12	3	1961	4.0	229	-32 46.1	-71 51.1	40.4	7.4	52	27371.
12	3	1961	4.0	250	-32 44.5	-71 48.7	43.0	6.8	231	27356.
12	3	1961	4.0	944	-33 14.1	-72 32.0	89.8	0.6	220	27629.
12	3	1961	4.0	958	-33 14.2	-72 32.1	90.0	7.6	227	27630.
12	3	1961	4.0	10 6	-33 14.9	-72 33.0	91.0	7.2	230	27636.
12	3	1961	4.0	13 1	-33 28.3	-72 52.3	112.0	7.7	233	27763.
12	3	1961	4.0	1310	-33 29.0	-72 53.4	113.1	0.5	220	27770.
12	3	1961	4.0	1327	-33 29.1	-72 53.5	113.2	7.3	233	27771.
12	3	1961	4.0	14 7	-33 32.0	-72 58.2	118.1	0.4	311	27801.
12	3	1961	4.0	1912	-33 30.7	-73 0.0	120.1	1.2	136	27803.
12	3	1961	4.0	2215	-33 33.3	-72 57.0	123.7	7.1	233	27801.
13	3	1961	5.0	011	-33 46.0	-73 17.0	144.7	6.3	54	27931.
13	3	1961	5.0	052	-33 43.5	-73 12.8	148.9	6.8	232	27904.
13	3	1961	5.0	228	-33 50.2	-73 23.2	159.9	0.3	220	27973.
13	3	1961	5.0	253	-33 50.3	-73 23.3	160.0	7.4	232	27974.
13	3	1961	5.0	11 7	-34 27.8	-74 21.0	220.7	1.3	255	28369.
13	3	1961	5.0	1143	-34 28.0	-74 21.9	221.5	0.9	123	28374.
13	3	1961	5.0	1740	-34 31.0	-74 16.2	227.1	7.1	230	28362.
14	3	1961	5.0	125	-35 6.4	-75 7.0	281.8	4.1	296	28737.
14	3	1961	5.0	145	-35 5.8	-75 8.5	283.1	7.2	226	28741.
14	3	1961	5.0	233	-35 9.8	-75 13.5	288.9	8.9	229	28781.
14	3	1961	5.0	8 7	-35 42.3	-75 59.0	338.2	6.5	229	29137.
14	3	1961	5.0	9 2	-35 46.2	-76 4.5	344.1	10.2	226	29180.
14	3	1961	5.0	920	-35 48.3	-76 7.2	347.1	9.6	231	29203.
14	3	1961	5.0	937	-35 50.0	-76 9.8	349.8	7.3	232	29223.
14	3	1961	5.0	1338	-36 8.1	-76 38.1	379.0	0.2	219	29442.
14	3	1961	5.0	1420	-36 8.2	-76 38.2	379.2	8.5	232	29443.
14	3	1961	5.0	1537	-36 15.0	-76 48.8	390.1	0.8	274	29527.
14	3	1961	5.0	1851	-36 14.8	-76 52.1	392.8	1.3	55	29541.
14	3	1961	5.0	2038	-36 13.5	-76 49.8	395.0	5.0	228	29524.
14	3	1961	5.0	22 6	-36 18.4	-76 56.5	402.3	7.8	53	29580.
15	3	1961	5.0	011	-36 8.5	-76 40.5	418.6	6.3	230	29455.
15	3	1961	5.0	513	-36 29.0	-77 10.4	450.2	7.4	230	29699.
15	3	1961	5.0	12 0	-37 1.3	-77 58.0	500.2	6.4	140	30096.
15	3	1961	5.0	1221	-37 3.0	-77 56.2	502.4	7.8	136	30096.
15	3	1961	5.0	1410	-37 13.2	-77 44.0	516.5	0.8	20	30092.
15	3	1961	5.0	2040	-37 8.5	-77 41.8	521.5	6.8	129	30056.
16	3	1961	5.0	239	-37 34.0	-77 2.2	562.0	7.6	312	30004.
16	3	1961	5.0	3 0	-37 32.2	-77 4.7	564.7	6.7	129	30006.
16	3	1961	5.0	539	-37 43.4	-76 47.3	582.5	6.4	130	29984.
16	3	1961	5.0	1057	-38 5.0	-76 14.1	616.4	0.6	142	29946.
16	3	1961	5.0	11 9	-38 5.1	-76 14.0	616.6	6.2	135	29946.
16	3	1961	5.0	1340	-38 16.0	-76 0.0	632.0	0.6	343	29942.
16	3	1961	5.0	1658	-38 13.0	-76 1.2	635.2	5.9	132	29931.
16	3	1961	5.0	2015	-38 18.1	-75 54.0	642.8	6.3	322	29926.
16	3	1961	5.0	2026	-38 17.2	-75 54.9	643.9	6.1	131	29925.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
16	3	1961	5.0	21 9	-38 20.1	-75 50.7	648.3	3.7	317	29921.
16	3	1961	5.0	2133	-38 19.0	-75 52.0	649.8	6.6	131	29921.
16	3	1961	5.0	2317	-38 26.4	-75 41.0	661.2	7.6	316	29912.
16	3	1961	5.0	2357	-38 22.8	-75 45.5	666.2	7.3	132	29912.
17	3	1961	5.0	125	-38 30.0	-75 35.3	677.0	6.9	321	29906.
17	3	1961	5.0	229	-38 24.3	-75 41.2	684.3	6.6	133	29901.
17	3	1961	5.0	515	-38 36.9	-75 24.2	702.7	6.0	140	29894.
17	3	1961	5.0	655	-38 44.5	-75 16.0	712.6	5.8	142	29900.
17	3	1961	5.0	913	-38 55.0	-75 5.5	725.9	6.0	148	29912.
17	3	1961	5.0	1033	-39 1.8	-75 0.0	733.9	8.7	318	29927.
17	3	1961	5.0	11 1	-38 58.8	-75 3.5	738.0	5.8	147	29926.
17	3	1961	5.0	12 8	-39 4.2	-74 59.0	744.4	6.6	147	29937.
17	3	1961	5.0	13 0	-39 9.0	-74 55.0	750.1	1.7	38	29947.
17	3	1961	5.0	1436	-39 6.8	-74 52.8	752.9	8.3	19	29924.
17	3	1961	5.0	1821	-38 37.5	-74 39.8	783.9	6.4	27	29691.
17	3	1961	5.0	22 1	-38 16.7	-74 26.0	807.4	9.4	11	29508.
18	3	1961	5.0	455	-37 13.4	-74 10.0	871.9	9.3	11	29093.
18	3	1961	5.0	628	-36 59.2	-74 6.5	886.4	8.6	30	29004.
18	3	1961	5.0	814	-36 46.0	-73 56.9	901.6	4.5	0	28895.
18	3	1961	5.0	9 7	-36 42.0	-73 56.9	905.6	11.6	76	28875.
18	3	1961	5.0	1047	-36 37.3	-73 33.5	925.0	11.0	75	28748.
18	3	1961	5.0	1130	-36 35.2	-73 24.0	932.9	10.3	83	28696.
18	3	1961	5.0	1230	-36 34.0	-73 11.2	943.3	11.6	116	28635.
18	3	1961	5.0	13 0	-36 36.5	-73 4.7	949.0			28619.

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DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
20	3	1961	5.0	1830	-36 37.1	-73 10.9	0.0	8.7	247	28647.
20	3	1961	5.0	2030	-36 43.8	-73 30.8	17.3	7.8	246	28767.
20	3	1961	5.0	23 0	-36 51.6	-73 53.0	36.7	9.7	245	28903.
21	3	1961	5.0	6 0	-37 20.0	-75 10.2	104.5	9.5	179	29399.
21	3	1961	5.0	957	-37 57.5	-75 9.7	142.0	0.5	47	29600.
21	3	1961	5.0	1526	-37 55.5	-75 7.0	145.0	10.3	152	29576.
22	3	1961	5.0	229	-39 36.0	-73 58.0	259.0	9.7	222	29846.
22	3	1961	5.0	5 9	-39 55.1	-74 20.5	284.7	10.3	226	30069.
22	3	1961	5.0	1023	-40 32.2	-75 11.3	338.4	5.5	224	30546.
22	3	1961	5.0	1053	-40 34.2	-75 13.8	341.2	2.8	61	30571.
22	3	1961	5.0	12 8	-40 32.5	-75 9.8	344.6	1.4	56	30541.
22	3	1961	5.0	1514	-40 30.0	-75 4.9	349.1	10.4	179	30501.
22	3	1961	5.0	1840	-41 5.8	-75 4.0	384.9	10.1	177	30737.
22	3	1961	5.0	2253	-41 48.2	-75 1.5	427.4	9.6	192	31020.
23	3	1961	5.0	810	-43 14.8	-75 27.5	516.1	0.3	24	31786.
23	3	1961	5.0	1048	-43 14.0	-75 27.0	516.9	11.0	140	31778.
23	3	1961	5.0	1131	-43 20.0	-75 20.0	524.8	0.5	65	31790.
23	3	1961	5.0	1328	-43 19.6	-75 18.8	525.8	9.9	122	31782.
23	3	1961	5.0	1424	-43 24.5	-75 8.0	535.0	1.3	55	31768.
23	3	1961	5.0	15 5	-43 24.0	-75 7.0	535.9	6.2	125	31759.
23	3	1961	5.0	1522	-43 25.0	-75 5.0	537.7	0.7	65	31757.
23	3	1961	5.0	1544	-43 24.9	-75 4.7	537.9	11.9	125	31755.
23	3	1961	5.0	1627	-43 29.8	-74 55.1	546.4	0.3	125	31747.
23	3	1961	5.0	17 0	-43 29.9	-74 54.9	546.6	9.3	195	31747.
23	3	1961	5.0	1720	-43 32.9	-74 56.0	549.7	8.9	198	31776.
23	3	1961	5.0	2350	-44 28.2	-75 21.0	607.9	8.2	196	32339.
24	3	1961	5.0	330	-44 57.1	-75 33.0	638.0	8.4	205	32638.
24	3	1961	5.0	749	-45 30.0	-75 55.0	674.4	8.7	173	33026.
24	3	1961	5.0	825	-45 35.2	-75 54.1	679.6	9.4	176	33066.
24	3	1961	5.0	14 0	-46 27.5	-75 49.0	732.0	9.1	182	33503.
24	3	1961	5.0	16 0	-46 45.7	-75 50.0	750.2	9.5	180	33673.
24	3	1961	5.0	1730	-47 0.0	-75 50.1	764.5	9.0	269	33805.
24	3	1961	5.0	18 0	-47 0.1	-75 56.7	769.0	0.9	73	33838.
24	3	1961	5.0	2130	-46 59.2	-75 52.5	772.0	12.4	110	33809.
24	3	1961	5.0	2158	-47 1.2	-75 44.6	777.8	0.5	70	33789.
24	3	1961	5.0	23 5	-47 1.0	-75 43.8	778.4	8.6	102	33783.
24	3	1961	5.0	2338	-47 2.0	-75 37.0	783.1	1.1	105	33759.
25	3	1961	5.0	022	-47 2.2	-75 35.9	783.9	8.0	112	33755.
25	3	1961	5.0	038	-47 3.0	-75 33.0	786.0	1.2	90	33749.
25	3	1961	5.0	120	-47 3.0	-75 31.8	786.8	8.0	208	33743.
25	3	1961	5.0	2 0	-47 7.7	-75 35.5	792.2	10.1	223	33804.
25	3	1961	5.0	518	-47 32.0	-76 9.0	825.4	9.9	229	34195.
25	3	1961	5.0	1216	-48 17.6	-77 26.5	894.5	9.3	218	35017.
25	3	1961	5.0	19 9	-49 8.0	-78 26.2	958.5	10.5	218	35814.
25	3	1961	5.0	21 1	-49 23.5	-78 44.8	978.2	0.7	186	36064.
26	3	1961	5.0	1 3	-49 26.5	-78 45.3	981.2	9.5	93	36096.
26	3	1961	5.0	530	-49 28.8	-77 40.0	1023.7	2.8	0	35788.
26	3	1961	5.0	535	-49 17.3	-77 40.0	1035.2	2.8	324	35672.
26	3	1961	5.0	1047	-49 14.6	-77 43.0	1038.6	3.1	311	35660.
26	3	1961	5.0	1250	-49 10.4	-77 50.3	1044.9	3.8	24	35655.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
26	3	1961	5.0	1553	-48 59.7	-77 43.0	1056.6	7.7	221	35512.
26	3	1961	5.0	1620	-49 2.3	-77 46.5	1060.1	7.1	267	35556.
26	3	1961	5.0	1817	-49 3.0	-78 7.5	1073.9	4.6	162	35669.
26	3	1961	5.0	1858	-49 6.0	-78 6.0	1077.0	6.0	29	35691.
26	3	1961	5.0	2135	-48 52.3	-77 54.2	1092.8	6.9	270	35496.
26	3	1961	5.0	2313	-48 52.3	-78 11.3	1104.0	8.6	239	35582.
27	3	1961	5.0	058	-49 0.0	-78 31.0	1119.1	8.4	180	35759.
27	3	1961	5.0	128	-49 4.2	-78 31.0	1123.3	6.3	270	35801.
27	3	1961	5.0	326	-49 4.2	-78 50.0	1135.7	8.7	160	35898.
27	3	1961	5.0	52	-49 17.7	-78 45.0	1149.6	1.9	141	36007.
27	3	1961	5.0	95	-49 23.8	-78 37.5	1157.4	9.6	146	36029.
27	3	1961	5.0	1218	-49 49.3	-78 10.8	1188.2	11.6	142	36151.
27	3	1961	5.0	1846	-50 48.2	-76 57.5	1263.5	10.8	141	36394.
27	3	1961	5.0	2355	-51 31.0	-76 1.3	1318.9	11.6	132	36576.
28	3	1961	5.0	05	-51 32.3	-75 59.0	1320.9	12.4	165	36579.
28	3	1961	5.0	334	-52 14.0	-75 40.6	1364.1	12.7	136	36942.
28	3	1961	5.0	430	-52 22.5	-75 27.0	1376.0	12.0	120	36971.
28	3	1961	5.0	530	-52 28.5	-75 9.9	1388.0	12.2	124	36957.
28	3	1961	5.0	628	-52 35.0	-74 53.8	1399.8	12.0	120	36953.
28	3	1961	5.0	730	-52 41.2	-74 36.0	1412.2	8.3	105	36939.
29	3	1961	4.0	23	-53 19.2	-70 41.2	1558.5	11.9	17	36325.
29	3	1961	4.0	30	-53 8.4	-70 35.8	1569.8	12.1	14	36178.
29	3	1961	4.0	348	-52 59.0	-70 32.0	1579.5	4.8	90	36055.
29	3	1961	4.0	357	-52 59.0	-70 30.8	1580.2	7.7	189	36050.
29	3	1961	4.0	50	-53 7.0	-70 32.8	1588.3	10.2	189	36150.
29	3	1961	4.0	617	-53 19.9	-70 36.3	1601.4			36312.

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DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
1	4	1961	4.0	1124	-53 10.2	-70 52.7	0.0	8.8	54	36269.
1	4	1961	4.0	1132	-53 9.5	-70 51.1	1.2	13.5	90	36255.
1	4	1961	4.0	1135	-53 9.5	-70 50.0	1.8	13.5	47	36250.
1	4	1961	4.0	1146	-53 7.8	-70 47.0	4.3	10.9	47	36218.
1	4	1961	4.0	1243	-53 0.8	-70 34.3	14.7	11.0	46	36084.
1	4	1961	4.0	13 9	-52 57.5	-70 28.6	19.4	9.7	0	36023.
1	4	1961	4.0	1330	-52 54.1	-70 28.6	22.8	10.2	9	35984.
1	4	1961	4.0	1348	-52 51.1	-70 27.8	25.9	12.9	359	35947.
1	4	1961	4.0	14 0	-52 48.5	-70 27.9	28.5	10.5	351	35918.
1	4	1961	4.0	1418	-52 45.4	-70 28.7	31.6	12.2	351	35886.
1	4	1961	4.0	1420	-52 45.0	-70 28.8	32.0	11.2	73	35882.
1	4	1961	4.0	1437	-52 44.1	-70 23.8	35.2	14.6	74	35851.
1	4	1961	4.0	1455	-52 42.9	-70 16.8	39.6	13.1	70	35808.
1	4	1961	4.0	1515	-52 41.4	-70 10.0	44.0	12.7	69	35762.
1	4	1961	4.0	1531	-52 40.2	-70 4.8	47.3	1.8	81	35727.
1	4	1961	4.0	1553	-52 40.1	-70 3.7	48.0	10.7	130	35721.
1	4	1961	4.0	16 0	-52 40.9	-70 2.1	49.3	2.2	123	35723.
1	4	1961	4.0	1630	-52 41.5	-70 0.6	50.4	7.6	125	35724.
1	4	1961	4.0	17 0	-52 43.7	-69 55.5	54.2	3.2	90	35727.
1	4	1961	4.0	1718	-52 43.7	-69 53.9	55.1	4.8	46	35721.
1	4	1961	4.0	1738	-52 42.6	-69 52.0	56.7	5.8	345	35701.
1	4	1961	4.0	1753	-52 41.2	-69 52.6	58.2	3.3	15	35687.
1	4	1961	4.0	1810	-52 40.3	-69 52.2	59.1	3.4	56	35675.
1	4	1961	4.0	1845	-52 39.2	-69 49.5	61.1	10.6	8	35652.
1	4	1961	4.0	19 5	-52 35.7	-69 48.7	64.6	2.3	76	35609.
1	4	1961	4.0	1926	-52 35.5	-69 47.4	65.4	8.6	177	35601.
1	4	1961	4.0	1942	-52 37.8	-69 47.2	67.7	8.9	168	35626.
1	4	1961	4.0	20 2	-52 40.7	-69 46.2	70.7	9.8	153	35655.
1	4	1961	4.0	2011	-52 42.0	-69 45.1	72.1	1.1	135	35665.
1	4	1961	4.0	2034	-52 42.3	-69 44.6	72.6	3.6	61	35666.
1	4	1961	4.0	2041	-52 42.1	-69 44.0	73.0	12.3	47	35662.
1	4	1961	4.0	2051	-52 40.7	-69 41.5	75.0	12.8	42	35635.
1	4	1961	4.0	21 8	-52 38.0	-69 37.5	78.7	0.8	12	35589.
2	4	1961	4.0	6 0	-52 31.3	-69 35.2	85.5	15.2	49	35504.
2	4	1961	4.0	615	-52 28.8	-69 30.5	89.3	16.3	42	35456.
2	4	1961	4.0	630	-52 25.8	-69 26.0	93.4	15.3	53	35404.
2	4	1961	4.0	645	-52 23.5	-69 21.0	97.2	13.8	59	35358.
2	4	1961	4.0	656	-52 22.2	-69 17.5	99.7	12.2	88	35329.
2	4	1961	4.0	758	-52 21.8	-68 56.9	112.3	8.0	119	35240.
2	4	1961	4.0	820	-52 23.2	-68 52.7	115.2	9.0	119	35239.
2	4	1961	4.0	845	-52 25.0	-68 47.3	119.0	10.2	117	35237.
2	4	1961	4.0	915	-52 27.3	-68 39.8	124.1	9.5	111	35233.
2	4	1961	4.0	947	-52 29.1	-68 32.0	129.2	10.1	123	35221.
2	4	1961	4.0	1030	-52 33.0	-68 22.0	136.4	10.6	124	35225.
2	4	1961	4.0	11 0	-52 36.0	-68 14.8	141.7	0.9	309	35230.
2	4	1961	4.0	1720	-52 32.6	-68 21.7	147.1	17.7	298	35220.
2	4	1961	4.0	1754	-52 27.9	-68 36.3	157.2	6.5	71	35225.
2	4	1961	4.0	1819	-52 27.0	-68 32.1	159.9	8.0	268	35198.
2	4	1961	4.0	1841	-52 27.1	-68 36.9	162.8	9.1	265	35219.
2	4	1961	4.0	1930	-52 27.8	-68 49.0	170.2	12.5	248	35275.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
2	4	1961	4.0	1948	-52 29.2	-68 54.7	173.9	4.3	205	35314.
2	4	1961	4.0	2C 8	-52 3C.5	-68 55.7	175.4	14.5	321	35333.
2	4	1961	4.0	2016	-52 29.0	-68 57.7	177.3	11.0	325	35324.
2	4	1961	4.0	2047	-52 24.3	-69 3.0	183.0	13.0	337	35293.
2	4	1961	4.0	21 0	-52 21.7	-69 4.8	185.8	10.2	353	35271.
2	4	1961	4.0	21 9	-52 2C.2	-69 5.1	187.3	11.3	329	35256.
2	4	1961	4.0	2117	-52 18.9	-69 6.4	188.9	0.5	351	35246.
2	4	1961	4.0	22 9	-52 18.5	-69 6.5	189.3	13.1	224	35242.
2	4	1961	4.0	2221	-52 2C.4	-69 9.5	191.9	9.4	259	35276.
2	4	1961	4.0	2242	-52 21.0	-69 14.8	195.2	17.6	255	35304.
2	4	1961	4.0	2250	-52 21.6	-69 18.5	197.5	1.7	238	35326.
2	4	1961	4.0	2310	-52 21.9	-69 19.3	198.1	13.0	218	35333.
2	4	1961	4.0	2330	-52 25.3	-69 23.7	2C2.5	11.9	232	35389.
2	4	1961	4.0	2344	-52 27.0	-69 27.3	2C5.2	18.8	233	35423.
2	4	1961	4.0	2353	-52 28.7	-69 31.0	2C8.1	16.2	223	35457.
3	4	1961	4.0	021	-52 34.2	-69 39.5	215.6	22.5	193	35554.
3	4	1961	4.0	026	-52 36.0	-69 4C.2	217.5	15.6	215	35577.
3	4	1961	4.0	032	-52 37.3	-69 41.7	219.0	8.7	245	35598.
3	4	1961	4.0	1 0	-52 39.0	-69 47.8	223.1	2.7	249	35642.
3	4	1961	4.0	132	-52 39.5	-69 5C.0	224.5	11.7	258	35657.
3	4	1961	4.0	23C	-52 41.9	-7C 8.2	235.8	9.7	257	35760.
3	4	1961	4.0	3 0	-52 43.0	-7C 16.0	24C.7	9.0	253	35805.
3	4	1961	4.0	33C	-52 44.3	-7C 23.1	245.2	7.6	257	35850.
3	4	1961	4.0	355	-52 45.0	-7C 28.2	248.3	8.8	227	35879.
3	4	1961	4.0	4 0	-52 45.5	-7C 29.1	249.1	7.8	180	35889.
3	4	1961	4.0	41C	-52 46.8	-7C 29.1	25C.4	11.4	182	35904.
3	4	1961	4.0	432	-52 51.0	-7C 29.3	254.6	1C.1	180	35952.
3	4	1961	4.0	5 0	-52 55.7	-7C 29.3	259.3	7.9	189	36005.
3	4	1961	4.0	537	-53 0.5	-7C 3C.5	264.1	9.6	184	36065.
3	4	1961	4.0	61C	-53 5.9	-7C 31.2	269.6	9.9	185	36129.
3	4	1961	4.0	728	-53 18.7	-7C 33.0	282.4			36283.

VEMA 1709 PUNTA ARENAS - PUERTO WILLIAMS

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
14	4	1961	4.0	1338	-55 12.2	-70 15.5	0.0	6.5	209	37534.
14	4	1961	4.0	15 0	-55 20.0	-70 23.0	8.9	6.1	200	37658.
14	4	1961	4.0	1657	-55 31.2	-70 30.0	20.8	6.7	265	37822.
14	4	1961	4.0	1920	-55 32.5	-70 58.0	36.7	10.2	233	37954.
15	4	1961	4.0	7 3	-56 45.1	-73 48.0	156.0	9.9	233	39562.
15	4	1961	4.0	8 9	-56 51.6	-74 4.0	166.9	9.0	334	39712.
15	4	1961	4.0	941	-56 39.2	-74 14.9	180.7	9.6	259	39610.
15	4	1961	4.0	1042	-56 41.0	-74 32.4	190.5	10.2	178	39710.
15	4	1961	4.0	1243	-57 1.5	-74 31.1	211.0	0.5	100	39952.
15	4	1961	4.0	1859	-57 2.0	-74 25.7	214.0	11.4	178	39934.
16	4	1961	4.0	640	-59 15.0	-74 18.7	347.0	6.6	181	41533.
16	4	1961	4.0	7 0	-59 17.2	-74 18.8	349.2	0.4	123	41561.
16	4	1961	4.0	1327	-59 18.7	-74 14.2	352.0	10.2	204	41560.
16	4	1961	4.0	1846	-60 8.3	-74 57.8	406.2	0.4	60	42361.
17	4	1961	4.0	0 2	-60 7.2	-74 54.0	408.4	7.7	203	42331.
17	4	1961	4.0	646	-60 55.0	-75 36.2	460.6	8.9	203	43102.
17	4	1961	4.0	750	-61 3.7	-75 44.0	470.0	9.8	222	43243.
17	4	1961	4.0	848	-61 10.7	-75 57.2	479.5	0.4	138	43385.
17	4	1961	4.0	1541	-61 12.7	-75 53.5	482.2	11.3	160	43394.
17	4	1961	4.0	21 9	-62 10.8	-75 8.8	544.0	1.0	142	43924.
18	4	1961	4.0	0 0	-62 13.1	-75 5.0	546.9	6.2	94	43937.
18	4	1961	4.0	630	-62 16.2	-73 38.2	587.5	10.3	92	43621.
18	4	1961	4.0	18 0	-62 20.0	-69 24.5	705.5	6.2	91	42681.
18	4	1961	4.0	20 0	-62 20.3	-68 57.7	717.9	4.4	4	42584.
19	4	1961	4.0	8 0	-61 27.3	-68 50.5	771.0	5.5	358	41878.
19	4	1961	4.0	1614	-60 42.0	-68 54.0	816.3	10.4	165	41311.
19	4	1961	4.0	18 0	-60 59.8	-68 44.0	834.8	6.2	165	41501.
19	4	1961	4.0	20 5	-61 12.2	-68 37.0	847.7	5.5	167	41633.
20	4	1961	4.0	039	-61 36.7	-68 25.3	872.8	0.5	335	41904.
20	4	1961	4.0	422	-61 35.0	-68 27.0	874.7	5.0	167	41889.
20	4	1961	4.0	6 8	-61 43.7	-68 22.8	883.6	0.7	333	41985.
20	4	1961	4.0	8 0	-61 42.6	-68 24.0	884.8	10.6	166	41975.
20	4	1961	4.0	858	-61 52.5	-68 18.7	895.0	0.3	317	42082.
20	4	1961	4.0	1242	-61 51.8	-68 20.1	896.0	10.7	164	42079.
20	4	1961	4.0	1339	-62 1.6	-68 14.1	906.2	0.3	317	42182.
20	4	1961	4.0	1655	-62 0.8	-68 15.7	907.3	9.0	164	42178.
20	4	1961	4.0	1756	-62 9.6	-68 10.2	916.5	0.8	319	42271.
20	4	1961	4.0	1855	-62 9.0	-68 11.3	917.3	5.6	83	42267.
21	4	1961	4.0	622	-62 1.3	-65 55.0	981.5	9.2	90	41677.
21	4	1961	4.0	8 0	-62 1.2	-65 22.9	996.6	11.4	90	41563.
21	4	1961	4.0	1040	-62 1.0	-64 18.2	1026.9	12.2	137	41338.
21	4	1961	4.0	1435	-62 36.1	-63 8.2	1074.8	12.7	117	41562.
21	4	1961	4.0	1530	-62 41.4	-62 45.7	1086.4	14.4	118	41558.
21	4	1961	4.0	1611	-62 46.0	-62 26.8	1096.2	6.1	115	41557.
21	4	1961	4.0	1657	-62 48.0	-62 17.5	1100.9	5.1	77	41553.
21	4	1961	4.0	18 1	-62 46.8	-62 6.0	1106.3	1.1	177	41501.
21	4	1961	4.0	1926	-62 48.3	-62 5.8	1107.8	5.5	115	41520.
21	4	1961	4.0	2141	-62 53.5	-61 41.0	1120.3	4.3	88	41506.
21	4	1961	4.0	2233	-62 53.4	-61 32.8	1124.0	5.4	128	41479.
21	4	1961	4.0	23 5	-62 55.2	-61 27.8	1126.9	4.3	94	41487.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
22	4	1961	4.0	021	-62 55.6	-61 15.8	1132.4	3.7	88	41454.
22	4	1961	4.0	230	-62 55.3	-60 58.5	1140.3	3.1	68	41396.
22	4	1961	4.0	335	-62 54.0	-60 51.6	1143.7	2.8	57	41358.
22	4	1961	4.0	6 0	-62 50.2	-60 39.0	1150.6	3.2	105	41268.
22	4	1961	4.0	637	-62 50.7	-60 34.8	1152.5	5.8	105	41262.
22	4	1961	4.0	725	-62 51.9	-60 24.9	1157.2	12.2	134	41247.
22	4	1961	4.0	735	-62 53.3	-60 21.7	1159.2	14.9	180	41256.
22	4	1961	4.0	745	-62 55.8	-60 21.7	1161.7	10.6	215	41289.
22	4	1961	4.0	8 3	-62 58.4	-60 25.7	1164.9	11.7	245	41335.
22	4	1961	4.0	820	-62 59.8	-60 32.3	1168.2	0.2	54	41374.
23	4	1961	4.0	12 0	-62 55.8	-60 20.3	1175.0	11.0	49	41285.
23	4	1961	4.0	14 0	-62 41.3	-59 44.0	1197.0	11.9	46	40982.
23	4	1961	4.0	15 0	-62 33.0	-59 25.6	1208.9	0.1	355	40817.
26	4	1961	4.0	9 9	-62 25.6	-59 27.0	1216.3	8.6	90	40724.
26	4	1961	4.0	928	-62 25.6	-59 21.1	1219.0	7.3	58	40706.
26	4	1961	4.0	945	-62 24.5	-59 17.3	1221.1	9.4	7	40680.
26	4	1961	4.0	1025	-62 18.3	-59 15.7	1227.3	11.1	337	40593.
26	4	1961	4.0	1055	-62 13.2	-59 20.3	1232.9	8.3	336	40540.
26	4	1961	4.0	12 0	-62 5.0	-59 28.0	1241.8	10.8	337	40455.
26	4	1961	4.0	13 0	-61 55.1	-59 37.0	1252.6	11.3	335	40352.
26	4	1961	4.0	1730	-61 8.8	-60 22.0	1303.6	7.0	336	39883.
26	4	1961	4.0	18 0	-61 5.6	-60 25.0	1307.1	6.3	347	39850.
26	4	1961	4.0	19 5	-60 59.0	-60 28.2	1313.9	0.3	78	39774.
26	4	1961	4.0	2246	-60 58.8	-60 26.2	1314.9	6.6	334	39765.
27	4	1961	4.0	635	-60 12.0	-61 12.0	1366.8	10.1	336	39300.
27	4	1961	4.0	16 0	-58 45.0	-62 28.6	1462.1	10.9	337	38429.
27	4	1961	4.0	1730	-58 30.0	-62 41.0	1478.5	8.3	335	38279.
27	4	1961	4.0	1757	-58 26.6	-62 44.0	1482.2	6.5	336	38246.
27	4	1961	4.0	2030	-58 11.4	-62 57.0	1498.9	7.9	332	38097.
28	4	1961	4.0	9 0	-56 44.3	-64 22.4	1597.3	5.7	336	37300.
28	4	1961	4.0	12 0	-56 28.8	-64 35.0	1614.3	2.7	340	37153.
28	4	1961	4.0	15 0	-56 21.3	-64 40.0	1622.3	5.5	333	37078.
28	4	1961	4.0	17 0	-56 11.4	-64 49.0	1633.4	6.9	330	36989.
28	4	1961	4.0	2035	-55 50.0	-65 11.0	1658.1	8.6	358	36806.
28	4	1961	4.0	23 0	-55 29.3	-65 12.2	1678.8	6.3	313	36559.
29	4	1961	4.0	134	-55 18.3	-65 33.0	1694.9	5.9	307	36502.
29	4	1961	4.0	247	-55 14.0	-65 43.0	1702.1	4.0	293	36487.
29	4	1961	4.0	4 0	-55 12.1	-65 50.8	1706.9	4.1	294	36493.
29	4	1961	4.0	6 0	-55 8.8	-66 4.0	1715.1	5.0	306	36500.
29	4	1961	4.0	7 0	-55 5.8	-66 11.1	1720.2	5.6	273	36490.
29	4	1961	4.0	8 0	-55 5.5	-66 20.8	1725.7	6.8	286	36523.
29	4	1961	4.0	945	-55 2.3	-66 40.8	1737.6	9.7	300	36560.
29	4	1961	4.0	10 0	-55 1.1	-66 44.5	1740.1	9.6	300	36559.
29	4	1961	4.0	1015	-54 59.9	-66 48.1	1742.5	8.2	299	36558.
29	4	1961	4.0	1030	-54 58.9	-66 51.2	1744.5	9.8	308	36558.
29	4	1961	4.0	1045	-54 57.4	-66 54.6	1747.0	9.4	299	36553.
29	4	1961	4.0	1053	-54 56.8	-66 56.5	1748.2	8.5	287	36553.
29	4	1961	4.0	11 5	-54 56.3	-66 59.3	1749.9	9.1	281	36558.
29	4	1961	4.0	1115	-54 56.0	-67 1.9	1751.4	8.5	284	36564.
29	4	1961	4.0	1118	-54 55.9	-67 2.6	1751.8	4.4	280	36566.

VEMA 17C9 PUNTA ARENAS - PUERTO WILLIAMS

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
29	4	1961	4.0	1126	-54 55.8	-67 3.6	1752.4	9.4	282	36568.
29	4	1961	4.0	1135	-54 55.5	-67 6.0	1753.8	9.1	289	36574.
29	4	1961	4.0	1149	-54 54.8	-67 9.5	1756.0	9.6	280	36579.
29	4	1961	4.0	1156	-54 54.6	-67 11.4	1757.1	13.5	270	36584.
29	4	1961	4.0	12 0	-54 54.6	-67 13.0	1758.0	8.3	267	36590.
29	4	1961	4.0	1215	-54 54.7	-67 16.6	1760.1	9.7	274	36605.
29	4	1961	4.0	1225	-54 54.6	-67 19.4	1761.7	9.0	266	36615.
29	4	1961	4.0	1235	-54 54.7	-67 22.0	1763.2	7.8	266	36626.
29	4	1961	4.0	1246	-54 54.8	-67 24.5	1764.6	8.7	261	36637.
29	4	1961	4.0	13 4	-54 55.2	-67 29.0	1767.2			36659.

VEMA 171C USHUAIA - PUERTO BELGRANO

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
4	5	1961	4.0	11 0	-54 48.6	-68 17.8	0.0	6.3	104	36770.
4	5	1961	4.0	1131	-54 49.4	-68 12.3	3.3	6.5	105	36757.
4	5	1961	4.0	12 0	-54 50.2	-68 7.0	6.4	7.0	96	36746.
4	5	1961	4.0	12 9	-54 50.3	-68 5.2	7.5	5.6	154	36740.
4	5	1961	4.0	1233	-54 52.3	-68 3.5	9.7	8.6	130	36757.
4	5	1961	4.0	1245	-54 53.4	-68 1.2	11.4	5.0	31	36761.
4	5	1961	4.0	13 9	-54 51.7	-67 59.4	13.4	5.6	131	36734.
4	5	1961	4.0	1330	-54 53.0	-67 56.8	15.4	5.9	96	36739.
4	5	1961	4.0	14 1	-54 53.3	-67 51.5	18.4	12.4	90	36722.
4	5	1961	4.0	1416	-54 53.3	-67 46.1	21.6	11.4	99	36701.
4	5	1961	4.0	1430	-54 53.7	-67 41.5	24.2	11.2	84	36688.
4	5	1961	4.0	1440	-54 53.5	-67 38.3	26.1	10.8	87	36673.
4	5	1961	4.0	1450	-54 53.4	-67 35.2	27.9	12.9	125	36660.
4	5	1961	4.0	15 2	-54 54.9	-67 31.5	30.5	6.5	102	36663.
4	5	1961	4.0	1515	-54 55.2	-67 29.1	31.9	11.2	86	36658.
4	5	1961	4.0	1529	-54 55.0	-67 24.6	34.5	12.8	86	36638.
4	5	1961	4.0	1536	-54 54.9	-67 22.0	36.0	11.5	83	36627.
4	5	1961	4.0	1545	-54 54.7	-67 19.0	37.7	11.3	88	36613.
4	5	1961	4.0	16 0	-54 54.6	-67 14.1	40.5	10.6	88	36593.
4	5	1961	4.0	1615	-54 54.5	-67 9.5	43.2	11.9	110	36574.
4	5	1961	4.0	1643	-54 56.4	-67 0.5	48.7	11.5	101	36562.
4	5	1961	4.0	17 0	-54 57.0	-66 54.9	52.0	11.8	123	36548.
4	5	1961	4.0	1715	-54 58.6	-66 50.6	54.9	11.1	124	36551.
4	5	1961	4.0	1738	-55 1.0	-66 44.5	59.1	11.0	128	36556.
4	5	1961	4.0	1817	-55 5.4	-66 34.7	66.3	12.9	125	36572.
4	5	1961	4.0	1830	-55 7.0	-66 30.7	69.1	5.0	117	36576.
4	5	1961	4.0	1925	-55 9.1	-66 23.5	73.7	10.5	125	36574.
4	5	1961	4.0	1954	-55 12.0	-66 16.2	78.8	1.3	13	36582.
4	5	1961	4.0	2017	-55 11.5	-66 16.0	79.3	11.1	124	36575.
4	5	1961	4.0	2044	-55 14.3	-66 8.8	84.2	1.2	49	36582.
4	5	1961	4.0	21 7	-55 14.0	-66 8.2	84.7	12.0	130	36576.
4	5	1961	4.0	2134	-55 17.5	-66 1.0	90.1	2.7	30	36592.
4	5	1961	4.0	2147	-55 17.0	-66 0.5	90.7	10.9	128	36584.
4	5	1961	4.0	2214	-55 20.0	-65 53.7	95.6	1.2	78	36595.
5	5	1961	4.0	1 0	-55 19.3	-65 48.0	98.9	15.3	55	36565.
5	5	1961	4.0	217	-55 8.1	-65 19.7	118.5	10.8	135	36327.
5	5	1961	4.0	327	-55 17.0	-65 4.0	131.2	9.7	243	36377.
5	5	1961	4.0	810	-55 38.0	-66 16.1	177.1	6.2	78	36895.
5	5	1961	4.0	851	-55 37.1	-66 8.8	181.3	13.3	22	36857.
5	5	1961	4.0	910	-55 33.2	-66 6.0	185.5	7.5	301	36800.
5	5	1961	4.0	927	-55 32.1	-66 9.2	187.7	4.9	307	36798.
5	5	1961	4.0	1037	-55 28.7	-66 17.2	193.3	2.3	33	36787.
5	5	1961	4.0	1056	-55 28.1	-66 16.5	194.0	5.6	22	36777.
5	5	1961	4.0	1112	-55 26.7	-66 15.5	195.6	9.6	20	36756.
5	5	1961	4.0	1128	-55 24.3	-66 14.0	198.1	11.7	99	36722.
5	5	1961	4.0	1151	-55 25.0	-66 6.2	202.6	12.8	294	36701.
5	5	1961	4.0	12 5	-55 23.8	-66 11.0	205.6	4.5	102	36705.
5	5	1961	4.0	1315	-55 24.9	-66 2.0	210.8	10.9	146	36684.
5	5	1961	4.0	15 0	-55 40.8	-65 43.2	229.9	7.4	144	36808.
5	5	1961	4.0	1555	-55 46.3	-65 36.2	236.7	12.3	281	36849.

VEMA 1710 USHUAIA - PUERTO BELGRANO

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
5	5	1961	4.0	16 0	-55 46.1	-65 38.0	237.7	5.9	145	36853.
5	5	1961	4.0	2030	-56 8.0	-65 10.7	264.4	3.5	165	37021.
5	5	1961	4.0	2320	-56 17.6	-65 6.2	274.3	2.4	151	37122.
6	5	1961	4.0	0 0	-56 19.0	-65 4.8	275.9	6.0	140	37135.
6	5	1961	4.0	4 0	-56 37.3	-64 36.8	299.9	6.0	123	37260.
6	5	1961	4.0	810	-56 50.7	-63 58.5	324.8	7.8	107	37291.
6	5	1961	4.0	11 3	-56 57.3	-63 19.4	347.2	8.6	97	37239.
6	5	1961	4.0	1145	-56 58.0	-63 8.4	353.2	6.3	44	37210.
6	5	1961	4.0	13 0	-56 52.3	-62 58.3	361.1	1.4	313	37105.
6	5	1961	4.0	1436	-56 50.8	-63 1.2	363.3	7.2	34	37096.
6	5	1961	4.0	17 5	-56 36.0	-62 42.8	381.2	1.0	13	36851.
7	5	1961	4.0	0 0	-56 29.3	-62 40.1	388.1	0.8	14	36759.
7	5	1961	4.0	3 0	-56 26.9	-62 39.0	390.6	6.5	28	36726.
7	5	1961	4.0	348	-56 22.3	-62 34.5	395.8	4.9	214	36654.
7	5	1961	4.0	626	-56 33.0	-62 47.4	408.7	4.3	27	36829.
7	5	1961	4.0	724	-56 29.3	-62 44.0	412.8	4.8	215	36772.
7	5	1961	4.0	910	-56 36.3	-62 52.8	421.3	3.9	55	36888.
7	5	1961	4.0	10 3	-56 34.3	-62 47.7	424.8	7.1	28	36846.
7	5	1961	4.0	13 6	-56 15.2	-62 29.7	446.3	7.2	26	36551.
7	5	1961	4.0	18 8	-55 42.7	-62 1.2	482.5	6.0	320	36060.
7	5	1961	4.0	1843	-55 40.0	-62 5.2	486.0	6.2	132	36040.
7	5	1961	4.0	1912	-55 42.0	-62 1.2	489.1	4.9	316	36051.
8	5	1961	4.0	517	-55 5.0	-62 59.5	538.7	0.9	330	35799.
8	5	1961	4.0	525	-55 4.9	-62 59.6	538.8	7.1	317	35798.
8	5	1961	4.0	6 8	-55 1.2	-63 5.7	543.9	7.5	312	35774.
8	5	1961	4.0	647	-54 57.9	-63 12.0	548.8	5.5	69	35756.
8	5	1961	4.0	8 8	-54 55.2	-63 0.0	556.2	6.1	312	35683.
8	5	1961	4.0	9 0	-54 51.7	-63 6.8	561.5	6.4	315	35664.
8	5	1961	4.0	11 3	-54 42.5	-63 23.0	574.6	9.2	303	35610.
8	5	1961	4.0	1215	-54 36.4	-63 39.0	585.6	8.7	242	35592.
8	5	1961	4.0	1249	-54 38.7	-63 46.5	590.6	8.3	210	35645.
8	5	1961	4.0	1325	-54 43.0	-63 50.8	595.5	0.1	7	35711.
9	5	1961	4.0	942	-54 40.0	-63 50.2	598.5	6.2	78	35674.
9	5	1961	4.0	1015	-54 39.3	-63 44.4	602.0	9.6	93	35645.
9	5	1961	4.0	11 0	-54 39.7	-63 32.0	609.2	9.1	78	35607.
9	5	1961	4.0	1145	-54 38.3	-63 20.5	616.0	7.2	75	35551.
9	5	1961	4.0	1217	-54 37.3	-63 14.1	619.8	11.5	72	35518.
9	5	1961	4.0	13 8	-54 34.3	-62 58.0	629.6	12.1	92	35428.
9	5	1961	4.0	1647	-54 35.8	-61 42.0	673.7	12.3	33	35195.
9	5	1961	4.0	1750	-54 25.0	-61 29.7	686.6	11.5	116	35028.
9	5	1961	4.0	19 7	-54 31.4	-61 6.8	701.4	4.9	174	35031.
9	5	1961	4.0	2118	-54 42.0	-61 4.9	712.0	5.7	49	35150.
9	5	1961	4.0	2238	-54 37.0	-60 55.0	719.6	6.1	120	35060.
10	5	1961	4.0	055	-54 44.0	-60 34.3	733.5	5.1	173	35078.
10	5	1961	4.0	139	-54 47.7	-60 33.5	737.2	7.2	176	35120.
10	5	1961	4.0	248	-54 56.0	-60 32.4	745.6	1.0	74	35215.
10	5	1961	4.0	413	-54 55.6	-60 30.0	747.0	9.2	39	35203.
10	5	1961	4.0	429	-54 53.7	-60 27.3	749.4	1.5	64	35172.
10	5	1961	4.0	5 5	-54 53.3	-60 25.9	750.3	5.6	49	35163.
10	5	1961	4.0	528	-54 51.9	-60 23.1	752.5	3.0	64	35138.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
10	5	1961	4.0	555	-54 51.3	-60 21.0	753.8	13.9	132	35124.
10	5	1961	4.0	615	-54 54.4	-60 15.0	758.5	1.1	68	35142.
10	5	1961	4.0	728	-54 53.9	-60 12.8	759.8	10.1	132	35130.
10	5	1961	4.0	8 4	-54 58.0	-60 5.0	765.9	8.2	90	35155.
10	5	1961	4.0	823	-54 58.0	-60 0.5	768.5	10.5	136	35141.
10	5	1961	4.0	9 7	-55 3.5	-59 51.2	776.1	5.7	58	35178.
10	5	1961	4.0	1037	-54 59.0	-59 38.5	784.7	11.2	141	35087.
10	5	1961	4.0	12 0	-55 11.0	-59 21.5	800.2	10.0	156	35179.
10	5	1961	4.0	13 4	-55 20.7	-59 13.8	810.8	6.5	154	35272.
10	5	1961	4.0	1730	-55 46.7	-58 51.5	839.7	2.0	70	35520.
10	5	1961	4.0	1757	-55 46.4	-58 50.0	840.6	6.2	155	35512.
10	5	1961	4.0	2018	-55 59.5	-58 39.0	855.1	1.1	48	35639.
10	5	1961	4.0	21 0	-55 59.0	-58 38.0	855.8	6.5	153	35630.
11	5	1961	4.0	130	-56 25.2	-58 14.0	885.2	6.8	44	35880.
11	5	1961	4.0	515	-56 6.8	-57 42.5	910.6	6.6	34	35566.
11	5	1961	4.0	526	-56 5.8	-57 41.3	911.8	7.2	44	35551.
11	5	1961	4.0	8 0	-55 52.5	-57 18.6	930.2	7.6	41	35326.
11	5	1961	4.0	12 0	-55 29.8	-56 43.0	960.5	6.4	40	34956.
11	5	1961	4.0	13 6	-55 24.4	-56 34.9	967.6	5.0	208	34870.
11	5	1961	4.0	1344	-55 27.2	-56 37.5	970.8	7.1	38	34910.
11	5	1961	4.0	1555	-55 15.0	-56 20.6	986.3	1.0	180	34720.
11	5	1961	4.0	1638	-55 15.7	-56 20.6	987.0	6.9	41	34729.
11	5	1961	4.0	2145	-54 49.2	-55 40.3	1022.1	12.7	358	34310.
11	5	1961	4.0	22 5	-54 45.0	-55 40.5	1026.3	1.4	54	34261.
12	5	1961	4.0	020	-54 43.2	-55 36.2	1029.4	4.3	0	34229.
12	5	1961	4.0	045	-54 41.4	-55 36.2	1031.2	0.7	28	34208.
12	5	1961	4.0	244	-54 40.1	-55 35.0	1032.7	3.0	0	34190.
12	5	1961	4.0	258	-54 39.4	-55 35.0	1033.4	12.4	53	34182.
12	5	1961	4.0	438	-54 27.1	-55 6.5	1054.0	6.5	0	33968.
12	5	1961	4.0	450	-54 25.8	-55 6.5	1055.3	1.2	50	33953.
12	5	1961	4.0	8 5	-54 23.4	-55 1.5	1059.1	1.1	60	33913.
12	5	1961	4.0	1724	-54 18.2	-54 46.0	1069.5	0.5	76	33815.
12	5	1961	4.0	20 3	-54 17.9	-54 44.0	1070.7	11.7	2	33807.
13	5	1961	3.0	435	-52 49.9	-54 39.0	1158.7	6.2	4	32804.
13	5	1961	3.0	722	-52 32.8	-54 37.0	1175.9	6.8	3	32612.
13	5	1961	3.0	857	-52 22.0	-54 36.0	1186.7	6.8	59	32492.
13	5	1961	3.0	916	-52 20.9	-54 33.0	1188.8	6.4	5	32473.
13	5	1961	3.0	1751	-51 26.0	-54 25.0	1243.9	8.1	5	31871.
13	5	1961	3.0	20 0	-51 8.7	-54 22.8	1261.3	1.1	61	31685.
13	5	1961	3.0	2248	-51 7.2	-54 18.5	1264.4	6.4	4	31661.
14	5	1961	3.0	222	-50 44.3	-54 16.0	1287.3	7.5	157	31420.
14	5	1961	3.0	235	-50 45.8	-54 15.0	1289.0	6.1	4	31433.
14	5	1961	3.0	639	-50 21.2	-54 12.3	1313.6	8.4	6	31178.
14	5	1961	3.0	7 2	-50 18.0	-54 11.8	1316.8	1.6	55	31145.
14	5	1961	3.0	825	-50 16.7	-54 8.9	1319.1	11.4	227	31126.
14	5	1961	3.0	9 2	-50 21.5	-54 17.0	1326.2	1.6	46	31191.
14	5	1961	3.0	1620	-50 13.3	-54 3.9	1337.9	5.8	0	31082.
14	5	1961	3.0	1648	-50 10.6	-54 3.9	1340.6	6.8	270	31055.
14	5	1961	3.0	1748	-50 10.6	-54 14.5	1347.4	8.0	173	31077.
14	5	1961	3.0	18 0	-50 12.2	-54 14.2	1349.0	5.3	178	31092.

VEMA 1710 USHUAIA - PUERTO BELGRANO

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
14	5	1961	3.0	1848	-50 16.4	-54 14.0	1353.2	6.9	91	31134.
14	5	1961	3.0	2030	-50 16.7	-53 55.7	1364.9	6.1	2	31099.
14	5	1961	3.0	2315	-50 0.0	-53 54.8	1381.6	6.5	3	30931.
15	5	1961	3.0	448	-49 24.0	-53 52.0	1417.6	11.0	2	30574.
15	5	1961	3.0	651	-49 1.5	-53 51.0	1440.1	10.9	0	30357.
15	5	1961	3.0	932	-48 32.3	-53 51.0	1469.3	4.1	48	30084.
15	5	1961	3.0	958	-48 31.1	-53 49.0	1471.1	10.3	329	30069.
15	5	1961	3.0	1128	-48 17.8	-54 1.0	1486.6	6.4	329	29970.
15	5	1961	3.0	1749	-47 42.7	-54 32.3	1527.5	6.6	334	29712.
16	5	1961	3.0	659	-46 25.3	-55 28.8	1614.0	5.9	324	29151.
16	5	1961	3.0	921	-46 14.1	-55 40.8	1627.9	10.5	325	29082.
16	5	1961	3.0	1127	-45 56.0	-55 59.0	1649.9	7.1	321	28968.
16	5	1961	3.0	1241	-45 49.2	-56 6.8	1658.7	6.3	331	28928.
16	5	1961	3.0	1747	-45 21.0	-56 28.9	1690.8	6.6	312	28746.
17	5	1961	3.0	9 3	-44 14.0	-58 14.0	1791.1	3.7	7	28453.
17	5	1961	3.0	921	-44 12.9	-58 13.8	1792.2	9.3	310	28445.
17	5	1961	3.0	935	-44 11.5	-58 16.1	1794.3	3.1	0	28439.
17	5	1961	3.0	1020	-44 9.2	-58 16.1	1796.6	8.0	311	28422.
17	5	1961	3.0	1055	-44 6.1	-58 21.0	1801.3	5.2	0	28410.
17	5	1961	3.0	12 8	-43 59.8	-58 21.0	1807.6	6.3	315	28362.
17	5	1961	3.0	2152	-43 16.3	-59 20.8	1869.0	7.1	354	28184.
17	5	1961	3.0	22 3	-43 15.0	-59 21.0	1870.3	6.2	90	28175.
17	5	1961	3.0	2217	-43 15.0	-59 19.0	1871.8	9.5	345	28170.
17	5	1961	3.0	2251	-43 9.8	-59 20.9	1877.1	5.9	79	28137.
17	5	1961	3.0	23 7	-43 9.5	-59 18.8	1878.7	6.7	2	28130.
18	5	1961	3.0	021	-43 1.2	-59 18.5	1887.0	4.5	149	28070.
18	5	1961	3.0	049	-43 3.0	-59 17.0	1889.1	10.9	342	28079.
18	5	1961	3.0	7 0	-41 58.7	-59 45.1	1956.7	11.5	341	27704.
18	5	1961	3.0	843	-41 40.0	-59 53.7	1976.4	0.6	63	27602.
18	5	1961	3.0	949	-41 39.7	-59 52.9	1977.1	11.5	342	27598.
18	5	1961	3.0	12 0	-41 15.8	-60 3.1	2002.2	1.0	59	27470.
18	5	1961	3.0	13 0	-41 15.3	-60 2.0	2003.2	10.3	342	27464.
18	5	1961	3.0	1458	-40 56.1	-60 10.2	2023.3	0.7	52	27364.
18	5	1961	3.0	1542	-40 55.8	-60 9.7	2023.8	3.3	344	27361.
18	5	1961	3.0	1557	-40 55.0	-60 10.0	2024.6	11.6	343	27356.
18	5	1961	3.0	18 0	-40 32.2	-60 19.3	2048.5	0.8	72	27240.
18	5	1961	3.0	1848	-40 32.0	-60 18.5	2049.2	4.1	336	27237.
18	5	1961	3.0	19 7	-40 30.8	-60 19.2	2050.5	10.6	343	27231.
18	5	1961	3.0	21 2	-40 11.3	-60 27.0	2070.8	0.2	123	27135.
18	5	1961	3.0	2150	-40 11.4	-60 26.8	2071.0	5.4	335	27135.
18	5	1961	3.0	2254	-40 6.2	-60 30.0	2076.8	8.6	336	27113.
19	5	1961	3.0	355	-39 26.8	-60 52.8	2119.9	9.2	274	26946.
19	5	1961	3.0	440	-39 26.3	-61 1.7	2126.8	11.3	321	26965.
19	5	1961	3.0	520	-39 20.4	-61 7.8	2134.3	10.1	267	26948.
19	5	1961	3.0	530	-39 20.5	-61 10.0	2136.0	3.6	0	26954.
19	5	1961	3.0	6 0	-39 18.7	-61 10.0	2137.8	9.4	305	26943.
19	5	1961	3.0	630	-39 16.0	-61 15.0	2142.6	10.8	300	26941.
19	5	1961	3.0	650	-39 14.2	-61 19.0	2146.1	8.9	274	26942.
19	5	1961	3.0	712	-39 14.0	-61 23.2	2149.4	10.4	259	26951.
19	5	1961	3.0	752	-39 15.3	-61 32.0	2156.3	12.7	270	26982.

VEMA 1710 USHUAIA - PUERTO BELGRANO

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
19	5	1961	3.0	8 3	-39 15.3	-61 35.0	2158.7			26989.

VEMA 1711 PUERTO BELGRANO - BUENOS AIRES

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
22	5	1961	3.0	2055	-39 20.3	-61 33.0	0.0	9.9	138	27011.
22	5	1961	3.0	22 0	-39 28.2	-61 23.7	10.7	10.3	146	27030.
23	5	1961	3.0	015	-39 47.5	-61 6.8	34.0	1.8	237	27096.
23	5	1961	3.0	045	-39 48.0	-61 7.8	34.9	10.0	145	27101.
23	5	1961	3.0	651	-40 38.0	-60 22.3	95.8	10.1	143	27280.
23	5	1961	3.0	1257	-41 27.2	-59 33.0	157.4	0.9	5	27467.
23	5	1961	3.0	1350	-41 26.4	-59 32.9	158.2	6.5	145	27462.
23	5	1961	3.0	1632	-41 40.8	-59 19.5	175.8	0.5	75	27523.
23	5	1961	3.0	1723	-41 40.7	-59 19.0	176.2	6.9	148	27521.
23	5	1961	3.0	1757	-41 44.0	-59 16.2	180.1	6.7	144	27536.
23	5	1961	3.0	2027	-41 57.6	-59 3.1	196.8	1.0	11	27594.
23	5	1961	3.0	2052	-41 57.2	-59 3.0	197.2	7.2	143	27591.
23	5	1961	3.0	2358	-42 15.0	-58 44.9	219.5	0.3	90	27668.
24	5	1961	3.0	045	-42 15.0	-58 44.6	219.7	6.5	143	27668.
24	5	1961	3.0	317	-42 28.1	-58 31.0	236.3	0.9	10	27725.
24	5	1961	3.0	410	-42 27.3	-58 30.8	237.1	10.6	141	27719.
24	5	1961	3.0	647	-42 48.8	-58 7.1	264.7	10.6	137	27814.
24	5	1961	3.0	836	-43 3.0	-57 49.2	284.1	8.6	41	27874.
24	5	1961	3.0	941	-42 56.0	-57 40.8	293.4	7.7	44	27807.
24	5	1961	3.0	1752	-42 11.2	-56 41.1	356.2	6.8	43	27381.
24	5	1961	3.0	2151	-41 51.3	-56 16.0	383.4	6.2	135	27204.
24	5	1961	3.0	2323	-41 58.0	-56 6.9	393.0	3.9	323	27231.
25	5	1961	3.0	041	-41 54.0	-56 11.0	398.0	6.1	135	27213.
25	5	1961	3.0	357	-42 8.0	-55 52.0	417.9	4.7	338	27268.
25	5	1961	3.0	422	-42 6.2	-55 53.0	419.8	6.0	135	27259.
25	5	1961	3.0	7 8	-42 18.0	-55 37.0	436.5	7.3	140	27307.
25	5	1961	3.0	20 0	-43 30.0	-54 15.0	530.3	7.4	110	27658.
26	5	1961	3.0	328	-43 49.0	-53 3.2	585.6	7.7	292	27681.
26	5	1961	3.0	430	-43 46.0	-53 13.4	593.6	7.8	111	27675.
26	5	1961	3.0	645	-43 52.2	-52 50.5	611.2	7.3	102	27686.
26	5	1961	3.0	1047	-43 58.2	-52 10.3	640.8	0.6	68	27673.
26	5	1961	3.0	15 0	-43 57.2	-52 6.9	643.4	7.5	86	27661.
26	5	1961	3.0	1736	-43 56.0	-51 40.0	662.8	6.5	90	27618.
26	5	1961	3.0	20 0	-43 56.0	-51 18.3	678.5	6.1	106	27592.
26	5	1961	3.0	21 0	-43 57.7	-51 10.2	684.5	2.4	293	27594.
26	5	1961	3.0	2126	-43 57.3	-51 11.5	685.6	7.6	110	27593.
26	5	1961	3.0	2245	-44 0.7	-50 58.4	695.6	0.1	144	27601.
26	5	1961	3.0	2340	-44 0.8	-50 58.3	695.7	7.4	102	27602.
27	5	1961	3.0	0 8	-44 1.5	-50 53.6	699.2	6.3	117	27601.
27	5	1961	3.0	537	-44 17.2	-50 11.1	733.4	4.3	279	27665.
27	5	1961	3.0	546	-44 17.1	-50 12.0	734.1	6.0	118	27665.
27	5	1961	3.0	627	-44 19.0	-50 6.9	738.2	7.2	121	27673.
27	5	1961	3.0	715	-44 22.0	-50 0.0	744.0	6.8	113	27687.
27	5	1961	3.0	1140	-44 34.0	-49 21.1	774.2	5.5	327	27733.
27	5	1961	3.0	1153	-44 33.0	-49 22.0	775.4	8.6	123	27727.
27	5	1961	3.0	12 6	-44 34.0	-49 19.8	777.3	0.6	53	27732.
27	5	1961	3.0	1615	-44 32.5	-49 17.0	779.8	6.8	115	27719.
27	5	1961	3.0	1725	-44 35.8	-49 6.9	787.7	6.3	118	27733.
28	5	1961	3.0	641	-45 14.8	-47 22.9	871.0	8.0	113	27925.
28	5	1961	3.0	9 2	-45 22.2	-46 58.2	889.9	0.4	86	27960.

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DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
28	5	1961	3.0	1217	-45 22.1	-46 56.3	891.2	7.1	115	27958.
28	5	1961	3.0	1657	-45 36.0	-46 13.2	924.5	7.0	112	28030.
28	5	1961	3.0	20 0	-45 44.1	-45 44.9	945.9	6.9	113	28071.
29	5	1961	3.0	0 0	-45 54.8	-45 8.5	973.4	7.2	113	28129.
29	5	1961	3.0	150	-46 0.0	-44 51.0	986.6	6.5	114	28158.
29	5	1961	3.0	356	-46 5.5	-44 33.0	1000.3	6.0	297	28189.
29	5	1961	3.0	436	-46 3.7	-44 38.2	1004.3	6.7	114	28178.
29	5	1961	3.0	8 0	-46 12.9	-44 8.2	1027.0	7.0	114	28231.
29	5	1961	3.0	12 0	-46 24.4	-43 31.3	1055.0	7.4	114	28300.
29	5	1961	3.0	16 0	-46 36.2	-42 52.0	1084.5	7.5	114	28372.
29	5	1961	3.0	20 0	-46 48.2	-42 12.2	1114.3	7.0	114	28448.
30	5	1961	3.0	4 0	-47 10.8	-40 57.0	1170.4	7.2	114	28595.
30	5	1961	3.0	8 0	-47 22.5	-40 18.0	1199.3	7.6	114	28673.
30	5	1961	3.0	945	-47 28.0	-40 0.0	1212.7	7.2	113	28711.
30	5	1961	3.0	12 0	-47 34.2	-39 37.9	1228.8	7.5	113	28754.
30	5	1961	3.0	1639	-47 48.0	-38 50.3	1263.7	7.7	107	28851.
30	5	1961	3.0	20 0	-47 55.5	-38 13.4	1289.6	7.2	107	28904.
31	5	1961	3.0	6 1	-48 17.0	-36 30.0	1361.9	6.5	114	29063.
31	5	1961	3.0	750	-48 21.8	-36 13.8	1373.7	6.3	156	29099.
31	5	1961	3.0	10 0	-48 34.4	-36 5.5	1387.5	0.7	68	29194.
31	5	1961	3.0	1443	-48 33.2	-36 1.0	1390.7	5.8	155	29185.
31	5	1961	3.0	1612	-48 41.0	-35 55.5	1399.3	7.4	152	29244.
1	6	1961	3.0	049	-49 37.3	-35 10.1	1462.9	6.7	213	29678.
1	6	1961	3.0	122	-49 40.4	-35 13.2	1466.6	6.2	217	29702.
1	6	1961	3.0	520	-50 0.0	-35 36.5	1491.3	6.5	217	29860.
1	6	1961	3.0	828	-50 16.3	-35 55.8	1511.8	8.7	38	29995.
1	6	1961	3.0	841	-50 14.8	-35 54.0	1513.7	0.5	130	29982.
1	6	1961	3.0	1116	-50 15.7	-35 52.3	1515.1	7.0	221	29989.
1	6	1961	3.0	1741	-50 49.3	-36 39.0	1559.9	2.2	208	30280.
1	6	1961	3.0	2114	-50 56.3	-36 44.9	1567.8	2.4	143	30342.
2	6	1961	3.0	0 0	-51 1.7	-36 38.5	1574.6	1.6	0	30386.
2	6	1961	3.0	4 0	-50 55.2	-36 38.5	1581.1	3.5	16	30330.
2	6	1961	3.0	820	-50 40.5	-36 31.8	1596.4	5.0	17	30203.
2	6	1961	3.0	11 0	-50 27.6	-36 25.7	1609.8	7.3	39	30094.
2	6	1961	3.0	1515	-50 3.5	-35 55.0	1640.9	6.4	27	29890.
2	6	1961	3.0	1730	-49 50.7	-35 44.9	1655.3	4.3	11	29786.
2	6	1961	3.0	2050	-49 36.6	-35 40.5	1669.7	3.7	2	29673.
2	6	1961	3.0	2210	-49 31.7	-35 40.2	1674.6	4.9	325	29634.
3	6	1961	3.0	212	-49 15.6	-35 57.8	1694.3	1.1	121	29509.
3	6	1961	3.0	4 5	-49 16.7	-35 55.0	1696.5	6.7	324	29517.
3	6	1961	3.0	554	-49 6.8	-36 6.0	1708.7	0.9	108	29441.
3	6	1961	3.0	717	-49 7.2	-36 4.1	1710.0	7.7	323	29444.
3	6	1961	3.0	840	-48 58.7	-36 13.8	1720.6	6.5	265	29378.
3	6	1961	3.0	1455	-49 2.5	-37 15.5	1761.3	6.2	231	29412.
3	6	1961	3.0	2330	-49 36.2	-38 18.5	1814.4	5.2	301	29694.
4	6	1961	3.0	742	-49 14.3	-39 14.8	1857.1	2.1	130	29531.
4	6	1961	3.0	814	-49 15.0	-39 13.5	1858.2	4.0	11	29536.
4	6	1961	3.0	930	-49 10.0	-39 12.0	1863.3	4.6	14	29495.
4	6	1961	3.0	1130	-49 1.0	-39 8.5	1872.5	5.0	234	29421.
4	6	1961	3.0	1633	-49 15.9	-39 39.5	1897.7	5.7	239	29552.

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DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
4	6	1961	3.0	2043	-49 28.0	-40 11.0	1921.5	4.0	266	29664.
5	6	1961	3.0	715	-49 30.7	-41 15.2	1963.3	5.8	351	29716.
5	6	1961	3.0	1130	-49 6.4	-41 21.2	1987.9	5.8	328	29515.
5	6	1961	3.0	2215	-48 13.0	-42 11.0	2050.6	5.1	315	29101.
6	6	1961	3.0	630	-47 43.3	-42 54.7	2092.3	4.7	316	28885.
6	6	1961	3.0	83e	-47 36.2	-43 5.0	2102.3	5.6	270	28834.
6	6	1961	3.0	1046	-47 36.2	-43 23.0	2114.4	0.9	75	28843.
6	6	1961	3.0	1445	-47 35.3	-43 17.9	2118.0	4.4	328	28834.
6	6	1961	3.0	1728	-47 25.2	-43 27.2	2129.8	3.3	270	28757.
6	6	1961	3.0	2013	-47 25.2	-43 40.7	2139.0	4.3	244	28765.
6	6	1961	3.0	23 0	-47 30.5	-43 56.6	2151.0	5.7	226	28815.
7	6	1961	3.0	7 9	-48 2.9	-44 46.9	2197.8	4.4	269	29109.
7	6	1961	3.0	1023	-48 3.2	-45 8.0	2211.9	0.7	73	29128.
7	6	1961	3.0	1345	-48 2.5	-45 4.5	2214.3	8.3	270	29119.
8	6	1961	3.0	8 5	-48 2.3	-48 51.9	2366.4	6.9	235	29341.
8	6	1961	3.0	834	-48 4.2	-48 56.0	2369.7	1.7	59	29362.
8	6	1961	3.0	848	-48 4.0	-48 55.5	2370.1	5.7	236	29360.
8	6	1961	3.0	12 0	-48 14.1	-49 18.2	2388.3	3.5	236	29476.
8	6	1961	3.0	1653	-48 23.8	-49 39.8	2405.6	4.4	323	29590.
9	6	1961	3.0	4 0	-47 45.3	-50 23.8	2454.1	6.4	318	29313.
9	6	1961	3.0	722	-47 29.2	-50 45.3	2475.7	7.0	314	29205.
9	6	1961	3.0	938	-47 18.1	-51 2.2	2491.7	9.5	291	29135.
9	6	1961	3.0	13 2	-47 6.5	-51 46.8	2524.1	0.6	49	29102.
9	6	1961	3.0	1740	-47 4.8	-51 43.9	2526.7	8.6	282	29083.
10	6	1961	3.0	717	-46 40.8	-54 31.9	2644.0	9.0	279	29166.
10	6	1961	3.0	1242	-46 33.5	-55 42.0	2692.7	9.5	281	29242.
10	6	1961	3.0	1734	-46 25.0	-56 48.0	2739.0	9.8	282	29311.
10	6	1961	3.0	2155	-46 16.0	-57 48.2	2781.5	9.4	294	29372.
11	6	1961	3.0	2 5	-46 0.0	-58 40.0	2820.8	10.4	297	29362.
11	6	1961	3.0	851	-45 28.5	-60 10.0	2891.1	7.1	112	29331.
11	6	1961	3.0	9 9	-45 29.3	-60 7.2	2893.2	0.9	0	29330.
11	6	1961	3.0	922	-45 29.1	-60 7.2	2893.4	8.4	297	29329.
11	6	1961	3.0	1118	-45 21.7	-60 27.7	2909.6	1.5	6	29323.
11	6	1961	3.0	1138	-45 21.2	-60 27.6	2910.1	9.4	297	29319.
11	6	1961	3.0	14 0	-45 11.0	-60 55.8	2932.4	1.7	19	29313.
11	6	1961	3.0	1422	-45 10.4	-60 55.5	2933.0	9.0	296	29307.
11	6	1961	3.0	1620	-45 2.5	-61 18.0	2950.8	1.4	35	29307.
11	6	1961	3.0	1647	-45 2.0	-61 17.5	2951.4	9.1	297	29301.
11	6	1961	3.0	18 0	-44 57.0	-61 31.5	2962.5	9.4	297	29301.
11	6	1961	3.0	1855	-44 53.1	-61 42.4	2971.1	0.6	180	29301.
11	6	1961	3.0	1932	-44 53.5	-61 42.4	2971.5	9.9	295	29304.
11	6	1961	3.0	2146	-44 44.3	-62 10.8	2993.7	1.4	180	29314.
11	6	1961	3.0	2211	-44 44.9	-62 10.8	2994.3	9.5	296	29318.
12	6	1961	3.0	0 3	-44 37.3	-62 33.2	3011.9	10.1	276	29325.
12	6	1961	3.0	034	-44 36.8	-62 40.5	3017.1	1.0	112	29343.
12	6	1961	3.0	1 7	-44 37.0	-62 39.8	3017.7	8.8	276	29343.
12	6	1961	3.0	320	-44 34.8	-63 7.1	3037.2	0.3	115	29410.
12	6	1961	3.0	4 1	-44 34.9	-63 6.8	3037.5	8.7	277	29409.
12	6	1961	3.0	612	-44 32.7	-63 33.4	3056.5	0.2	180	29476.
12	6	1961	3.0	647	-44 32.8	-63 33.4	3056.6	6.9	294	29477.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
12	6	1961	3.0	658	-44 32.3	-63 35.0	3057.9	8.5	276	29478.
12	6	1961	3.0	830	-44 31.0	-63 53.3	3071.0	8.4	274	29527.
12	6	1961	3.0	9 0	-44 30.7	-63 59.2	3075.2	1.0	180	29543.
12	6	1961	3.0	918	-44 31.0	-63 59.2	3075.5	9.4	281	29546.
12	6	1961	3.0	1117	-44 27.5	-64 24.8	3094.1	2.5	180	29602.
12	6	1961	3.0	1134	-44 28.2	-64 24.8	3094.8	6.2	168	29608.
12	6	1961	3.0	1144	-44 29.2	-64 24.5	3095.8	8.9	91	29615.
12	6	1961	3.0	1645	-44 30.0	-63 22.0	3140.4	7.0	90	29418.
12	6	1961	3.0	18 4	-44 30.0	-63 9.0	3149.7	6.6	89	29377.
13	6	1961	3.0	8 3	-44 28.8	-60 59.2	3242.3	1.5	90	28984.
13	6	1961	3.0	831	-44 28.8	-60 58.2	3243.0	6.3	88	28981.
13	6	1961	3.0	10 0	-44 28.5	-60 45.2	3252.3	1.3	25	28943.
13	6	1961	3.0	1016	-44 28.2	-60 45.0	3252.6	5.9	89	28940.
13	6	1961	3.0	1310	-44 27.8	-60 20.9	3269.8	7.8	81	28871.
13	6	1961	3.0	1534	-44 25.0	-59 55.0	3288.5	2.8	20	28781.
13	6	1961	3.0	1824	-44 17.7	-59 51.2	3296.3	1.7	9	28715.
13	6	1961	3.0	1931	-44 15.8	-59 50.8	3298.2	6.6	76	28699.
14	6	1961	3.0	0 0	-44 8.5	-59 11.0	3327.7	6.5	77	28542.
14	6	1961	3.0	4 0	-44 2.5	-58 36.0	3353.5	6.7	86	28410.
14	6	1961	3.0	8 0	-44 0.7	-57 59.0	3380.2	5.2	82	28311.
14	6	1961	3.0	9 0	-44 0.0	-57 51.8	3385.4	5.7	94	28290.
14	6	1961	3.0	1250	-44 1.7	-57 21.6	3407.2	6.1	92	28236.
14	6	1961	3.0	18 0	-44 2.9	-56 37.6	3438.9	6.3	102	28152.
14	6	1961	3.0	2218	-44 8.5	-56 0.5	3466.1	7.1	100	28120.
15	6	1961	3.0	0 0	-44 10.5	-55 44.0	3478.1	6.9	102	28103.
15	6	1961	3.0	730	-44 21.5	-54 33.0	3530.1	6.6	99	28056.
15	6	1961	3.0	829	-44 22.5	-54 24.0	3536.6	7.6	68	28048.
15	6	1961	3.0	936	-44 19.4	-54 13.0	3545.1	5.3	141	28006.
15	6	1961	3.0	11 4	-44 25.5	-54 6.2	3552.9	8.5	60	28040.
15	6	1961	3.0	1430	-44 11.0	-53 30.6	3582.2	0.4	191	27876.
17	6	1961	3.0	710	-44 26.5	-53 34.9	3598.0	0.7	180	27997.
17	6	1961	3.0	1017	-44 28.8	-53 34.9	3600.3	3.9	270	28014.
17	6	1961	3.0	1038	-44 28.8	-53 36.8	3601.6	10.1	245	28017.
17	6	1961	3.0	15 0	-44 47.3	-54 33.0	3645.7	8.5	0	28250.
17	6	1961	3.0	1736	-44 25.2	-54 32.9	3667.8	7.6	1	28083.
17	6	1961	3.0	20 0	-44 7.0	-54 32.5	3686.0	7.2	2	27948.
18	6	1961	3.0	3 4	-43 15.9	-54 30.0	3737.1	5.7	1	27579.
18	6	1961	3.0	819	-42 46.0	-54 29.0	3767.0	7.6	1	27374.
18	6	1961	3.0	930	-42 37.0	-54 28.8	3776.0	9.3	2	27313.
18	6	1961	3.0	1015	-42 30.0	-54 28.5	3783.0	10.1	311	27267.
18	6	1961	3.0	13 0	-42 12.0	-54 57.0	3810.8	9.5	354	27195.
18	6	1961	3.0	1738	-41 28.2	-55 2.8	3854.8	8.9	354	26928.
19	6	1961	3.0	0 7	-40 30.5	-55 10.3	3912.7	9.1	173	26598.
19	6	1961	3.0	033	-40 34.4	-55 9.7	3916.7	0.6	176	26620.
19	6	1961	3.0	217	-40 35.5	-55 9.6	3917.8	4.8	352	26626.
19	6	1961	3.0	245	-40 33.3	-55 10.0	3920.0	1.0	171	26614.
19	6	1961	3.0	316	-40 33.8	-55 9.9	3920.5	2.3	355	26617.
19	6	1961	3.0	340	-40 32.9	-55 10.0	3921.4	1.4	171	26612.
19	6	1961	3.0	443	-40 34.4	-55 9.7	3922.9	10.4	355	26620.
19	6	1961	3.0	658	-40 11.0	-55 12.4	3946.4	9.7	357	26492.

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DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
19	6	1961	3.0	8 0	-40 1.0	-55 13.0	3956.4	11.4	357	26438.
19	6	1961	3.0	12 0	-39 15.3	-55 16.0	4002.2	10.9	355	26199.
19	6	1961	3.0	1344	-38 56.5	-55 18.0	4021.0	6.6	167	26107.
19	6	1961	3.0	1357	-38 57.9	-55 17.6	4022.5	0.6	90	26113.
19	6	1961	3.0	1447	-38 57.9	-55 17.0	4022.9	10.7	355	26112.
19	6	1961	3.0	1722	-38 30.3	-55 19.8	4050.6	10.7	352	25981.
19	6	1961	3.0	18 0	-38 23.6	-55 21.0	4057.4	11.3	349	25951.
19	6	1961	3.0	1837	-38 16.8	-55 22.7	4064.3	1.7	60	25921.
19	6	1961	3.0	1934	-38 16.0	-55 20.9	4065.9	0.4	90	25914.
19	6	1961	3.0	2136	-38 16.0	-55 19.8	4066.8	5.1	340	25913.
19	6	1961	3.0	23 4	-38 9.0	-55 23.0	4074.2	11.0	350	25885.
19	6	1961	3.0	2350	-38 0.7	-55 24.8	4082.7	5.1	355	25849.
20	6	1961	3.0	010	-37 59.0	-55 25.0	4084.4	9.8	350	25841.
20	6	1961	3.0	115	-37 48.6	-55 27.4	4094.9	9.0	348	25798.
20	6	1961	3.0	132	-37 46.1	-55 28.1	4097.5	10.2	350	25787.
20	6	1961	3.0	416	-37 18.5	-55 34.0	4125.5	6.2	335	25675.
20	6	1961	3.0	434	-37 16.8	-55 35.0	4127.4	10.2	350	25669.
20	6	1961	3.0	8 0	-36 42.5	-55 42.8	4162.2	9.8	348	25537.
20	6	1961	3.0	917	-36 30.2	-55 46.1	4174.8	11.8	326	25493.
20	6	1961	3.0	1222	-36 0.0	-56 11.0	4211.1	11.3	328	25413.
20	6	1961	3.0	1425	-35 40.4	-56 26.1	4234.2			25363.

VEMA 1712 BUENOS AIRES - DAKAR

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
27	6	1961	3.0	220	-35 8.8	-56 12.8	0.0	9.2	64	25230.
27	6	1961	3.0	4 0	-35 2.0	-55 56.0	15.3	10.5	90	25183.
27	6	1961	3.0	645	-35 2.2	-55 20.8	44.2	10.7	93	25137.
27	6	1961	3.0	8 2	-35 3.0	-55 4.0	57.9	10.5	100	25118.
27	6	1961	3.0	1010	-35 7.0	-54 37.0	80.4	9.7	70	25099.
27	6	1961	3.0	18 9	-34 41.0	-53 8.0	157.9	9.2	69	24925.
27	6	1961	3.0	2246	-34 25.5	-52 19.8	200.5	1.2	59	24839.
27	6	1961	3.0	2316	-34 25.2	-52 19.2	201.1	8.5	70	24838.
28	6	1961	3.0	032	-34 21.5	-52 7.0	211.8	0.7	29	24819.
28	6	1961	3.0	1 3	-34 21.2	-52 6.8	212.1	9.8	69	24818.
28	6	1961	3.0	425	-34 9.2	-51 29.7	245.1	2.9	70	24760.
28	6	1961	3.0	536	-34 8.0	-51 25.8	248.5	3.6	69	24754.
28	6	1961	3.0	745	-34 5.2	-51 17.2	256.2	8.4	66	24742.
28	6	1961	3.0	850	-34 1.5	-51 7.2	265.2	9.4	315	24726.
28	6	1961	3.0	1150	-33 41.5	-51 31.0	293.4	9.8	70	24686.
28	6	1961	3.0	1315	-33 36.8	-51 15.2	307.3	4.3	68	24666.
28	6	1961	3.0	1418	-33 35.1	-51 10.2	311.8	10.5	69	24659.
28	6	1961	3.0	1630	-33 27.0	-50 44.3	334.9	5.7	67	24626.
28	6	1961	3.0	1745	-33 24.2	-50 36.5	342.0	9.5	69	24616.
28	6	1961	3.0	2157	-33 10.0	-49 51.8	381.9	0.5	320	24567.
29	6	1961	3.0	028	-33 9.0	-49 52.8	383.2	10.0	51	24564.
29	6	1961	3.0	349	-32 47.8	-49 22.1	416.6	5.8	49	24509.
29	6	1961	3.0	6 9	-32 39.0	-49 10.0	430.1	4.7	59	24488.
29	6	1961	3.0	619	-32 38.6	-49 9.2	430.8	9.9	50	24487.
29	6	1961	3.0	1245	-31 57.5	-48 11.2	494.8	9.5	51	24402.
29	6	1961	3.0	20 0	-31 14.0	-47 8.0	564.0	9.2	50	24334.
30	6	1961	3.0	4 0	-30 26.5	-46 2.0	638.0	9.7	51	24284.
30	6	1961	3.0	1728	-29 3.7	-44 6.2	768.2	9.6	48	24250.
1	7	1961	3.0	550	-27 44.0	-42 25.5	887.4	9.9	52	24267.
1	7	1961	3.0	1619	-26 40.0	-40 53.0	991.6	1.5	252	24324.
1	7	1961	3.0	1829	-26 41.0	-40 56.5	994.9	9.4	50	24321.
2	7	1961	3.0	532	-25 33.8	-39 28.0	1099.0	9.0	49	24402.
2	7	1961	3.0	12 0	-24 55.8	-38 39.0	1157.3	9.7	36	24458.
2	7	1961	3.0	1730	-24 13.8	-38 3.3	1210.4	14.1	36	24507.
2	7	1961	3.0	1740	-24 11.9	-38 1.8	1212.8	4.7	31	24509.
2	7	1961	3.0	1758	-24 10.7	-38 1.0	1214.2	8.8	36	24511.
2	7	1961	3.0	20 7	-23 55.4	-37 48.7	1233.1	9.5	43	24530.
3	7	1961	3.0	525	-22 51.0	-36 43.0	1321.4	9.8	43	24636.
3	7	1961	3.0	14 3	-21 48.8	-35 41.0	1406.0	0.9	268	24750.
3	7	1961	3.0	1911	-21 49.0	-35 46.0	1410.6	8.8	42	24744.
4	7	1961	3.0	514	-20 43.8	-34 42.3	1498.8	8.9	40	24876.
4	7	1961	3.0	12 3	-19 57.5	-34 1.0	1559.2	0.9	286	24973.
4	7	1961	3.0	18 3	-19 56.0	-34 6.5	1564.5	8.6	36	24967.
5	7	1961	2.0	551	-18 41.0	-33 9.2	1657.0	8.8	37	25124.
5	7	1961	2.0	9 0	-18 18.8	-32 51.8	1684.7	8.7	41	25174.
5	7	1961	2.0	1030	-18 9.0	-32 42.8	1697.7	1.0	296	25198.
5	7	1961	2.0	1247	-18 8.0	-32 45.0	1700.0	8.7	41	25196.
5	7	1961	2.0	1816	-17 31.8	-32 12.0	1747.9	8.2	41	25287.
6	7	1961	2.0	544	-16 21.3	-31 7.2	1841.8	9.1	40	25475.
6	7	1961	2.0	1750	-14 57.0	-29 53.8	1951.8	9.0	41	25709.

VEMA 1712 BUENOS AIRES - DAKAR

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
7	7	1961	2.0	524	-13 38.3	-28 43.0	2056.2	9.2	42	25945.
7	7	1961	2.0	1748	-12 13.0	-27 25.2	2170.3	8.3	43	26216.
8	7	1961	2.0	522	-11 3.2	-26 18.0	2266.3	9.0	39	26455.
8	7	1961	2.0	16 7	-9 48.3	-25 16.0	2362.9	1.7	301	26705.
8	7	1961	2.0	1647	-9 47.7	-25 17.0	2364.0	8.9	40	26705.
8	7	1961	2.0	1720	-9 44.0	-25 13.8	2368.9	1.9	309	26718.
8	7	1961	2.0	18 0	-9 43.2	-25 14.8	2370.1	8.8	43	26718.
9	7	1961	2.0	510	-8 31.0	-24 7.0	2468.6	9.0	42	26981.
9	7	1961	2.0	11 3	-7 52.0	-23 31.1	2521.4	9.8	234	27125.
9	7	1961	2.0	1124	-7 54.0	-23 33.9	2524.8	0.5	255	27116.
9	7	1961	2.0	1349	-7 54.3	-23 35.0	2525.9	8.9	43	27113.
9	7	1961	2.0	1734	-7 30.0	-23 11.8	2559.4	8.9	41	27205.
10	7	1961	2.0	5 7	-6 12.2	-22 4.2	2662.1	9.3	39	27494.
10	7	1961	2.0	1221	-5 20.0	-21 21.8	2729.2	9.0	225	27687.
10	7	1961	2.0	1254	-5 23.5	-21 25.3	2734.2	1.0	299	27673.
10	7	1961	2.0	1543	-5 22.2	-21 27.7	2736.9	9.3	39	27673.
10	7	1961	2.0	1732	-5 9.0	-21 17.0	2753.8	8.2	40	27722.
10	7	1961	2.0	2030	-4 50.2	-21 1.3	2778.3	8.1	48	27793.
11	7	1961	1.0	542	-4 5.2	-20 12.0	2844.9	9.0	43	27983.
11	7	1961	1.0	8 0	-3 50.0	-19 58.0	2865.6	9.3	61	28043.
11	7	1961	1.0	1224	-3 30.0	-19 22.3	2906.4	9.0	69	28150.
11	7	1961	1.0	1433	-3 23.0	-19 4.2	2925.8	10.8	199	28196.
11	7	1961	1.0	1545	-3 35.3	-19 8.5	2938.8	11.4	332	28158.
11	7	1961	1.0	1815	-3 10.0	-19 21.7	2967.4	0.8	284	28202.
11	7	1961	1.0	23 7	-3 9.0	-19 25.7	2971.5	9.7	172	28198.
12	7	1961	1.0	220	-3 39.8	-19 21.5	3002.6	11.6	317	28126.
12	7	1961	1.0	550	-3 10.0	-19 49.0	3043.1	11.3	318	28160.
12	7	1961	1.0	8 4	-2 51.2	-20 6.0	3068.4	9.9	36	28186.
12	7	1961	1.0	12 4	-2 19.0	-19 43.0	3108.0	8.5	36	28307.
12	7	1961	1.0	1826	-1 35.0	-19 11.0	3162.4	1.5	290	28475.
12	7	1961	1.0	22 0	-1 33.2	-19 16.0	3167.7	8.7	41	28473.
13	7	1961	1.0	446	0-48.5	-18 37.7	3226.5	7.3	18	28655.
13	7	1961	1.0	525	0-44.0	-18 36.2	3231.3	6.5	27	28670.
13	7	1961	1.0	645	0-36.2	-18 32.3	3240.0	6.9	31	28698.
13	7	1961	1.0	16 6	0 18.5	-17 58.8	3304.1	10.2	32	28906.
13	7	1961	1.0	1726	0 30.0	-17 51.6	3317.7	5.6	212	28950.
13	7	1961	1.0	1855	0 23.0	-17 56.0	3326.0	1.8	284	28923.
13	7	1961	1.0	2047	0 23.8	-17 59.2	3329.3	5.3	153	28922.
13	7	1961	1.0	2142	0 19.5	-17 57.0	3334.1	1.5	281	28911.
13	7	1961	1.0	2325	0 20.0	-17 59.5	3336.7	9.6	16	28910.
14	7	1961	1.0	424	1 6.0	-17 46.0	3384.6	10.5	343	29070.
14	7	1961	1.0	12 0	2 22.0	-18 9.7	3464.2	10.4	342	29299.
14	7	1961	1.0	1825	3 25.8	-18 30.0	3531.1	2.8	291	29514.
14	7	1961	1.0	1855	3 26.3	-18 31.3	3532.5	1.7	355	29515.
14	7	1961	1.0	2143	3 31.0	-18 31.7	3537.3	10.0	0	29532.
15	7	1961	1.0	529	4 49.0	-18 31.3	3615.3	10.3	360	29843.
15	7	1961	1.0	1220	5 59.5	-18 31.8	3685.8	9.8	359	30145.
15	7	1961	1.0	1415	6 18.3	-18 32.1	3704.6	1.4	109	30229.
15	7	1961	1.0	1455	6 18.0	-18 31.2	3705.5	9.7	359	30228.
15	7	1961	1.0	1915	7 0.0	-18 31.7	3747.5	1.9	113	30421.

VEMA 1712 BUENOS AIRES - DAKAR

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
15	7	1961	1.0	1955	6 59.5	-18 30.5	3748.8	9.3	356	30419.
16	7	1961	0.0	4 0	8 5.3	-18 34.8	3814.7	9.6	356	30736.
16	7	1961	0.0	12 0	9 22.0	-18 39.8	3891.6	1.4	122	31131.
16	7	1961	0.0	16 7	9 19.0	-18 35.0	3897.2	9.5	359	31115.
16	7	1961	0.0	1940	9 52.8	-18 35.8	3931.0	9.6	353	31297.
17	7	1961	0.0	0 0	10 34.0	-18 41.0	3972.5	10.5	352	31525.
17	7	1961	0.0	620	11 40.0	-18 50.2	4039.1	10.8	352	31908.
17	7	1961	0.0	1019	12 22.5	-18 56.2	4082.0	0.7	41	32165.
17	7	1961	0.0	1456	12 25.0	-18 54.0	4085.3	10.9	355	32180.
17	7	1961	0.0	1646	12 45.0	-18 55.7	4105.4	10.5	39	32304.
17	7	1961	0.0	20 0	13 11.5	-18 34.0	4139.3	10.6	38	32462.
17	7	1961	0.0	23 5	13 37.0	-18 13.2	4171.9	9.5	38	32617.
18	7	1961	0.0	435	14 18.0	-17 40.2	4223.9	7.2	38	32869.
18	7	1961	0.0	615	14 27.5	-17 32.5	4236.0	10.3	34	32929.
18	7	1961	0.0	720	14 36.7	-17 26.0	4247.1			32986.

VEMA 1713 DAKAR - HALIFAX

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
19	7	1961	0.0	11 2	14 38.0	-17 29.0	0.0	11.0	309	32995.
19	7	1961	0.0	1145	14 43.0	-17 35.3	7.9	7.7	297	33030.
19	7	1961	0.0	1348	14 50.2	-17 49.8	23.6	8.4	302	33082.
19	7	1961	0.0	1519	14 57.0	-18 1.0	36.4	9.1	312	33131.
19	7	1961	0.0	1848	15 18.2	-18 25.5	68.2	1.1	166	33283.
19	7	1961	0.0	2031	15 16.3	-18 25.0	70.1	8.6	313	33270.
19	7	1961	0.0	2210	15 26.0	-18 35.7	84.3	9.3	316	33340.
20	7	1961	0.0	6 5	16 18.5	-19 29.0	157.7	10.9	323	33733.
20	7	1961	0.0	930	16 48.0	-19 52.5	194.8	10.1	325	33958.
20	7	1961	0.0	1059	17 0.2	-20 1.5	209.7	1.1	243	34052.
20	7	1961	0.0	1326	16 59.0	-20 4.0	212.4	1.4	188	34046.
20	7	1961	0.0	20 9	16 50.0	-20 5.4	221.5	1.6	183	33982.
20	7	1961	0.0	2124	16 48.0	-20 5.5	223.5	10.2	323	33968.
21	7	1961	1.0	1023	18 42.0	-21 36.0	366.4	1.5	232	34891.
21	7	1961	1.0	1245	18 39.8	-21 39.0	370.0	9.8	323	34877.
21	7	1961	1.0	20 0	19 36.8	-22 23.8	441.0	9.8	319	35364.
22	7	1961	1.0	513	20 45.0	-23 27.0	531.4	9.7	319	35979.
22	7	1961	1.0	1018	21 22.3	-24 1.5	580.7	0.4	227	36325.
22	7	1961	1.0	1243	21 21.7	-24 2.2	581.6	0.8	212	36321.
22	7	1961	1.0	1644	21 19.0	-24 4.0	584.7	10.2	308	36303.
22	7	1961	1.0	1959	21 39.5	-24 32.0	617.9	9.9	309	36510.
22	7	1961	1.0	23 0	21 58.5	-24 57.0	647.9	1.3	223	36704.
22	7	1961	1.0	2331	21 58.0	-24 57.5	648.6	9.9	309	36701.
23	7	1961	1.0	8 0	22 51.0	-26 8.0	732.6	10.1	309	37255.
23	7	1961	1.0	12 0	23 16.3	-26 42.0	772.8	1.0	210	37527.
23	7	1961	1.0	1253	23 15.5	-26 42.5	773.7	0.8	232	37522.
23	7	1961	1.0	1744	23 13.0	-26 46.0	777.8	9.7	312	37509.
23	7	1961	1.0	23 0	23 46.7	-27 27.5	828.6	1.6	213	37869.
23	7	1961	1.0	2331	23 46.0	-27 28.0	829.5	9.2	312	37864.
24	7	1961	1.0	529	24 22.5	-28 13.0	884.4	9.5	313	38261.
24	7	1961	1.0	1051	24 57.2	-28 54.2	935.5	0.8	286	38641.
24	7	1961	1.0	1815	24 58.8	-29 0.5	941.4	9.9	302	38669.
24	7	1961	1.0	2015	25 9.3	-29 19.0	961.2	9.3	304	38801.
25	7	1961	1.0	516	25 56.0	-30 36.0	1044.9	9.1	304	39382.
25	7	1961	1.0	1112	26 25.8	-31 25.8	1098.6	3.6	236	39763.
25	7	1961	1.0	1130	26 25.2	-31 26.8	1099.7	9.0	304	39761.
25	7	1961	1.0	1630	26 50.0	-32 8.5	1144.5	0.6	228	40084.
25	7	1961	1.0	1920	26 48.8	-32 10.0	1146.3	8.9	303	40079.
25	7	1961	1.0	2030	26 54.5	-32 19.7	1156.6	9.2	304	40155.
26	7	1961	2.0	433	27 41.3	-33 37.3	1240.0	8.9	303	40776.
26	7	1961	2.0	8 5	27 58.5	-34 7.3	1271.6	0.5	277	41013.
26	7	1961	2.0	13 9	27 58.8	-34 10.2	1274.2	10.6	303	41025.
26	7	1961	2.0	1812	28 28.0	-35 1.0	1327.6	0.7	270	41432.
26	7	1961	2.0	1929	28 28.0	-35 2.0	1328.5	0.6	202	41435.
26	7	1961	2.0	2225	28 26.5	-35 2.7	1330.1	9.9	306	41425.
27	7	1961	2.0	443	29 3.0	-36 0.5	1392.6	10.1	306	41923.
27	7	1961	2.0	11 2	29 40.0	-37 0.0	1456.3	7.2	126	42438.
27	7	1961	2.0	1147	29 38.8	-36 55.0	1461.7	0.4	270	42393.
27	7	1961	2.0	1416	29 36.8	-36 56.2	1462.7	10.5	308	42398.
27	7	1961	2.0	1745	29 59.0	-37 29.5	1499.1	0.8	259	42701.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
27	7	1961	2.0	2023	29 58.6	-37 31.8	1501.2	9.3	309	42706.
27	7	1961	2.0	23 2	30 14.0	-37 54.0	1525.8	8.8	100	42914.
28	7	1961	2.0	020	30 12.0	-37 41.0	1537.2	13.4	186	42848.
28	7	1961	2.0	038	30 8.0	-37 41.5	1541.2	9.8	306	42818.
28	7	1961	2.0	427	30 30.0	-38 16.5	1578.6	9.9	306	43129.
28	7	1961	2.0	1535	31 35.0	-40 0.0	1688.6	10.0	307	44059.
28	7	1961	2.0	2015	32 3.2	-40 44.0	1735.4	9.9	306	44463.
29	7	1961	2.0	430	32 51.8	-42 2.0	1817.2	8.9	135	45174.
29	7	1961	2.0	540	32 44.5	-41 53.2	1827.6	0.9	315	45080.
29	7	1961	2.0	810	32 46.0	-41 55.0	1829.7	10.4	309	45099.
29	7	1961	2.0	10 1	32 58.0	-42 12.8	1848.9	6.0	125	45269.
29	7	1961	2.0	1116	32 53.7	-42 5.5	1856.4	11.0	279	45204.
29	7	1961	2.0	12 0	32 55.0	-42 15.0	1864.5	8.8	127	45256.
29	7	1961	2.0	1245	32 51.0	-42 8.7	1871.1	10.5	326	45197.
29	7	1961	2.0	1330	32 57.5	-42 14.0	1879.0	10.3	308	45270.
29	7	1961	2.0	1622	33 15.6	-42 41.8	1908.5	0.7	298	45531.
29	7	1961	2.0	19 4	33 16.5	-42 43.8	1910.4	9.4	310	45547.
29	7	1961	2.0	2015	33 23.7	-42 54.0	1921.5	8.7	308	45647.
30	7	1961	2.0	0 0	33 43.8	-43 24.9	1954.2	9.0	308	45938.
30	7	1961	2.0	5 3	34 12.0	-44 8.0	1999.7	8.4	306	46346.
30	7	1961	2.0	11 0	34 41.7	-44 56.8	2049.7	8.3	301	46791.
30	7	1961	2.0	13 7	34 50.7	-45 15.2	2067.3	8.7	303	46943.
30	7	1961	2.0	1455	34 59.2	-45 31.2	2082.9	10.3	116	47080.
30	7	1961	2.0	1538	34 56.0	-45 23.1	2090.3	0.9	90	47019.
30	7	1961	2.0	20 5	34 56.0	-45 18.0	2094.5	8.8	298	46995.
30	7	1961	2.0	2230	35 5.8	-45 40.9	2115.7	6.6	297	47174.
30	7	1961	2.0	2252	35 6.9	-45 43.5	2118.1	9.1	298	47194.
30	7	1961	3.0	2340	35 14.6	-46 1.2	2134.4	9.2	149	47333.
31	7	1961	3.0	043	35 6.4	-45 55.1	2144.0	0.7	186	47245.
31	7	1961	3.0	258	35 4.8	-45 55.3	2145.6	8.7	285	47235.
31	7	1961	3.0	316	35 5.5	-45 58.4	2148.3	9.7	63	47254.
31	7	1961	3.0	432	35 11.0	-45 45.0	2160.5	9.8	68	47231.
31	7	1961	3.0	517	35 13.8	-45 36.7	2167.9	8.5	286	47212.
31	7	1961	3.0	916	35 23.2	-46 16.8	2201.9	8.9	296	47470.
31	7	1961	3.0	1150	35 33.0	-46 42.0	2224.7	7.5	302	47660.
31	7	1961	3.0	1213	35 34.5	-46 45.0	2227.5	9.5	304	47685.
31	7	1961	3.0	1410	35 44.8	-47 4.1	2246.2	0.4	165	47851.
31	7	1961	3.0	1546	35 44.2	-47 3.9	2246.8	9.0	300	47845.
31	7	1961	3.0	1943	36 2.0	-47 42.0	2282.4	9.4	305	48155.
31	7	1961	3.0	2253	36 19.2	-48 12.2	2312.2	4.3	309	48422.
31	7	1961	3.0	2335	36 21.1	-48 15.1	2315.3	9.0	304	48450.
1	8	1961	3.0	0 0	36 23.2	-48 19.0	2319.0	9.6	309	48483.
1	8	1961	3.0	424	36 50.0	-49 0.0	2361.5	9.8	305	48869.
1	8	1961	3.0	845	37 14.7	-49 43.5	2404.1	5.3	297	49250.
1	8	1961	3.0	9 0	37 15.3	-49 45.0	2405.4	9.1	308	49261.
1	8	1961	3.0	940	37 19.0	-49 51.0	2411.5	1.4	58	49316.
1	8	1961	3.0	1020	37 19.5	-49 50.0	2412.4	9.8	308	49314.
1	8	1961	3.0	1125	37 26.0	-50 0.5	2423.0	0.9	38	49410.
1	8	1961	3.0	12 8	37 26.5	-50 0.0	2423.6	9.4	300	49410.
1	8	1961	3.0	1240	37 29.0	-50 5.5	2428.6	0.4	37	49454.

VEMA 1713 DAKAR - HALIFAX

DAY	MCN	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
1	8	1961	3.C	1820	37 3C.8	-5C 3.8	243C.9	9.5	3C7	49458.
1	8	1961	3.0	2C 8	37 41.0	-5C 21.0	2447.9	9.2	300	49611.
2	8	1961	3.C	430	38 19.7	-51 45.C	2524.6	8.9	3C2	50277.
2	8	1961	3.0	1C38	38 49.C	-52 44.0	2579.2	1.0	128	50755.
2	8	1961	3.0	1312	38 47.5	-52 41.5	2581.7	9.0	303	50733.
2	8	1961	3.0	2C 0	39 21.0	-53 47.0	2642.6	0.9	326	51264.
2	8	1961	3.C	2215	39 22.7	-53 48.5	2644.6	1C.5	3C7	51281.
3	8	1961	3.C	1C 8	4C 38.2	-55 58.0	2769.3	1.5	0	52361.
3	8	1961	3.C	1C4C	4C 39.C	-55 58.C	2770.1	1.2	323	52365.
3	8	1961	3.C	1322	4C 41.5	-56 0.5	2773.2	10.1	304	52392.
3	8	1961	3.C	1950	41 18.C	-57 12.0	2838.4	0.5	318	52939.
3	8	1961	3.0	2230	41 19.0	-57 13.2	2839.7	9.1	310	52950.
4	8	1961	3.C	353	41 5C.4	-58 3.C	2888.5	9.7	310	53356.
4	8	1961	3.C	1C1C	42 29.5	-59 6.0	2949.4	0.7	19	53855.
4	8	1961	3.0	1453	42 32.8	-59 4.5	2952.8	9.0	311	53865.
4	8	1961	3.C	1546	42 38.0	-59 12.7	2960.8	9.8	310	53929.
4	8	1961	3.0	1930	43 1.2	-59 51.C	2997.2	1.6	278	54221.
4	8	1961	3.0	2216	43 1.8	-59 57.0	3001.7	7.6	305	54251.
5	8	1961	3.C	1 0	43 13.6	-6C 2C.5	3022.5	6.6	301	54415.
5	8	1961	3.C	353	43 23.3	-6C 43.0	3041.5	5.8	295	54563.
5	8	1961	3.C	958	43 38.2	-61 27.0	3076.7	0.3	346	54829.
5	8	1961	3.0	18 8	43 40.2	-61 27.7	3078.8	8.7	300	54841.
5	8	1961	3.0	22 0	43 57.C	-62 8.C	3112.4	8.8	297	55096.
6	8	1961	3.C	017	44 6.2	-62 32.8	3132.4	8.8	295	55245.
6	8	1961	3.0	441	44 22.5	-63 22.0	3171.3			55527.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
11	8	1961	3.0	17 3	44 23.0	-63 21.0	0.0	7.5	90	55525.
11	8	1961	3.0	20 0	44 23.0	-62 50.0	22.2	8.0	90	55394.
12	8	1961	3.0	0 0	44 23.0	-62 5.0	54.3	7.8	90	55202.
12	8	1961	3.0	356	44 23.0	-61 22.0	85.0	7.8	87	55015.
12	8	1961	3.0	917	44 25.5	-60 23.5	126.9	12.7	89	54770.
12	8	1961	3.0	11 0	44 26.0	-59 53.0	148.7	10.0	94	54637.
12	8	1961	3.0	12 0	44 25.3	-59 39.0	158.7	10.8	104	54571.
12	8	1961	3.0	1237	44 23.7	-59 30.0	165.3	9.8	95	54524.
12	8	1961	3.0	1431	44 22.0	-59 4.0	184.0	10.1	148	54399.
12	8	1961	3.0	1443	44 20.3	-59 2.5	186.0	11.2	164	54384.
12	8	1961	3.0	1517	44 14.2	-59 0.0	192.4	11.6	265	54344.
12	8	1961	3.0	1530	44 14.0	-59 3.5	194.9	1.1	106	54359.
12	8	1961	3.0	1611	44 13.8	-59 2.5	195.6	9.9	187	54354.
12	8	1961	3.0	1726	44 1.5	-59 4.5	208.0	8.1	90	54305.
12	8	1961	3.0	1742	44 1.5	-59 1.5	210.2	1.2	0	54291.
12	8	1961	3.0	1855	44 3.0	-59 1.5	211.7	4.8	86	54298.
12	8	1961	3.0	2029	44 3.5	-58 51.0	219.2	4.7	179	54253.
13	8	1961	3.0	0 0	43 47.0	-58 50.5	235.7	5.9	173	54172.
13	8	1961	3.0	242	43 31.3	-58 48.0	251.5	5.7	257	54084.
13	8	1961	3.0	933	43 22.5	-59 40.0	290.3	0.4	0	54277.
13	8	1961	3.0	1040	43 23.0	-59 40.0	290.8	5.9	309	54279.
13	8	1961	3.0	1414	43 36.0	-60 2.5	311.7	1.5	227	54444.
13	8	1961	3.0	1515	43 35.0	-60 4.0	313.2	5.4	180	54445.
13	8	1961	3.0	1627	43 28.5	-60 4.0	319.7	0.3	180	54414.
13	8	1961	3.0	17 7	43 28.3	-60 4.0	319.9	7.3	142	54413.
13	8	1961	3.0	1731	43 26.0	-60 1.5	322.8	10.5	180	54391.
13	8	1961	3.0	20 0	43 0.0	-60 1.5	348.8	12.0	180	54262.
13	8	1961	3.0	21 0	42 48.0	-60 1.5	360.8	9.9	249	54202.
14	8	1961	3.0	318	42 26.0	-61 21.0	423.3	12.1	340	54447.
14	8	1961	3.0	355	42 33.0	-61 24.5	430.7	2.5	261	54498.
14	8	1961	3.0	516	42 32.5	-61 29.0	434.1	0.9	136	54515.
14	8	1961	3.0	733	42 31.0	-61 27.0	436.2	5.2	317	54499.
14	8	1961	3.0	1040	42 43.0	-61 42.0	452.5	4.5	352	54626.
14	8	1961	3.0	1227	42 51.0	-61 43.5	460.6	0.5	54	54672.
14	8	1961	3.0	15 9	42 51.8	-61 42.0	461.9	4.6	319	54669.
14	8	1961	3.0	1629	42 56.5	-61 47.5	468.1	0.5	216	54717.
14	8	1961	3.0	1748	42 56.0	-61 48.0	468.8	5.1	304	54717.
14	8	1961	3.0	1830	42 58.0	-61 52.0	472.3	0.4	180	54744.
14	8	1961	3.0	1955	42 57.5	-61 52.0	472.8	3.5	304	54742.
14	8	1961	3.0	2025	42 58.5	-61 54.0	474.6	6.2	310	54755.
14	8	1961	3.0	2233	43 7.0	-62 7.8	487.8	0.8	270	54857.
14	8	1961	3.0	2328	43 7.0	-62 8.8	488.5	8.4	316	54861.
15	8	1961	3.0	335	43 32.0	-62 41.5	523.0	9.0	336	55123.
15	8	1961	3.0	517	43 46.0	-62 50.0	538.3	10.8	326	55225.
15	8	1961	3.0	640	43 58.5	-63 1.5	553.3	1.5	216	55332.
15	8	1961	3.0	7 5	43 58.0	-63 2.0	553.9	6.9	333	55332.
15	8	1961	3.0	10 0	44 16.0	-63 15.0	574.2	8.8	313	55469.
15	8	1961	3.0	11 0	44 22.0	-63 24.0	583.0	11.8	334	55534.
15	8	1961	3.0	1154	44 31.5	-63 30.5	593.6	6.0	325	55603.
15	8	1961	3.0	12 0	44 32.0	-63 31.0	594.2	0.2	153	55607.

VEMA 1714 HALIFAX - HALIFAX

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
18	8	1961	3.0	1430	44 22.0	-63 24.0	605.4	11.3	142	55534.
18	8	1961	3.0	15 7	44 16.5	-63 18.0	612.3	0.4	144	55484.
18	8	1961	3.0	1640	44 16.0	-63 17.5	612.9			55479.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
18	8	1961	3.0	1813	44 3.5	-63 3.0	0.0	1.8	144	55362.
18	8	1961	3.0	1834	44 3.0	-63 2.5	0.6	10.7	140	55357.
18	8	1961	3.0	1934	43 54.8	-62 53.0	11.3	1.0	125	55279.
18	8	1961	3.0	2025	43 54.3	-62 52.0	12.2	10.2	139	55273.
18	8	1961	3.0	2318	43 32.0	-62 25.3	41.7	0.9	24	55054.
18	8	1961	3.0	2355	43 32.5	-62 25.0	42.2	11.4	38	55055.
19	8	1961	3.0	5 6	44 19.0	-61 34.0	101.5	9.8	37	55050.
19	8	1961	3.0	918	44 51.5	-60 59.0	142.4	1.1	115	55043.
19	8	1961	3.0	1025	44 51.0	-60 57.5	143.6	6.7	95	55034.
19	8	1961	3.0	12 0	44 50.0	-60 42.5	154.3	8.3	90	54964.
19	8	1961	3.0	1223	44 50.0	-60 38.0	157.5	0.9	90	54944.
19	8	1961	3.0	1238	44 50.0	-60 37.0	158.2	6.6	90	54940.
19	8	1961	3.0	1529	44 50.0	-60 15.0	173.8	0.4	90	54843.
19	8	1961	3.0	1626	44 50.0	-60 14.5	174.1	10.9	90	54841.
19	8	1961	3.0	2025	44 50.0	-59 13.0	217.7	11.1	90	54568.
20	8	1961	3.0	0 0	44 50.0	-58 17.0	257.5	11.1	89	54317.
20	8	1961	3.0	6 0	44 51.0	-56 43.2	324.0	9.9	219	53896.
20	8	1961	3.0	845	44 30.0	-57 7.5	351.2	0.4	90	53908.
20	8	1961	3.0	936	44 30.0	-57 7.0	351.5	10.8	168	53906.
20	8	1961	3.0	956	44 26.5	-57 6.0	355.1	6.1	251	53885.
20	8	1961	3.0	1026	44 25.5	-57 10.0	358.1	6.7	311	53898.
20	8	1961	3.0	11 0	44 28.0	-57 14.0	361.9	3.2	200	53929.
20	8	1961	3.0	1120	44 27.0	-57 14.5	363.0	3.8	200	53926.
20	8	1961	3.0	1137	44 26.0	-57 15.0	364.0	0.5	180	53924.
20	8	1961	3.0	12 0	44 25.8	-57 15.0	364.2	2.8	230	53923.
20	8	1961	3.0	13 0	44 24.0	-57 18.0	367.0	0.0	90	53928.
20	8	1961	3.0	1345	44 24.0	-57 18.0	367.0	1.0	324	53928.
20	8	1961	3.0	1422	44 24.5	-57 18.5	367.7	0.0	90	53933.
20	8	1961	3.0	1445	44 24.5	-57 18.5	367.7	10.2	61	53933.
20	8	1961	3.0	1739	44 39.0	-56 42.5	397.1	0.8	0	53837.
20	8	1961	3.0	1815	44 39.5	-56 42.5	397.6	11.8	54	53839.
20	8	1961	3.0	1946	44 50.0	-56 22.0	415.6	9.6	67	53795.
20	8	1961	3.0	2010	44 51.5	-56 17.0	419.4	1.2	109	53779.
20	8	1961	3.0	2054	44 51.2	-56 15.8	420.3	7.7	145	53772.
21	8	1961	3.0	5 2	43 59.5	-55 26.0	483.1	7.5	146	53293.
21	8	1961	3.0	1045	43 24.0	-54 53.0	525.9	1.2	109	52960.
21	8	1961	3.0	12 0	43 23.5	-54 51.0	527.4	0.9	164	52948.
21	8	1961	3.0	1446	43 21.0	-54 50.0	530.0	1.0	305	52930.
21	8	1961	3.0	1628	43 22.0	-54 52.0	531.8	7.8	325	52945.
22	8	1961	3.0	8 6	45 1.5	-56 30.0	653.6	11.4	321	53885.
22	8	1961	3.0	12 0	45 36.0	-57 9.5	697.9	10.8	325	54220.
22	8	1961	3.0	1811	46 31.0	-58 4.0	764.6	2.1	19	54698.
22	8	1961	3.0	1940	46 34.0	-58 2.5	767.8	8.4	161	54704.
22	8	1961	3.0	2233	46 11.0	-57 51.0	792.1	1.9	90	54557.
22	8	1961	3.0	2338	46 11.0	-57 48.0	794.2	8.6	313	54544.
23	8	1961	3.0	4 0	46 36.5	-58 28.0	831.8	1.2	174	54826.
23	8	1961	3.0	915	46 30.0	-58 27.0	838.3	0.0	90	54795.
23	8	1961	3.0	930	46 30.0	-58 27.0	838.3	3.5	331	54795.
23	8	1961	3.0	11 8	46 35.0	-58 31.0	844.0	8.5	303	54833.
23	8	1961	3.0	12 0	46 39.0	-58 40.0	851.4	0.4	306	54889.

VEMA 1715 HALIFAX - ARGENTIA

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
23	8	1961	3.0	14 5	46 39.5	-58 41.0	852.2	6.1	101	54895.
23	8	1961	3.0	1610	46 37.0	-58 23.0	864.8	0.4	250	54806.
23	8	1961	3.0	20 8	46 36.5	-58 25.0	866.3	1.1	146	54813.
23	8	1961	3.0	23 0	46 34.0	-58 22.5	869.3	11.3	140	54792.
24	8	1961	3.0	344	45 53.0	-57 32.5	923.0	1.4	120	54398.
24	8	1961	3.0	513	45 52.0	-57 30.0	925.0	1.9	138	54382.
24	8	1961	3.0	1124	45 43.5	-57 19.0	936.4	5.8	205	54296.
24	8	1961	3.0	1215	45 39.0	-57 22.0	941.4	7.5	180	54289.
24	8	1961	3.0	1251	45 34.5	-57 22.0	945.9	7.5	180	54270.
24	8	1961	3.0	1255	45 34.0	-57 22.0	946.4	10.8	53	54267.
24	8	1961	3.0	1834	46 10.5	-56 12.0	1007.3	0.8	180	54113.
24	8	1961	3.0	1914	46 10.0	-56 12.0	1007.8	11.6	56	54111.
24	8	1961	3.0	2051	46 20.5	-55 49.5	1026.5	11.2	53	54056.
25	8	1961	3.0	140	46 53.0	-54 47.0	1080.4	0.6	54	53916.
25	8	1961	3.0	3 3	46 53.5	-54 46.0	1081.2	10.9	42	53914.
25	8	1961	3.0	450	47 8.0	-54 27.0	1100.7	10.8	62	53891.
25	8	1961	3.0	550	47 13.0	-54 13.0	1111.4	10.2	47	53850.
25	8	1961	3.0	650	47 20.0	-54 2.0	1121.7			53831.

DAY	MCN	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
25	8	1961	3.0	1656	47 20.0	-54 1.0	0.0	7.1	208	53827.
25	8	1961	3.0	21 8	46 53.5	-54 21.5	29.9	9.3	146	53806.
25	8	1961	3.0	2151	46 48.0	-54 16.0	36.6	9.5	124	53757.
25	8	1961	3.0	2225	46 45.0	-54 9.5	42.0	9.6	122	53716.
26	8	1961	3.0	115	46 30.5	-53 36.0	69.2	9.3	99	53502.
26	8	1961	3.0	343	46 27.0	-53 3.0	92.2	1.2	161	53339.
26	8	1961	3.0	434	46 26.0	-53 2.5	93.2	10.1	159	53333.
26	8	1961	3.0	755	45 54.5	-52 45.0	127.0	1.3	126	53110.
26	8	1961	3.0	835	45 54.0	-52 44.0	127.8	10.4	161	53103.
26	8	1961	3.0	11 8	45 29.0	-52 31.5	154.3	0.9	35	52928.
26	8	1961	3.0	1147	45 29.5	-52 31.0	154.9	11.4	160	52928.
26	8	1961	3.0	1443	44 58.0	-52 15.0	188.4	8.8	160	52703.
26	8	1961	3.0	18 6	44 30.0	-52 1.0	218.1	1.2	90	52498.
26	8	1961	3.0	1843	44 30.0	-52 0.0	218.8	7.6	28	52494.
26	8	1961	3.0	20 8	44 39.5	-51 53.0	229.5	8.4	15	52510.
26	8	1961	3.0	2240	45 0.0	-51 45.5	250.7	8.0	18	52578.
27	8	1961	3.0	457	45 48.0	-51 23.0	301.2	6.6	17	52710.
27	8	1961	3.0	530	45 51.5	-51 21.5	304.9	8.3	25	52720.
27	8	1961	3.0	10 0	46 25.5	-50 59.0	342.3	9.4	90	52780.
27	8	1961	3.0	1044	46 25.5	-50 49.0	349.2	9.1	19	52735.
27	8	1961	3.0	11 5	46 28.5	-50 47.5	352.4	10.1	4	52743.
27	8	1961	3.0	1225	46 42.0	-50 46.0	365.9	2.9	270	52799.
27	8	1961	3.0	1232	46 42.0	-50 46.5	366.2	1.5	270	52801.
27	8	1961	3.0	1313	46 42.0	-50 48.0	367.3	10.2	270	52807.
27	8	1961	3.0	16 2	46 42.0	-51 30.0	396.1	1.7	180	52993.
27	8	1961	3.0	1637	46 41.0	-51 30.0	397.1	10.4	270	52989.
27	8	1961	3.0	1925	46 41.0	-52 12.5	426.2	1.4	180	53177.
27	8	1961	3.0	20 7	46 40.0	-52 12.5	427.2	10.0	270	53173.
27	8	1961	3.0	22 0	46 40.0	-52 40.0	446.1	8.2	281	53295.
27	8	1961	3.0	2259	46 41.5	-52 51.5	454.1	1.9	46	53353.
27	8	1961	3.0	2345	46 42.5	-52 50.0	455.6	9.5	8	53351.
28	8	1961	3.0	134	46 59.5	-52 46.5	472.7	10.4	15	53410.
28	8	1961	3.0	452	47 32.5	-52 33.5	506.9	10.2	352	53495.
28	8	1961	3.0	835	48 10.0	-52 41.0	544.7	11.0	348	53683.
28	8	1961	3.0	11 0	48 36.0	-52 49.0	571.3	10.5	340	53822.
28	8	1961	3.0	1325	49 0.0	-53 2.0	596.8	10.4	337	53971.
28	8	1961	3.0	1553	49 23.5	-53 17.5	622.3	10.6	15	54125.
28	8	1961	3.0	1721	49 38.5	-53 11.5	637.8	10.5	49	54154.
28	8	1961	3.0	18 0	49 43.0	-53 3.5	644.7	11.3	9	54137.
28	8	1961	3.0	1854	49 53.0	-53 1.0	654.8	1.1	297	54162.
28	8	1961	3.0	23 1	49 55.0	-53 7.0	659.2	7.3	47	54194.
29	8	1961	3.0	143	50 8.5	-52 44.5	679.0	6.9	47	54148.
29	8	1961	3.0	542	50 27.0	-52 13.0	706.3	1.1	303	54082.
29	8	1961	3.0	1130	50 30.5	-52 21.5	712.7	1.0	298	54129.
29	8	1961	3.0	1232	50 31.0	-52 23.0	713.8	6.3	57	54137.
29	8	1961	3.0	15 7	50 40.0	-52 1.5	730.2	7.2	67	54080.
29	8	1961	3.0	16 1	50 42.5	-51 52.0	736.7	7.3	52	54049.
29	8	1961	3.0	19 6	50 56.5	-51 24.0	759.2	1.1	0	53983.
29	8	1961	3.0	20 0	50 57.5	-51 24.0	760.2	0.9	240	53986.
30	8	1961	3.0	122	50 55.0	-51 31.0	765.3	7.0	53	54006.

VEMA 1716 ARGENTIA - HALIFAX

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REVOLVING
30	8	1961	3.0	310	51 2.5	-51 15.0	777.9	8.0	84	53917.
30	8	1961	3.0	352	51 5.0	-51 7.0	783.5	0.8	49	53913.
30	8	1961	3.0	442	51 5.0	-51 4.0	784.1	8.0	52	53919.
30	8	1961	3.0	810	51 22.0	-50 31.0	811.9	0.8	231	53859.
30	8	1961	3.0	1219	51 20.0	-50 35.0	815.1	0.5	148	53864.
30	8	1961	3.0	1442	51 19.0	-50 34.0	816.2	8.7	53	53857.
30	8	1961	3.0	1745	51 35.0	-50 0.0	842.8	11.1	51	53779.
30	8	1961	3.0	1758	51 36.5	-49 57.0	845.2	9.0	13	53758.
30	8	1961	3.0	2025	51 58.0	-49 49.0	867.2	9.5	11	53808.
31	8	1961	3.0	3 3	53 0.0	-49 30.0	930.3	9.5	6	53930.
31	8	1961	3.0	413	53 11.0	-49 28.0	941.4	9.7	11	53955.
31	8	1961	3.0	1217	54 28.0	-49 2.0	1019.9	10.0	13	54075.
31	8	1961	3.0	17 0	55 14.0	-48 44.0	1067.0	7.7	270	54129.
31	8	1961	3.0	1731	55 14.0	-48 51.0	1071.0	1.0	66	54154.
31	8	1961	3.0	1957	55 15.0	-48 47.0	1073.5	2.5	270	54142.
31	8	1961	3.0	2131	55 15.0	-48 54.0	1077.5	6.3	13	54167.
1	9	1961	3.0	453	56 0.0	-48 35.5	1123.7	8.7	13	54209.
1	9	1961	3.0	646	56 16.0	-48 29.0	1140.1	8.8	9	54223.
1	9	1961	3.0	9 0	56 35.5	-48 23.5	1159.8	9.0	7	54247.
1	9	1961	3.0	1014	56 46.5	-48 21.0	1170.9	9.4	11	54262.
1	9	1961	3.0	12 0	57 2.8	-48 15.0	1187.6	9.1	10	54275.
1	9	1961	3.0	1733	57 52.5	-47 58.0	1238.1	9.0	11	54317.
1	9	1961	3.0	21 4	58 23.5	-47 47.0	1269.6	3.9	10	54338.
2	9	1961	3.0	050	58 38.0	-47 42.0	1284.4	3.4	23	54348.
2	9	1961	3.0	815	59 1.0	-47 23.5	1309.3	7.8	8	54328.
2	9	1961	3.0	12 8	59 31.0	-47 15.5	1339.6	8.4	8	54351.
2	9	1961	3.0	1313	59 40.0	-47 13.0	1348.6	8.8	18	54357.
2	9	1961	3.0	1813	60 22.0	-46 46.5	1392.7	11.7	36	54338.
2	9	1961	3.0	1923	60 33.0	-46 30.0	1406.4	14.3	51	54305.
2	9	1961	3.0	20 0	60 38.5	-46 16.0	1415.2	0.1	199	54271.
4	9	1961	3.0	1130	60 34.2	-46 19.0	1419.7	8.0	243	54273.
4	9	1961	3.0	12 3	60 32.2	-46 27.0	1424.1	9.3	256	54294.
4	9	1961	3.0	1529	60 24.5	-47 30.0	1456.1	10.0	272	54473.
4	9	1961	3.0	17 5	60 25.0	-48 2.5	1472.2	8.3	272	54572.
4	9	1961	3.0	1843	60 25.5	-48 30.0	1485.8	2.4	338	54656.
4	9	1961	3.0	20 3	60 28.5	-48 32.5	1489.0	10.0	273	54667.
5	9	1961	3.0	023	60 30.5	-50 0.0	1532.1	7.4	272	54937.
5	9	1961	3.0	815	60 33.0	-51 58.0	1590.2	9.6	270	55302.
5	9	1961	3.0	12 0	60 33.0	-53 11.2	1626.2	8.2	264	55529.
5	9	1961	3.0	20 0	60 26.5	-55 24.0	1692.0	8.7	269	55939.
6	9	1961	3.0	323	60 25.0	-57 34.0	1756.1	8.5	48	56344.
6	9	1961	3.0	6 0	60 40.0	-57 0.5	1778.4	8.1	270	56243.
6	9	1961	3.0	747	60 40.0	-57 30.0	1792.3	7.9	267	56334.
6	9	1961	3.0	9 0	60 39.5	-57 49.5	1802.4	5.4	0	56394.
6	9	1961	3.0	956	60 44.5	-57 49.5	1807.4	0.5	21	56394.
6	9	1961	3.0	12 0	60 45.5	-57 48.7	1808.5	1.3	154	56392.
6	9	1961	3.0	1826	60 47.5	-57 54.0	1816.9	9.0	201	56[illegible].
7	9	1961	3.0	1 5	59 45.0	-58 52.0	1876.2	7.5	105	56[illegible].
7	9	1961	3.0	7 3	59 [illegible].5	-57 [illegible].	[illegible].1	[illegible].5	1[illegible]	56[illegible].
7	9	1961	3.0	[illegible]	59 30.5	-57 [illegible]	[illegible].0	8.4	[illegible]	56[illegible].

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
7	9	1961	3.0	1243	59 28.2	-55 59.0	1966.4	8.7	91	56020.
7	9	1961	3.0	15 9	59 28.0	-55 17.5	1987.5	1.6	176	55886.
7	9	1961	3.0	1738	59 24.0	-55 17.0	1991.5	9.1	93	55882.
7	9	1961	3.0	1943	59 23.0	-54 40.0	2010.4	8.7	90	55761.
7	9	1961	3.0	2230	59 23.0	-53 52.5	2034.6	4.9	357	55607.
8	9	1961	3.0	645	59 34.0	-53 53.5	2045.6	8.6	267	55619.
8	9	1961	3.0	319	59 33.0	-54 37.0	2067.6	6.8	305	55759.
8	9	1961	3.0	7 5	59 47.5	-55 18.5	2093.1	10.9	184	55902.
8	9	1961	3.0	8 3	59 37.0	-55 20.0	2103.7	10.8	163	55900.
8	9	1961	3.0	832	59 32.0	-55 17.0	2108.9	11.1	159	55887.
8	9	1961	3.0	1137	59 0.0	-54 52.5	2143.2	11.5	159	55783.
8	9	1961	3.0	1237	58 49.3	-54 44.5	2154.7	10.2	161	55748.
8	9	1961	3.0	1829	57 52.5	-54 7.0	2214.8	0.6	168	55561.
8	9	1961	3.0	2245	57 50.0	-54 6.0	2217.4	10.0	156	55555.
9	9	1961	3.0	8 0	56 26.0	-52 56.0	2309.6	9.5	155	55186.
9	9	1961	3.0	11 0	56 0.0	-52 34.5	2338.2	9.1	156	55062.
9	9	1961	3.0	12 5	55 51.0	-52 27.5	2348.0	4.3	110	55020.
9	9	1961	3.0	1230	55 50.4	-52 24.5	2349.8	0.9	168	55008.
9	9	1961	3.0	1948	55 44.0	-52 22.0	2356.3	7.6	219	54986.
9	9	1961	3.0	2135	55 33.5	-52 37.0	2369.8	6.5	237	55020.
9	9	1961	3.0	2243	55 29.5	-52 48.0	2377.2	7.6	217	55052.
10	9	1961	3.0	145	55 11.0	-53 12.5	2400.4	0.3	139	55104.
10	9	1961	3.0	542	55 10.0	-53 11.0	2401.7	8.1	217	55096.
10	9	1961	3.0	8 0	54 55.0	-53 30.5	2420.4	9.6	208	55137.
10	9	1961	3.0	857	54 47.0	-53 38.0	2429.5	0.0	90	55148.
10	9	1961	3.0	927	54 47.0	-53 38.0	2429.5	8.3	208	55148.
10	9	1961	3.0	1156	54 28.8	-53 55.0	2450.2	10.1	258	55173.
10	9	1961	3.0	1242	54 27.2	-54 8.0	2457.9	0.3	180	55218.
10	9	1961	3.0	1443	54 26.5	-54 8.0	2458.6	10.3	236	55217.
10	9	1961	3.0	19 0	54 2.0	-55 11.0	2502.8	10.6	216	55403.
10	9	1961	3.0	2121	53 42.0	-55 36.0	2527.7	7.5	180	55454.
10	9	1961	3.0	2125	53 41.5	-55 36.0	2528.2	1.2	119	55453.
10	9	1961	3.0	2215	53 41.0	-55 34.5	2529.2	7.8	158	55446.
10	9	1961	3.0	2342	53 30.5	-55 27.5	2540.5	7.6	177	55395.
11	9	1961	3.0	343	53 0.0	-55 25.0	2571.0	10.5	177	55313.
11	9	1961	3.0	720	52 22.8	-55 21.2	2609.1	11.3	194	55200.
11	9	1961	3.0	812	52 12.5	-55 25.0	2618.9	12.1	215	55190.
11	9	1961	3.0	9 0	52 4.5	-55 34.0	2628.6	10.3	231	55205.
11	9	1961	3.0	11 0	51 51.5	-56 0.0	2649.2	11.1	231	55273.
11	9	1961	3.0	12 0	51 44.5	-56 14.0	2660.4	11.6	233	55311.
11	9	1961	3.0	13 0	51 37.5	-56 29.0	2672.0	11.1	230	55352.
11	9	1961	3.0	1432	51 26.5	-56 50.0	2689.1	11.4	248	55406.
11	9	1961	3.0	1534	51 22.0	-57 7.5	2700.9	5.8	286	55464.
11	9	1961	3.0	1611	51 23.0	-57 13.0	2704.5	4.7	255	55489.
11	9	1961	3.0	17 0	51 22.0	-57 19.0	2708.3	11.3	242	55511.
11	9	1961	3.0	1933	51 8.5	-57 59.5	2737.1	1.0	212	55638.
11	9	1961	3.0	2044	51 7.5	-58 0.5	2736.2	9.2	145	55639.
11	9	1961	3.0	2152	50 59.0	-57 51.0	2748.6	0.5	270	55576.
11	9	1961	3.0	2230	50 59.0	-57 51.5	2748.9	9.6	146	55578.
11	9	1961	3.0	2330	50 51.0	-57 43.0	2758.6	1.2	212	55521.

VENA 1716 ARGENTIA - HALIFA

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
12	9	1961	3.0	C C	50 [illegible].5	-57 43.5	2759.2	8.8	144	[illegible]322.
12	9	1961	3.0	1 3	50 [illegible].0	-57 35.0	2768.4	1.2	270	[illegible].
12	9	1961	3.0	134	50 [illegible].0	-57 36.0	2769.0	11.0	246	55469.
12	9	1961	3.0	9 0	50 [illegible].5	-58 32.7	2850.5	11.2	256	55849.
12	9	1961	3.0	1044	50 [illegible].8	-59 [illegible].2	2869.9	11.4	253	55955.
12	9	1961	3.0	12 0	50 [illegible].5	-59 24.5	2884.4	11.1	263	56043.
12	9	1961	3.0	1535	49 58.5	-61 26.5	2924.2	10.3	275	56277.
12	9	1961	3.0	17 5	49 59.5	-61 30.0	2939.7	0.6	119	56377.
12	9	1961	3.0	1815	49 59.5	-61 42.5	2940.4	9.4	170	56372.
12	9	1961	3.0	1923	49 49.0	-61 [illegible].0	2951.1	0.3	147	56330.
12	9	1961	3.0	2013	49 48.5	-61 45.8	2951.3	10.4	153	56329.
12	9	1961	3.0	2123	49 37.0	-61 50.0	2963.5	0.9	90	56311.
12	9	1961	3.0	22 8	49 37.0	-61 49.0	2964.1	10.2	189	56307.
12	9	1961	3.0	2312	49 26.2	-61 51.5	975.0	1.7	99	56285.
12	9	1961	3.0	2359	49 26.0	-61 49.5	2976.3	9.7	165	56277.
13	9	1961	3.0	047	49 18.5	-61 46.5	2984.1	1.5	133	56242.
13	9	1961	3.0	215	49 17.0	-61 44.0	2986.3	10.9	116	56227.
13	9	1961	3.0	810	48 49.0	-60 15.0	3051.0	10.7	112	55773.
13	9	1961	3.0	945	48 42.5	-59 56.0	3068.7	7.1	266	55647.
13	9	1961	3.0	1045	48 42.0	-60 0.0	3075.3	1.7	204	55687.
13	9	1961	3.0	1144	48 40.5	-60 1.0	3077.0	10.6	109	55686.
13	9	1961	3.0	1253	48 36.5	-59 43.5	3089.2	1.0	180	55599.
13	9	1961	3.0	1352	48 35.5	-59 43.5	3090.2	10.5	109	55596.
13	9	1961	3.0	15 2	48 31.5	-59 26.0	3102.5	8.0	282	55509.
13	9	1961	3.0	1942	48 39.5	-60 21.0	3139.7	0.5	152	55766.
14	9	1961	3.0	053	48 37.0	-60 19.0	3142.5	9.6	237	55750.
14	9	1961	3.0	2 2	48 31.0	-60 33.0	3153.6	5.1	239	55788.
14	9	1961	3.0	225	48 30.0	-60 35.5	3155.5	8.0	73	55795.
14	9	1961	3.0	238	48 30.5	-60 33.0	3157.2	8.3	233	55786.
14	9	1961	3.0	250	48 29.5	-60 35.0	3158.9	10.0	253	55791.
14	9	1961	3.0	340	48 27.0	-60 47.0	3167.2	9.8	236	55833.
14	9	1961	3.0	752	48 4.0	-61 38.0	3208.2	9.7	248	55966.
14	9	1961	3.0	923	47 58.5	-61 58.5	3223.0	0.2	110	56032.
14	9	1961	3.0	1422	47 58.0	-61 57.0	3224.1	10.9	241	56025.
14	9	1961	3.0	1519	47 53.0	-62 10.5	3234.5	11.1	245	56063.
14	9	1961	3.0	1545	47 51.0	-62 17.0	3239.3	11.7	258	56083.
14	9	1961	3.0	1622	47 49.5	-62 27.5	3246.5	9.9	238	56121.
14	9	1961	3.0	1857	47 36.0	-63 0.0	3272.2	0.5	24	56207.
14	9	1961	3.0	22 5	47 37.5	-62 59.0	3273.8	9.3	241	56208.
15	9	1961	3.0	315	47 14.0	-64 1.0	3321.9	0.5	54	56377.
15	9	1961	3.0	623	47 15.0	-63 59.0	3323.6	0.0	90	56373.
15	9	1961	3.0	647	47 15.0	-63 59.0	3323.6	8.7	238	56373.
15	9	1961	3.0	8 5	47 9.0	-64 13.0	3334.8	9.6	264	56408.
15	9	1961	3.0	835	47 8.5	-64 20.0	3339.6	8.3	250	56434.
15	9	1961	3.0	854	47 7.5	-64 24.0	3342.5	11.0	15	56446.
15	9	1961	3.0	11 0	47 29.5	-64 15.5	3365.3	10.9	17	56470.
15	9	1961	3.0	14 [illegible]	48 1.0	-64 1.0	3394.2	1.0	9	56539.
15	9	1961	3.0	16 0	48 3.0	-64 0.5	3401.3	1.7	27	56543.
15	9	1961	3.0	1741	48 4.5	-63 57.0	[illegible]	[illegible]	[illegible]	[illegible].
15	9	1961	3.0	1911	137 24.0	[illegible] .0	[illegible]	17	[illegible]	56552.

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
15	9	1961	3.0	1957	47 51.5	-63 32.0	14139.4	10.0	130	56390.
15	9	1961	3.0	2153	47 39.0	-63 10.0	14158.7	0.3	180	56258.
16	9	1961	3.0	057	47 38.0	-63 10.0	14159.7	8.0	136	56255.
16	9	1961	3.0	210	47 31.0	-63 0.0	14169.5	2.7	126	56190.
16	9	1961	3.0	229	47 30.5	-62 59.0	14170.3	10.0	135	56184.
16	9	1961	3.0	5 5	47 12.0	-62 32.0	14196.3	11.1	129	56006.
16	9	1961	3.0	653	46 59.5	-62 9.0	14216.4	0.8	129	55865.
16	9	1961	3.0	12 0	46 57.0	-62 4.5	14220.3	0.8	90	55837.
16	9	1961	3.0	1227	46 57.0	-62 4.0	14220.6	10.8	130	55835.
16	9	1961	3.0	1642	46 27.5	-61 13.0	14266.4	0.9	134	55506.
16	9	1961	3.0	1958	46 25.5	-61 10.0	14269.3	8.8	255	55486.
16	9	1961	3.0	2037	46 24.0	-61 18.0	14275.0	10.4	210	55514.
16	9	1961	3.0	2323	45 59.0	-61 39.0	14303.9	11.3	180	55503.
16	9	1961	3.0	2355	45 53.0	-61 39.0	14309.9	10.4	148	55479.
17	9	1961	3.0	110	45 42.0	-61 29.0	14322.9	3.7	134	55391.
17	9	1961	3.0	645	45 27.5	-61 7.5	14343.8	12.6	114	55237.
17	9	1961	3.0	749	45 22.0	-60 50.0	14357.3	12.4	186	55138.
17	9	1961	3.0	8 6	45 18.5	-60 50.5	14360.8	11.7	224	55125.
17	9	1961	3.0	845	45 13.0	-60 58.0	14368.4	12.1	242	55134.
17	9	1961	3.0	11 0	45 0.0	-61 32.0	14395.7	12.4	244	55225.
17	9	1961	3.0	1358	44 44.0	-62 18.5	14432.4	11.6	247	55355.
17	9	1961	3.0	1557	44 35.0	-62 48.2	14455.3	11.9	263	55442.
17	9	1961	3.0	18 7	44 32.0	-63 24.2	14481.1			55580.

VEMA 1717 HALIFAX - NEW YORK

DAY	MON	YEAR	TZ	TIME	LATITUDE	LONGITUDE	DISTANCE	SPEED	COURSE	REGIONAL MAG
23	9	1961	3.0	15 0	44 19.5	-63 24.0	0.0	10.2	177	55524.
23	9	1961	3.0	1840	43 42.1	-63 21.3	37.5	5.7	176	55342.
23	9	1961	3.0	1950	43 35.5	-63 20.6	44.1	10.0	178	55308.
23	9	1961	3.0	21 8	43 22.5	-63 20.0	57.1	8.8	177	55244.
24	9	1961	3.0	2 0	42 39.5	-63 17.2	100.1	9.8	178	55022.
24	9	1961	3.0	438	42 13.7	-63 15.7	125.9	8.5	177	54885.
24	9	1961	3.0	1052	41 21.0	-63 12.2	178.7	6.3	178	54594.
24	9	1961	3.0	1429	40 58.1	-63 11.0	201.6	11.0	179	54465.
24	9	1961	3.0	1735	40 24.0	-63 10.2	235.7	0.6	315	54272.
24	9	1961	3.0	2114	40 25.6	-63 12.3	238.0	6.3	180	54290.
24	9	1961	3.0	23 0	40 14.5	-63 12.3	249.1	0.3	180	54227.
24	9	1961	3.0	2353	40 14.2	-63 12.3	249.4	6.9	180	54225.
25	9	1961	3.0	157	40 0.0	-63 12.3	263.6	7.2	178	54144.
25	9	1961	3.0	720	39 21.0	-63 10.8	302.6	7.4	176	53910.
25	9	1961	3.0	9 5	39 8.1	-63 9.5	315.6	1.9	0	53827.
25	9	1961	3.0	1344	39 17.0	-63 9.5	324.5	6.3	168	53880.
25	9	1961	3.0	16 0	39 3.0	-63 5.5	338.8	6.0	156	53779.
25	9	1961	3.0	18 0	38 52.0	-62 59.2	350.8	6.1	164	53685.
25	9	1961	3.0	20 3	38 40.0	-62 54.9	363.3	7.2	171	53593.
25	9	1961	3.0	22 0	38 26.2	-62 52.0	377.3	6.4	186	53495.
25	9	1961	4.0	23 0	38 13.4	-62 53.8	390.2	7.0	183	53423.
26	9	1961	4.0	5 0	37 31.3	-62 56.8	432.3	6.7	183	53169.
26	9	1961	4.0	930	37 1.0	-62 59.0	462.7	2.7	22	52981.
26	9	1961	4.0	1811	37 22.3	-62 48.0	485.7	5.3	192	53072.
26	9	1961	4.0	2018	37 11.4	-62 51.0	496.9	4.3	202	53015.
26	9	1961	4.0	2036	37 10.2	-62 51.6	498.2	5.7	176	53009.
27	9	1961	4.0	0 0	36 51.0	-62 49.8	517.4	5.3	184	52875.
27	9	1961	4.0	820	36 6.8	-62 53.2	561.7	9.4	299	52593.
27	9	1961	4.0	9 0	36 9.8	-63 0.0	568.0	8.9	294	52643.
27	9	1961	4.0	12 0	36 20.6	-63 30.1	594.5	8.2	277	52846.
27	9	1961	4.0	1818	36 27.2	-64 34.0	646.4	9.1	246	53161.
27	9	1961	4.0	2029	36 19.0	-64 56.5	666.3	10.9	224	53198.
27	9	1961	4.0	2045	36 16.9	-64 59.0	669.2	8.8	290	53194.
28	9	1961	4.0	553	36 45.2	-66 33.2	750.0	8.3	306	53760.
28	9	1961	4.0	1418	37 26.0	-67 44.0	819.7	9.9	295	54298.
28	9	1961	4.0	1447	37 28.0	-67 49.5	824.5	8.3	302	54332.
29	9	1961	4.0	847	38 46.5	-70 30.0	973.1	2.9	170	55392.
29	9	1961	4.0	1140	38 38.3	-70 28.2	981.5	9.4	315	55335.
29	9	1961	4.0	16 0	39 7.2	-71 5.2	1022.3	9.7	320	55634.
29	9	1961	4.0	20 6	39 37.5	-71 38.2	1061.9	9.1	322	55921.
29	9	1961	4.0	2137	39 48.3	-71 49.2	1075.6	5.1	317	56020.
29	9	1961	4.0	2241	39 52.3	-71 54.0	1081.0	9.1	318	56058.
29	9	1961	4.0	2342	39 59.2	-72 2.0	1090.3			56123.

VEMA-17 Station Index

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth (fm) Start	Depth (fm) End	Lat.	Long.	Msdn Sq.	C	K	D	H	P	SRP
	Leg 1		New York, N.Y. - St. George's, Bermuda							Dec 9 - Dec 13, 1960, J. L. Worzel, Ch. Sc.					
1	11	+5	1330	1638	2770	2770	34 29N	67 28		-	-	-	-	1	
	Leg 2		St. George's, Bermuda - Key West, Florida							Dec 14-Dec 24, 1960, J. L. Worzel, Ch. Sc.					
2	15	+4	0951	1240	2658	2638	28 29N	65 03W	079	1	-	-	-	2	
3	16	+4	1020	1320	2800	2820	24 57	65 31	079	2	1	-	-	-	
4	18	+4	1312	2355	4230	4070	19 50	67 24	043	3	2	1	-	3	Wire parted. Core and dredge lost.
5	20	+4	1352	1921	3450	3370	19 53	68 08	043	4	-	2	-	4	
6	22	+4	0022	0350	1850	2035	20 26	73 20	080	5	-	-	1	-	
7	22	+4	0729	1013	1989	1978	19 57	73 49	044	6	-	-	2	-	
	Leg 3		Key West, Florida - Galveston, Texas							Dec 27, 1960 - Jan 9, 1961, J. L. Worzel, Ch. Sc.					
7.1	30	+5	1700	2345	-	5	26 05N	81 49W	081	-	-	-	-	-	1VR
7.2	31	+5	0021	0420	5	10	25 58	82 25	081	-	-	-	-	-	1VS255°
7.2	31	+5	0420	0956	10	24	25 58	82 25	081	-	-	-	-	-	2VS255°
8	31	+5	0956	1205	24	-	25 50	83 06	081	-	-	-	-	5	
8	31	+5	1117	1644	-	-	25 50	83 06	081	-	-	-	-	-	2VR
8.1	31	+5	1644	1955	-	-	26 00	83 05	081	-	-	-	-	-	3VR
8.1	31	+5	1955	2110	-	-	26 00	83 05	081	-	-	-	-	5	
8.2	31	+5	2257	0402	22	52	25 47	83 48	081	-	-	-	-	-	3VS255°
8.2	01	+5	0402	0811	52	80	25 47	83 48	081	-	-	-	-	-	4VS255°
9	01	+5	0819	0919	80	-	25 39	84 09	081	7	-	3	-	-	
9.1	01	+5	0919	1434	-	-	25 37	84 07	081	-	-	-	-	6	4VR
9.1	01	+5	1434	2323	-	73	25 37	84 07	081	-	-	-	-	-	5VR
9.2	02	+5	0102	1430	75	1775	24 55	85 22	081	-	-	-	-	-	5VS255°
9.2	02	+5	1556	0032	1775	1783	24 55	85 22	081	-	-	-	-	-	6VS255°
10	03	+5	1430	1641	510	590	25 20	84 31	081	8	3	4	-	7	
11	04	+5	0348	0612	1148	990	24 33	86 51	081	9	-	5	-	-	
12	05	+5	1413	1635	1085	1120	23 04	90 46	082	10	4	6	-	8	
12.1	05	+5	2230	0900	1980	1982	23 35	91 05	082	-	-	-	-	-	Continuous profiling, sheets 1-4
13	06	+5	0912	1133	1982	1981	24 22	91 36	082	11	-	7	-	9	

C=Core K=Camera D=Dredge H=Hydro P=Plankton SRP=Seismic Refraction Profile

VEMA-17 Station Index, Leg 3, Key West- Galveston Dec 27, 1960 - Jan 9, 1961 (continued)

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth (fm) Start	Depth (fm) End	Lat.	Long.	Msdn Sq	C	TG	K	D	WB	P	SRP
13.1	06	+5	1130	0730	1981	1365	24 20N	91 38W	082	-	-	-	-			Continuous profiling, sheets 5-11
14	07	+5	0925	1447	1630	-	25 51	92 30	082	-	-	-	-	-	10	
15	07	+5	1505	1615	-	1395	25 51	92 29	082	12	-	5	-			
16	08	+6	0810	1121	1010	1163	26 30	94 37	082	13	-	6	8			
Leg 4			Galveston, Texas - Cristobal, Panama							Jan 11- Feb 14, 1961, J. L. Worzel, Ch. Sc.						
16.1	12	+6	0213	0537	10	18	29 11N	94 50W	082	-	-	-	-			7VS180°
16.2	12	+6	1440	2007	-	-	28 43	94 56	082	-	-	-	-			7VR
16.2	12	+6	2009	0426	-	-	28 40	94 56	082	-	-	-	-			8VR
16.3	13	+6	0718	1146	15	29	28 01	94 31	082	-	-	-	-			8VS140°
16.3	13	+6	1146	1832	29	325	28 01	94 31	082	-	-	-	-			9VS145°
17	13	+6	1845	2304	368	418	27 36	94 11	082	14	-	7	9	-	11	Continuous profiling, sheets 12-19
17.1	15	+6	1430	1330	990	1953	26 45	92 40	082	-	-	-	-			
18	16	+6	1321	1632	1955	1959	24 33	91 09	082	15	1	-	-	3	12	
18.1	16	+6	1715	0915	1956	1970	24 33	91 09	082	-	-	-	-			Continuous profiling, sheets 20-24
19	17	+6	0948	1320	872	1140	23 27	90 16	082	16	-	-	-	-	13	
19.1	17	+6	1700	0800	1967	915	23 52	90 35	082	-	-	-	-			Continuous profiling, sheets 25-29
20	18	+6	0824	1114	953	1400	23 02	90 42	082	17	-	-	-	4	14	
20.1	18	+6	1850	1030	962	1992	22 32	91 27	082	-	-	-	-			Continuous profiling, sheets 30-34
21	19	+6	1057	1326	1962	1954	23 33	92 25	082	18	-	8	-	5	-	
21.1	19-21	+6	1340	2355	1980	1985	23 33	92 25	082	-	-	-	-			Continuous profiling, sheets 35-54
21.2	22	+6	1027	1353	1982	1974	24 19	91 01	082	-	-	-	-			10VS050°
21.2	22	+6	1405	1851	1973	1970	24 19	91 01	082	-	-	-	-			11VS153°
22	22	+6	2021	0131	1970	1970	23 49	90 44	082	-	-	-	-			11VR
22	23	+6	0004	0150	1970	1970	23 49	90 44	082	19	2	-	-			
22	23	+6	0134	0549	1970	1970	23 49	90 44	082	-	-	-	-			12VR
22.1	23	+6	0827	1358	1973	1962	23 28	90 31	082	-	-	-	-			12VS149°
22.2	23	+6	1741	1833	-	-	23 00	90 13	082	-	-	-	-			13VR
22.2	23	+6	1836	2304	-	-	23 00	90 13	082	-	-	-	-			14VR
22.3	24	+6	0039	0407	690	52	22 36	90 03	082	-	-	-	-			14VS150°(171°)
22.3	24	+6	0411	0930	51	17	22 36	90 03	082	-	-	-	-			15VS157°
22.4	24	+6	1053	1602	20	20	21 49	89 48	081	-	-	-	-			15VR
22.4	24	+6	1604	1918	20	20	21 49	89 48	081	-	-	-	-			16VR
22.5	24	+6	2040	2348	18	5	21 21	89 40	081	-	-	-	-			16VS157°
22.6	25	+6	0554	0723	22	22	22 21	89 42	081	-	-	-	-			17VR

C=Core TG=T-Grad K=Camera D=Dredge WB=Water Barrel P=Plankton SRP=Seismic Refraction Profile

VEMA-17 Station Index, Leg 4, Galveston - Cristobal, Panama Jan 11 - Feb 14, 1961 (continued)

Ship Stn.	Day	TIME Zone	Start	End	Depth (fm) Start	End	Lat.	Long.	Msd Sq	C	TG	K	D	WB	Geo-Chem	H	P	SRP / NOTES
22.7	25	+6	0747	0908	25	25	22 22N	89 54W	081									17VS270°
22.7	25	+6	0928	1057	25	40	22 22	89 54	081									18VS Circling
22.8	25	+6	1139	1309	40	42	22 34	89 54	081									18VR
23	26	+6	0230	0508	1984	1984	24 02	91 25	082	20	3	-	-	6	-	-	15	
23.1	26	+6	1705	0418	-	-	24 00	91 27	082									19VR with OBS 090° OBS#1
23.1	28	+6	0423	1800	-	-	24 00	91 27	082									20VR with OBS 315° OBS#1
23.2	30	+6	1030	1810	2276	2396	21 13	84 48	081									Continuous profiling, sheets 55-56
24	30	+6	1828	2113	2398	2399	20 45	84 17	081	21	4	-	-	-	-	-	16	
24.1	31	+5	1126	1148	2120	2117	20 18	83 17	081		-	-	-	7				
X	01	+5	1000	1500	70	5	19 18	81 24	045									At Grand Cayman
25	02	+5	0849	1524	2280	2325	21 14	83 00	081	22	-	9	-	-	-	3		
26	02	+5	1822	0057	2381	2388	20 47	83 27	081	23	-	10	-	-	IA	4	17	
27	03	+5	0500	1028	2405	2405	20 31	84 03	081	24	-	11	-	-	IB	5		
28	03	+5	1516	2041	2412	2412	20 01	84 22	081	25	-	-	-	8	IC-F	6		Watergrad
29	04	+5	0050	0457	2416	2416	19 40	84 52	045	26	-	-	-	-	-	7		
30	04	+5	0831	1736	2415	2417	19 25	85 13	045	27	-	-	-	-	-	8	18	
31	04	+5	2159	0250	2415	2415	19 02	85 14	045		-	-	-	9	-	9		
32	05	+5	0926	1300	2300	2306	18 23	86 21	045	28	-	-	-	10	-	10		
33	05	+5	1819	2328	2101	2108	17 51	86 57	045	29	-	12	-	-	-	11		
34	06	+5	0900	1533	2250	2377	18 14	85 46	045	30	-	-	-	-	-	12	19	
35	07	+5	0814	1124	1148	1520	17 01	84 44	045	31	-	13	10	-	-	13		
36	07	+5	1519	2200	2725	2730	17 33	84 24	045	-	-	-	-	11-14	IG-K	14		
37	08	+5	0106	0656	2747	2657	18 01	84 10	045	32	-	-	-	-	-	15		Deep Bottom Trawl #3
38	08	+5	0917	1328	2150	-	18 22	84 00	045	33	-	-	11	-	-	16	20	Hydrograd
39	09	+5	0050	0406	1079	792	17 13	82 50	045	34	-	-	-	-	IL-M	17		
40	09	+5	0750	1743	2949	2647	17 49	82 55	045	35	5-6	15A	-	-	-	18		Wire parted. Camera Hydrocast lost.
41	09	+5	1900	2115	2635	2080	17 58	82 53	045	-	-	-	-	-	-	19		
42	10	+5	0208	0937	2113	2026	18 21	82 19	045	36	7	-	-	-	-	20		
43	10	+5	1310	2231	2610	2290	18 37	81 59	045	37	8	-	-	15-16	IN-O	21	21	
44	11	+5	0900	1950	2410	2220	18 32	81 31	045	38	9	-	-	-	-	22	22	
45	13	+5	1847	2244	1833	1840	11 46	80 26	045	39	10	-	-	17-19	-	-	23	
45.1	14	+5	0811	0834	1488	1432	10 05	80 07	045	-	-	-	-	20				

C=Core TG=T'Grad K=Camera D=Dredge WB=Water Barrel H=Hydro Station P=Plankton SRP=Seismic Refraction Profile
OBS=Ocean Bottom Seismograph

VEMA-17 Station Index (continued)

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth (fm) Start	Depth (fm) End	Lat.	Long.	Msdn Sq	C	TG	WB	Geochem	P	T	NOTES
	Leg 5		Balboa, Panama - Valparaiso, Chile						Feb 18 - Mar 9, 1961, J. R. Heirtzler, Ch. Sc.							
45.2	19	+5	0400	1900	531	1660	08 25N	79 22W								Continuous profiling, sheets 67-70
46	19	+5	1934	0013	1650	1631	06 08	79 54	008	40	1a	21	-	24		-
46.1	20	+5	0030	1245	1608	1830	06 08	79 58								Intermittent profiling, sheets 71-72
47	20	+5	1320	1600	1810	1847	05 58	79 15	008	41	2a	-	-	25		-
47.1	20-21		1700	1700	1680	1016	05 54	79 23								Intermittent profiling, sheets 73-79
48	21	+5	2252	0331	980	958	03 32	81 11	009	42	-	22-24	IIA-E	26		-
48.1	22	+5	1545	0215	1223	1650	02 35	81 51								Intermittent profiling, sheets 80-82
49	23	+5	0228	0630	1690	1640	01 52	82 37	009	43	3a	-	-	27		-
49.1	23	+5	0650	1630	1660	1853	01 52	82 40								Intermittent profiling, sheets, 82-92
50	25	+5	0908	1140	1810	1788	03 34S	85 07W	308	44	-	-	-	28		-
50.1	25	+5	1300	1210	1800	2160	03 57	85 11								Continuous profiling, sheets 93-99
51	26	+5	1921	0040	2078	2254	07 10	85 50	308	45	-	-	-	29		1
51.1	27-01		1910	1315	2410	2610	09 48	86 03								Continuous profiling, sheets 100-107
52	02	+5	0002	0334	2540	2235	16 02	82 35	344	-	-	25	IIF-H	30		-
52.1	2-3	+5	1630	0820	2405	2187	17 40	81 43								Continuous profiling, sheets 108-112
53	04	+5	0920	1503	2467	2420	22 21	78 56	379	46	4a	-	-	31		-
53.1	04	+5	1530	1900	2500	2510	22 22	78 55								Continuous profiling, sheet 113
53.2	05	+5	1315	2240	2160	1908	25 19	76 57								Continuous profiling, sheets 114-116
54	06	+5	1457	2002	2315	2286	28 41	75 45	379	47	-	26-27	II-IJ	32		-
55	No Station															
55.1	7-9		2040	0830	2342	1880	33 01	73 08								Continuous profiling, sheets 117-127
	Leg 6		Valparaiso, Chile - Talcahuano, Chile						Mar 11-Mar 18, 1961, J. Hennion, Ch. Sc.							
56	12	+4	1407	2143	2861	2863	33 32S	72 59W	415	48	-	-	-	33		Continuous profiling, sheets 128-134
57	12	+4	1901	2143	2853	2863	33 31	73 00	415	49						
58	13	+5	1143	1740	2143	2187	34 30	74 19	415	50	-	-	-	34	2	" " sheets 135-138
59	14	+5	1537	2048	2167	2158	36 15	76 51	415	51	-	-	-	35	3	" " sheets 139-143
60	15	+5	1410	2040	2195	2186	37 13	77 44	415	52	-	-	-	36	4	" " sheets 144-148
61	16	+5	1340	1858	2115	2103	38 15	76 00	415	53	-	-	-	37	5	" " sheets 149-151
	Leg 7		Talcahuano, Chile - Punta Arenas, Chile						Mar 20 - Mar 30, 1961, W. C. Pitman, III, Ch. Sc.							
62	21	+5	0957	1530	2274	2347	37 57S	75 09W	415	54	-	-	-	38	6	
63	22	+5	1053	1514	2000	1589	40 32	75 09	451	55	-	28-29	IIIA	39	7	
64	23	+5	0800	1048	1520	1675	43 14	75 27	451	-	-	-	-	-	8	
65	23	+5	1131	1328	787	942	43 20	75 20	451	56	-	-	-	-	9	

C=Core TG=T'Grad WB=Water Barrel P=Plankton T=Trawl

VEMA-17 Station Index, Leg 7, Talcahuano -Punta Arenas Mar 20 - Mar 30, 1961 (continued)

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth (fm) Start	Depth (fm) End	Lat.	Long.	Msdn Sq	C	WB	Geochem	P	T
66	23	+5	1419	1505	320	246	43 24S	75 08W	451	-	-	-	-	10
67	23	+5	1516	1540	87	78	43 25	75 05	451	-	-	-	-	11
68	23	+5	1627	1700	61	61	43 30	74 55	451	-	-	-	-	12
69	24	+5	1800	2130	1686	1332	47 00	75 56	451	57	-	-	40	13
70	24	+5	2158	2305	630	595	47 01	75 44	451	-	-	-	-	14
71	24	+5	2338	0022	389	325	47 02	75 36	451	-	-	-	-	15
72	25	+5	0038	0120	130	80	47 03	75 32	451	-	-	-	-	16
73	25	+5	2101	0103	2070	2069	49 25	78 46	451	58	-	IIIB-C	41	
74	27	+5	0502	0905	2078	2018	49 19	78 44	451	-	30-32	IIID-H	-	
75	28	+5	1455	1524	223	135	53 34	72 29	487	59	-	-	-	17
76	28	+5	1735	1807	100	121	53 48	71 45	487	60	-	-	-	18
77	28	+5	1902	1955	200	215	53 55	71 17	487	61	-	-	-	
78	29	+4	0349	0417	44	49	52 59	70 31	487	62	-	-	-	19
79	29	+4	0617	0656	127	135	53 21	70 36	487	63	-	-	-	20
80	29	+4	0808	0830	84	82	53 23	70 55	487	64	-	-	-	21
81	29	+4	0959	1100	136	140	53 38	70 50	487	65	-	-	-	22
82	29	+4	1515	1555	155	153	53 47	70 17	487	66	-	-	-	23
83	29	+4	1727	1744	23	23	53 38	69 55	486	67	-	-	-	24
84	29	+4	1900	1925	24	24	53 28	69 33	486	68	-	-	-	25
85	29	+4	2038	2058	15	15	53 27	69 57	486	69	-	-	-	26
86	29	+4	2209	2241	144	142	53 34	70 17	487	70	-	-	-	27
Leg 8			Punta Arenas, Chile - Punta Arenas, Chile Apr 1 - Apr 5, 1961, W. C. Pitman III, Ch. Sc.											
87	01	+4	1531	1553	16	16	52 40S	70 05W	487	71	-	-	-	28
88	01	+4	1718	1723	13	13	52 44	69 54	486	72	-	-	-	29
89	01	+4	1810	1824	13	13	52 40	69 52	486	73	-	-	-	30
90	01	+4	1900	1926	8	8	52 35	69 48	486	74	-	-	-	31
91	01	+4	2011	2030	17	22	52 42	69 45	486	75	-	-	-	32
92	02	+4	1301	1317	36	36	52 49	67 35	486	76	-	-	-	33
93	02	+4	1958	2007	24	24	52 30	68 56	486	77	-	-	-	34
94	02	+4	2117	2209	21	21	52 19	68 07	486	78	-	-	-	35
95	02	+4	2250	2306	24	24	52 22	69 20	486	79	-	-	-	36
96	03	+4	0100	0132	16	16	52 39	69 49	486	80	-	-	-	37
97	03	+4	0931	1014	66	74	53 35	70 23	487	81	-	-	-	39

C=Core WB= Water Barrel P=Plankton T=Trawl

VEMA-17 Station Index, Leg 8, Punta Arenas - Punta Arenas Apr 1 - Apr 5, 1961 (continued)

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth(fm) Start	Depth(fm) End	Lat.	Long.	Msdn Sq	C	WB	H	P	T	
98	03	+4	1130	1205	148	148	53 47S	70 18W	487	82				39	
99	03	+4	1315	1333	124	145	53 52	70 22	487	83					
100	03	+4	1425	1453	314	314	54 01	70 16	487	84					
101	03	+4	1544	1613	153	147	54 01	70 07	487	85					
102	04	+4	2044	2114	147	136	53 53	70 14	487	86					
Leg 9 Punta Arenas, Chile - Puerto Williams, Chile, Apr 11-Apr 29, 1961, W. C. Pitman III, Ch. Sc.															
103	13	+4	1058	1137	282	264	54 21S	71 42W	487	87					
104	15	+4	1242	1855	2244	2228	57 02	74 29	487	88	33-36	-	42		
105	16	+4	0700	1327	2365	2354	59 18	74 17	487	89	-				
106	16	+4	1846	0002	2453	2462	60 08	74 56	523	90	-	-	43	40	
107	17	+4	0848	1541	2466	2470	61 11	75 56	523	91					
108	17	+4	2109	0000	2185	2195	62 11	75 07	523	92					
109	20	+4	0039	0422	2234	2231	61 36	68 27	522	-	-	23	44	41	
110	20	+4	0608	0800	2060	2093	61 43	68 23	522	-	-	24			
111	20	+4	0858	1242	1982	1985	61 52	68 20	522	-	-	25	-	42	
112	20	+4	1339	1655	2100	2088	62 02	68 15	522	93	-	26			
113	20	+4	1756	1904	2055	2058	62 09	68 11	522	-	-	27			
114	21	+4	0801	1926	357	357	62 48	62 06	522	94	-	-	-	43	
115	22	+4	0820	1200	82	90	62 57	60 37	522	95				44	
116	23	+4	1456	1540	280	348	62 33	59 26	521	96	-	-	-	45	
116.1	26	+4	1905	2246	2261	2150	60 59	60 27	522	97	-	-	45		
Leg 10 Ushuaia, Argentina - Puerto Belgrano, Argentina May 4- May 19, 1961, M. Ewing, Ch. Sc.															
117	04	+4	1330	1350	122	123	54 53S	67 57W	486	98	-	-	-	46	
118	04	+4	1830	1848	39	39	55 07	66 30	486	99	-	-	-	47	
118.1	04	+4	1921	1927	23	23	55 10	66 23	486	-	-	-	-	48	
119	04	+4	1954	2017	34	35	55 12	66 15	486	100	-	-	-	49	
120	04	+4	2044	2107	57	57	55 14	66 07	486	101	-	-	-	50	
121	04	+4	2134	2145	110	118	55 17	66 00	486	-	-	-	-	51	
122	04	+4	2214	0100	437	870	55 20	65 52	486	102	-	-	-	52-4	
123	05	+4	1037	1056	54	53	55 28	66 17	486	103	-	-	-	55	
124	06	+4	1705	0300	2155	2155	56 34	62 41	486	104	TG -	-	46	56	Continuous profiling, sheets 201-207*

C=Core WB=Water Barrel H=Hydro P=Plankton T=Trawl *new numbering system begun

VEMA-17 Station Index, Leg 10, Ushuaia - Puerto Belgrano May 4- May 19, 1961 (continued)

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth(fm) Start	Depth(fm) End	Lat.	Long.	Msdn Sq	C	TG	K	H	P	T	NOTES
124.1	08	+4	0648	0808	1012	1067	54 57S	63 04W	486	-	-	-	-	-	57	
124.2	10	+4	0300	0413	440	350	54 56	60 32	486	-	-	-	-	-	58	
124.3	10	+4	0429	0505	327	213	54 53	60 27	486	-	-	-	-	-	59	
124.4	10	+4	0528	0607	158	170	54 51	60 22	486	-	-	-	-	-	60	
125	10	+4	0615	0728	420	400	54 54	60 13	486	105	-	14.1	-	-	-	Continuous profiling, sheets 208-216
126	11	+4	2205	0020	972	1105	54 44	55 39	485	106	-	-	-	-	61	
126.1	12	+4	0045	0244	1074	522	54 41	55 35	485	-	-	-	-	-	62	
126.2	12	+4	0845	2000	1165	1037	54 23	55 00	485	-	-	-	-	-	63	
127	13	+3	2000	2248	818	846	51 08	55 22	485	107	-	15	-	-	64	Continuous profiling remainder of
128	14	+3	0703	0825	812	817	50 18	54 11	485	108	-	-	-	-	65	Leg 10, Sheets 217 - 241
128.1	14	+3	1130	1155	822	850	50 18	54 14	485	-	-	-	-	-	66	
129	18	+3	0843	0949	40	40	41 39	59 53	449	109	-	16	-	-	67	
130	18	+3	1200	1300	38	36	41 16	60 03	450	110	-	17	-	-	68	
131	18	+3	1458	1542	38	38	40 56	60 10	450	111	-	18	-	-	69	
132	18	+3	1800	1848	31	31	40 32	60 19	450	112	-	19	-	-	70	
133	18	+3	2102	2150	24	24	40 11	60 27	450	113	-	20	-	-	71	
134	19	+3	0530	0600	8	8	39 20	61 08	414	114	-	-	-	-	72	
	Leg 11		Puerto Belgrano, Argentina - Buenos Aires, Argentina												May 22-June 21, 1961, M. Ewing, Ch. Sc.	
135	23	+3	0015	0045	13	13	39 47S	61 08W	414	115	-	-	-	-	73	
136	23	+3	1257	1350	39	39	41 27	59 33	449	116	-	21	-	-	74	
137	23	+3	1632	1725	45	45	41 41	59 19	449	117	-	22	-	-	75	
138	23	+3	2027	2052	44	44	41 57	59 03	449	118	-	-	-	-	76	
139	23	+3	2358	0045	47	51	42 15	58 45	449	119	-	-	-	-	77	
140	24	+3	0317	0410	123	143	42 28	58 31	449	120	-	-	-	-	78-9	
141	26	+3	1047	1500	3082	3073	43 58	52 09	449	121	TG	-	-	47	80	Continuous profiling, sheets 296-
142	27	+3	1206	1615	2842	2840	44 33	49 19	448	122	-	-	-	48	81	308 (0600 June 5)
143	28	+3	0802	1217	2812	2805	45 22	46 58	448	123	-	-	-	49	82	Sheets 309-320 lost.
144	31	+3	1000	1441	2818	2850	48 34	36 04	447	124	-	-	-	50	83	
145	01	+3	0843	1116	2500	2523	50 15	35 53	483	125	-	-	-	51	84	
146	03	+3	0212	0405	2615	2632	49 16	35 56	447	-	-	-	28	-	-	
147	03	+3	0554	0717	2918	2908	49 07	36 06	447	-	-	-	29	-	-	
148	06	+3	1046	1442	2936	2924	47 35	43 21	448	126	5	-	-	52	85	
149	07	+3	1023	1344	3160	3150	48 03	45 06	448	127	6	-	-	53	-	
150*	09	+3	1300	1740	3233	3233	47 06	51 46	449	128	7	-	-	-	-	T-Grad #7 lost

C=Core TG=T'Grad K=Camera H=Hydro P=Plankton T=Trawl *Continuous profiling from 1000 June 9, sheets 321-372

VEMA-17 Station Index, Leg 11, Puerto Belgrano - Buenos Aires May 22- June 21, 1961, M. Ewing, Ch. Sc.

Ship Stn.	Day	T Zone	TIME Start	TIME End	Depth(fm) Start	Depth(fm) End	Lat.	Long.	Msdn Sq	C	TG	D	WB	Geochem	P	T	NOTES
151	11	+3	0906	0922	120	124	45 29S	60 06W	450	129	-	-	-	-	-	86	Continuous profiling
152	11	+3	1119	1138	59	59	45 21	60 27	450	130	-	-	-	-	-	87	to Buenos Aires
153	11	+3	1400	1644	60	58	45 11	60 55	450	131	-	-	-	-	-	88	
154	11	+3	1621	1647	58	58	45 02	60 18	450	132	-	-	-	-	-	89	
155	11	+3	1856	1932	56	56	44 53	61 43	450	133	-	-	-	-	-	90	
156	11	+3	2146	2209	54	54	44 45	62 11	450	134	-	-	-	-	-	91	
157	12	+3	0035	0108	51	53	44 37	62 40	450	135	-	-	-	-	-	92	
158	12	+3	0321	0404	51	51	44 35	63 07	450	136	-	-	-	-	-	93	
159	12	+3	0610	0645	50	50	44 33	63 33	450	137	-	-	-	-	-	94	
160	12	+3	0900	0918	47	45	44 30	63 59	450	138	-	-	-	-	-	95	
161	12	+3	1116	1134	43	42	44 28	64 25	450	139	-	-	-	-	-	96	
162	13	+3	0806	0830	55	55	44 29	60 59	450	140	-	-	-	-	-	97	
163	13	+3	1000	1015	57	58	44 28	60 45	450	141	-	-	-	-	-	98	
164	13	+3	1534	1657	82	101	44 25	59 54	449	142	-	-	-	-	-	99	
165	13	+3	1740	1834	143	143	44 23	59 53	449	143	-	12	-	-	-	100	
165.1	15-17	+3	1610	1017	3064	3130	44 10	53 32	449	-	-	-	-	-	*54		OBS#2
166	19	+3	0033	0233	1310	1233	40 34	55 10	449	144	-	-	-	-	-		
167	19	+3	0242	0444	1480	1250	40 34	55 10	449	-	-	13	-	-	-		
168	19	+3	1357	1448	320	319	38 58	55 17	413	-	-	14	-	-	-		
169	19	+3	1836	2032	75	162	38 13	55 19	413	-	-	15	-	-	-		
170	19	+3	2042	2136	240	241	38 13	55 19	413	-	-	16-17	-	-	-	101	
													-	-			
	Leg 12	Buenos Aires, Argentina - Dakar, Senegal June 26 - July 18, 1961, M. Talwani, Ch. Sc.															
171	27	+3	2251	2316	41	41	34 25S	52 19W	413	145	-	-	-	-	-	102	Continuous profiling,
172	28	+3	0036	0058	60	60	34 21	51 07	413	146	-	-	-	-	-	103	Buenos Aires to
173	28	+3	2157	0024	810	825	33 09	49 52	412	147	-	-	37	VIIA	-	-	Dakar
174	01	+3	1621	1830	1427	1457	26 40	40 55	376	-	-	-	38-9	-	-	104	
175	03	+3	1406	1909	2362	2363	21 49	35 43	375	148	-	-	40-1	VIIB-E	55		
176	04	+3	1212	1800	2222	2220	19 57	34 03	339	149	-	-	42-3	VIIF-I	56		
177	05	+2	1037	1247	2368	2364	18 09	32 44	339	150	-	-	-	-	57		
178	10	+2	1254	1545	2790	2720	05 23	21 26	302	151	10	-	-	-	58		
179	11	+1	1815	2307	2690	2781	03 09	19 23	301	152	11	-	-	-	59		

C= Core TG= T'Grad D=Dredge WB=Water Barrel P=Plankton T=Trawl OBS=Ocean Bottom Seismograph
*Plankton 54 was 2310 to 2352 hr on 15 June 1961

VEMA-17 Station Index, Leg 12, Buenos Aires - Dakar June 26 - July 18, 1961 (continued)

Ship Stn.	Day	T Zone	Time Start	Time End	Depth(fm) Start	Depth(fm) End	Lat.	Long.	Msdn Sq	C	TG	WB	Geochem	H	P	T	
180	12	+1	1826	2200	2355	2344	01 34S	19 16W	301	153	-	44-45	VIIJ-K		60		
181	13	+1	1857	2047	1896	1954	00 23N	17 58W	002	154	-	-	-		61		
182	13	+1	2141	2324	1655	1625	00 20	17 59	002	155			-		-		
183	14	+1	1825	2143	2654	2654	03 26	18 31	002	156	-	46	-		62		
184	16	0	1205	1606	2230	2184	09 20	18 38	002	157	-	47-48	VIIL-M		63		
185	17	0	1019	1454	2320	2318	12 24	18 55	038	158	12	49-50	VIIN-O		64		
	Leg 13 Dakar, Senegal - Halifax, Nova Scotia July 19 - Aug 6, 1961, M. Talwani, Ch. Sc.																
185.1	19	0	1849	2030	1502	1528	15 17N	18 26W	038	-	-	-	-	-	65		
186	20	0	1058	2124	1414	1430	16 59	20 03	039	159	-	-	-	30	66-7	105*	Continuous profiling on Leg 13
186.1	21	+1	1024	1243	1715	1718	18 41	21 38	039	-	-	-	-	-	68		
187	22	+1	1018	1637	2573	2575	21 22	24 02	075	160	-	51-52	VIIIA-B	-	69		
188	23	+1	1200	1740	2862	2880	23 15	26 43	075	161	-	-	VIIIC	-	70		
189	24	+1	1051	1819	2930	2992	24 58	28 58	075	162	-	53-54	-	-	71		
189.1	25	+1	1633	1919	2855	2872	26 50	32 09	076	-	-	-	-	-	72		
190	26	+2	0805	1307	2715	2600	27 58	34 08	076	163	-	55	VIIID-G	-	73		
191	26	+2	1915	2223	2452	2415	28 29	35 02	076	-	-	56-57	VIIIH-K	-	74		
192	27	+2	1145	1416	2348	2352	29 37	36 55	076	164	13	-	-	-	75		
192.1	27	+2	1741	2015	1430	1978	29 59	37 31	076	-	-	-	-	-	76		
193	29	+2	0540	0810	2090	2050	32 45	41 54	113	165	14	-	-	-	77		
193.1	29	+2	1622	1904	1900	2072	33 16	42 42	113	-	-	-	-	-	78		
194	30	+2	1542	2006	2173	2285	34 56	45 21	113	166	-	-	-	-	79		
194.1	31	+3	0038	0300	1534	1880	35 06	34 56	113	-	-	-	-	-	-	106	
194.2	31	+3	1406	1546	2598	2598	35 45	47 05	113	-	-	-	-	-	80		
195	01	+3	1236	1818	2869	2869	37 30	50 05	114	-	-	58-59	VIIIL-N	-	81		
196	02	+3	1037	1309	2818	2820	38 48	52 42	114	-	-	60	VIII-Q	-	82		
196.1	02	+3	2008	2215	2776	2777	39 21	53 47	114	-	-	-	-	-	83		
197	03	+3	1009	1317	2730	2726	40 39	55 59	150	-	-	61-63	VIIIR-T	-	84		
197.1	03	+3	1948	2228	2694	2673	41 18	57 12	150	-	-	-	-	-	85		
198	04	+3	1008	1453	2300	2293	42 30	59 06	150	167	15	-	-	-	86		
198.1	04	+3	1933	2215	1408	1270	43 01	59 51	150	-	-	-	-	-	87		
198.2	05	+3	0956	1807	25	27	43 38	61 27	151	-	-	-	-	-	88	107	

C=Core TG=T'Grad WB=Water Barrel H=Hydro P=Plankton T=Trawl

* = No trawl 104

VEMA-17 Station Index

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth(fm) Start	Depth(fm) End	Lat.	Long.	Msdn Sq	C	TG	K	D	H	P	T	NOTES
Leg 14	Halifax, Nova Scotia - Halifax, Nova Scotia									Aug 11 -			Aug 15, 1961, C. L. Drake, Ch. Sc.				
198.3	12	+3	1413	1425	52	52	44 22N	59 05W	150	-	-	-	-	-	-	108	
198.4	12	+3	1535	1610	100	105	44 14	59 03	150	-	-	-	18	-	-	-	
198.5	12	+3	1739	1856	368	350	44 02	59 02	150	-	-	-	19	-	-	-	Microbiology Trigger Core #1
199	12	+3	2130	2150	75	75	43 59	58 51	150	168	-	-	-	-	-	-	
200	13	+3	0934	1039	1140	1122	43 23	59 39	150	169	-	-	-	-	-	-	
201	13	+3	1439	1513	84	91	43 34	60 04	151	170	-	-	-	-	-	109	
201.1	13	+3	1627	1709	180	202	43 28	60 04	151	-	-	-	20	-	-	-	
201.2	14	+3	0356	0734	1450	1592	42 33	61 25	151	-	-	-	-	31	-	-	
202	14	+3	1227	1508	590	536	42 51	61 44	151	171	-	-	-	32	-	-	
203	14	+3	1636	1744	237	299	42 56	61 44	151	-	-	100	21	-	-	-	Start new camera no. sequence
203.1	14	+3	1840	1956	188	276	42 58	61 51	151	-	-	-	22	-	-	-	½m plankton tow to 200m
203.2	14	+3	2241	2326	56	57	43 07	62 08	151	-	-	-	-	33	-	-	for Dalhousie
204	15	+3	0643	0704	120	121	43 58	63 02	151	172	-	-	-	-	-	-	
Leg 15	Halifax, Nova Scotia - Argentia, Newfoundland									Aug 18 -			Aug 25, 1961, C. L. Drake, Ch. Sc.				
204.1	18	+3	1333	1480	49	45	44 24N	63 28W	151	-	-	-	-	34	-	-	Dalhousie Core #1 4 Phleger cores
204.2	18	+3	1507	1636	78	78	44 17	63 18	151	-	-	-	-	35	-	-	
205	18	+3	1812	1834	112	114	44 03	63 03	151	173	-	-	-	-	-	-	
205.1	18	+3	1934	2030	141	140	43 54	62 53	151	-	-	-	-	36	-	-	
205.2	18	+3	2318	2355	41	41	43 32	62 25	151	-	-	-	-	37	-	-	
206	19	+3	0918	1023	118	128	44 51	60 58	151	174	-	-	-	-	-	-	Dalh. Core 2, 4 Phl. cores, AOG 1
207	19	+3	1224	1309	175	150	44 50	60 37	151	175	-	-	-	-	-	110	
208	19	+3	1527	1626	115	165	44 50	60 15	151	176	-	-	-	-	-	111	Dalh. Core 3, 4 Phl. cores
209	20	+3	0845	0935	190	190	44 30	57 07	150	177	-	-	-	-	-	112	
209.1	20	+3	1055	1121	180	210	44 27	57 14	150	-	-	-	23	-	-	-	
210	20	+3	1130	1243	218	202	44 26	57 15	150	-	-	101	24	-	154*	-	Surface water 154;
210.1	20	+3	1252	1354	270	365	44 23	57 18	150	-	-	-	25	-	-	-	
210.2	20	+3	1410	1445	265	220	44 24	57 19	150	-	-	-	26	-	-	-	
210.3	20	+3	1739	1815	214	210	44 39	56 42	150	-	-	-	27	-	-	-	
210.4	20	+3	2010	2051	200	199	44 50	56 18	150	-	-	-	28	-	-	-	
211	21	+3	1045	1630	2134	2140	43 23	54 52	150	178	16	-	-	38	155	-	Surface water 155
212	22	+3	1810	1938	245	247	46 31	58 04	150	179	-	-	-	-	156*	113	Dalh. Core3, 4 Phl. cores,
212.1	22	+3	2223	2338	255	253	46 11	57 50	150	-	-	-	-	39	-	-	Surface water 156
212.2	23	+3	0400	0930	225	240	46 35	58 27	150	-	-	-	-	40	-	-	

C=Core TG=T'Grad K=Camera D=Dredge H=Hydro P=Plankton T= Trawl

*Plankton 154-155 are nannoplankton tows; 156-175 are phytoplankton tows

VEMA-17 Station Index, Leg 15, Halifax - Argentia Aug 18 - Aug 25, 1961 (continued)

Ship Stn.	Day	TIME Zone	Start	End	Depth(fm) Start	End	Lat.	Long.	Msdn' Sq	C	H	P	T	SRP	NOTES
213	23	+3	1200	1410	223	221	46 39N	58 40W	150	180	-	157	114		Dalh. Core 4; 4 Phl cores, Surface 157
213.1	23	+3	1843	2103	243	243	46 36	58 24	150	-	-	-	-	100 VR	with Canadian ship SACKVILLE
213.2	23	+3	2312	0133	243	258	46 12	57 56	150	-	-	-	-	100 VS 140°	
213.2	24	+3	0135	0303	258	262	46 12	57 56	150	-	-	-	-	101 VS 140°	
214	24	+3	0346	0844	256	251	45 53	57 30	150	181	-	-	-		
214	24	+3	0434	0635	253	253	45 53	57 30	150	-	-	-	-	101 VR	
214	24	+3	0638	0825	253	251	45 53	57 30	150	-	-	-	-	102 VR	
214.1	24	+3	1110	1231	240	238	45 45	57 20	150	-	-	-	-	102 VS 208°	
214.2	24	+3	1835	1912	33	40	46 10	56 12	150	-	41	158	-		Surface water #158
214.3	25	+3	0145	0258	127	127	46 53	54 47	150	-	42	-	-		Dalh. Core 5; 4 Phl cores
Leg 16 Argentia, Newfoundland - Halifax, Nova Scotia Aug 25 - Sept 17, 1961, C. L. Drake, Ch.Sc.															
214.4	26	+3	0400	0431	64	64	46 27N	57 03W	150	-	43	-	-		
214.5	26	+3	0800	0834	54	54	45 54	52 45	150	-	44	-	-		
215	26	+3	1110	1143	52	51	45 29	52 32	150	182	45	-	-		
216	26	+3	1443	1524	32	34	44 57	52 15	150	183	46	159	115		Surface water #159
216.1	26	+3	1810	1841	40	40	44 28	52 01	150	-	47	-	-		
217	27	+3	1232	1313	59	58	46 42	50 47	150	184	48	160	-		Surface water #160
218	27	+3	1602	1637	43	43	46 41	51 30	150	185	49	-	-		
219	27	+3	1925	2007	51	48	46 40	52 12	150	186	50	-	-		
219.1	27	+3	2303	2345	18	22	46 42	52 50	150	-	51	-	-		
220	28	+3	1900	2310	144	160	49 53	53 02	150	187	-	-	-		Dalh. Core 6; 3 Phl cores
220	28	+3	1945	2153	140	158	49 53	53 02	150	-	-	-	-	103 VR	
220.1	28	+3	2326	0208	180	200	50 11	52 41	186	-	-	-	-	103 VS 053°	
220.1	29	+3	0211	0452	198	118	50 11	52 41	186	-	-	-	-	104 VS 053°	
221	29	+3	0548	1232	123	121	50 30	52 19	186	188	52	161	-		Surface water #161
221	29	+3	0610	0837	120	120	50 30	52 19	186	-	-	-	-	104 VR	
221	29	+3	0841	1040	121	121	50 30	52 19	186	-	-	-	-	105 VR	
221.1	29	+3	1246	1601	120	125	50 43	51 52	186	-	-	-	-	105 VS 053°	
221.1	29	+3	1604	1756	126	138	50 43	51 52	186	-	-	-	-	106 VS 153°	
222	29	+3	1906	0128	145	-	50 57	51 24	186	189	53	-	-		AOG Plankton #3
222	29	+3	2007	2225	-	-	50 57	51 24	186	-	-	-	-	106 VR	
222	29	+3	2225	0012	-	-	50 57	51 24	186	-	-	-	-	107 VR	
222.1	30	+3	0128	0440	-	-	51 05	51 06	186	-	-	-	-	107 VS 053°	
222.1	30	+3	0443	0701	-	-	51 05	51 06	186	-	-	-	-	108 VS 053°	
223	30	+3	0808	1450	-	-	51 20	50 36	186	190	54	-	-		

C=Core H= Hydro P = Plankton T= Trawl SRP= Seismic Refraction Profile

VEMA-17 Station Index, Leg 16, Argentia - Halifax Aug 25 - Sept. 17, 1961 (continued)

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth(fm) Start	Depth(fm) End	Lat.	Long.	Msdn Sq	C	TG	D	WB	Geochem	H	P	T	SRP	& NOTES
223	30	+3	0844	1117	-	-	51 20N	50 36W	186	-	-	-	-	-	-	-	-	108VR	
223	30	+3	1217	1405	-	-	51 20	50 36	186	-	-	-	-	-	-	-	-	109VR	
223.1	30	+3	1503	1752	-	-	51 21	50 32	186	-	-	-	-	-	-	-	-	109VS 053°	
224	31	+3	1729	1950	-	-	55 14	48 50	185	191	17	-	-	-	-	(89	-		
																(162		AOG Plankton 4; Surf. water 162	
225	01	+3	2108	0012	-	-	58 23	47 46	185	192	18	-	-	-	-	163	116		
																		Surface water #163	
226	03	+3	1324	1449	227	200	60 44	45 45	221	193	19	-	-	-	55	164	117		
																		Surface water #164	
227	03	+3	1517	1547	135	142	60 43	45 54	221	194	-	-	-	-	-	-	-		
228	03	+3	1610	1702	143	142	60 42	46 01	221	195	-	-	-	-	56	-	-		
228.1	04	+3	1828	2000	180	104	60 27	48 31	221	-	-	29	-	-	-	165		Surface water #165	
229	06	+3	0956	1824	1507	1480	60 44	57 50	222	196	20	-	64-6	IXA-E	-	166		AOG Plankton 6; Surface water #166	
229.1	07	+3	1509	1736	1739	1751	60 42	51 52	222	-	-	-	67-8	IXF-J	-	167		AOG Plankton 7; Surface water #167	
230	08	+3	1830	2243	1830	1818	57 51	54 06	186	197	21	-	-	-	-	168	118	AOG Plankton 8; Surface water #168	
231	09	+3	1200	1925	1788	1805	55 49	52 27	186	198	-	-	-	-	57	169	-	Surface water #169	
231	09	+3	1534	1847	1805	1805	55 49	52 27	186	-	-	-	-	-	-	-	-	110VR	
231.1	09	+3	1958	2243	1800	1715	55 29	52 49	186	-	-	-	-	-	-	-	-	110VS 225°	
231.1	09	+3	2251	0108	1710	1610	55 29	52 49	186	-	-	-	-	-	-	-	-	111VS 225°	
231.2	10	+3	0220	0513	1500	1450	55 11	53 12	186	-	-	-	-	-	-	-	-	111VR	
231.3	10	+3	0912	0927	58	258	54 47	53 38	186	-	-	30	-	-	-	170	-		
231.4	10	+3	1302	1443	120	118	54 27	54 08	186	-	-	31	69-71	-	58	-	119	Surface water #170	
232	10	+3	2121	2215	79	80	53 42	55 36	186	199	-	-	-	-	59	171	-	Surface water #171	
233	11	+3	1933	2044	104	105	51 08	58 01	186	200	-	-	-	-	60	172	120	Microbio. Trigger Core 2 (Phleger); Surf. water #172	
233.1	11	+3	2155	2228	67	67	50 59	57 52	186	-	-	-	-	-	61	-	-		
233.2	11	+3	2336	2359	42	40	50 51	57 43	186	-	-	-	-	-	62	-	-		
233.3	12	+3	0104	0133	114	103	50 43	57 35	186	-	-	-	-	-	63	-	-		
233.4	12	+3	1800	1815	46	48	50 00	61 50	187	-	-	-	-	-	64	173	-	Microbio. Trigger Core 3 (Phleger); Surf. water #173	
234	12	+3	1925	2015	100	113	49 49	61 46	151	201	-	-	-	-	65	-			
235	12	+3	2123	2208	140	140	49 37	61 49	151	202	-	-	-	-	66	-			
235.1	12	+3	2312	2359	57	57	49 26	61 51	151	-	-	-	-	-	67	-			

C= Core TG= T'Grad D= Dredge WB= Water Barrel H= Hydro P= Plankton T= Trawl SRP= Seismic Refraction Profile

VEMA-17 Station Index, Leg 16, Argentia - Halifax Aug 25 - Sept. 17, 1961 (continued)

Ship Stn.	Day	Zone	TIME Start	TIME End	Depth(fm) Start	Depth(fm) End	Lat.	Long.	Msdn Sq	C	TG	K	D	H	P	SRP	NOTES
236	13	+3	1045	1144	182	188	48 41N	60 00W	151	203	22	-	-	-	-		
237	13	+3	1300	1352	43	110	48 36	59 43	150	-	-	103	32	-	-		
237.1	13	+3	1923	0053	180	184	48 39	60 20	151	-	-	-	-	68	-		
237.1	13	+3	2217	0001	182	182	48 39	60 20	151	-	-	-	-	-	-	112 VR	
237.2	14	+3	0114	0404	200	237	48 36	60 22	151	-	-	-	-	-	-	112 VS 240°	
238	14	+3	0923	1018	30	30	47 58	61 58	151	204	-	-	-	69	-		
238	14	+3	1049	1254	30	30	47 58	61 58	151	-	-	-	-	-	-	113 VR	
238.1	14	+3	1426	1632	30	37	47 58	61 57	151	-	-	-	-	-	-	113 VS 240°	
239	14	+3	1854	1934	28	30	47 36	63 00	151	205	-	-	-	70	174		Surface water #174
239.1	14	+3	2210	0031	29	35	47 37	63 00	151	-	-	-	-	-	-	114 VS 240°	
239.2	15	+3	0405	0537	15	15	47 14	64 00	151	-	-	-	-	-	-	115 VR	
239.2	15	+3	0557	0612	17	17	47 14	64 00	151	-	-	-	-	71	-		
239.2	15	+3	0655	0856	16	20	47 14	64 00	151	-	-	-	-	-	-	115 VS 240°	
240	15	+3	1404	1730	43	43	48 01	64 01	151	206	-	-	-	-	-		
240	15	+3	1426	1625	40	40	48 01	64 01	151	-	-	-	-	-	-	116 VR	
240.1	15	+3	1638	1704	38	42	48 03	64 00	151	-	-	-	-	72	-		
240.2	15	+3	1735	2056	44	42	47 45	63 22	151	-	-	-	-	-	-	116 VS 130°	
240.2	15	+3	2059	2141	41	40	47 45	63 22	151	-	-	-	-	-	-	117 VS 120°	
240.3	15	+3	2156	2218	34	30	47 40	63 12	151	-	-	-	-	73	-		
240.3	15	+3	2248	0044	30	30	47 40	63 12	151	-	-	-	-	-	-	117 VR	
240.4	16	+3	0205	0230	26	26	47 31	62 59	151	-	-	-	33	-	-		
240.5	16	+3	0435	0639	31	27	47 16	62 37	151	-	-	-	-	-	-	118 VS 136°	
240.6	16	+3	0803	0929	27	27	46 59	62 07	151	-	-	-	-	-	-	118 VR	
240.6	16	+3	0931	1121	27	26	46 58	62 06	151	-	-	-	-	-	-	119 VR	
241	16	+3	1125	1227	26	28	46 58	62 05	151	207	-	-	-	74	-		
241.1	16	+3	1238	1440	25	36	46 42	61 37	151	-	-	-	-	-	-	119 VS 130°	
241.1	16	+3	1443	1642	34	24	46 42	61 37	151	-	-	-	-	-	-	120 VS 130°	
242	16	+3	1648	1958	21	20	46 27	61 12	151	208	-	-	-	75	175		Surface water #175
242	16	+3	1727	1911	20	20	46 27	61 12	151	-	-	-	-	-	-	120 VR	

C= Core TG= T'Grad K= Camera D= Dredge H= Hydro P= Plankton SRP= Seismic Refraction Profile

VEMA-17 Station Index

Leg 17 Halifax, Nova Scotia - New York, New York Sept. 23 - Sept. 30, 1961, J. L. Worzel, Ch. Sc.

Ship Stn.	Day	T I M E Zone	Start	End	Depth(fm) Start	End	Lat.	Long.	Msdn Sq	C	TG	WB	Geochem	P
243	24	+3	1735	2114	2454	2445	40 24N	63 10W	151	209	-	72-73	XA-B	90
244	25	+3	0939	1344	2648	2648	39 15	63 09	115	210	-	74-75	XC-D	91
245	26	+4	0940	1804	2651	2678	37 04	62 55	115	211	23	76-77	XE-F	92

C= Core TG= T'Grad WB= Water Barrel P= Plankton

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1960	Position Lat. North	Position Long. West	Msdn Sq.	Local time of hit	Depth at hit Fms.	Depth at hit C.M.**	Penetration length of good core (centimeters)	Penetration of core (centimeters)	Trigger core length (centimeters)	Data & Remarks
1	02	15 Dec	28°29'	65°03'	079	1101	2658	5030	1089	1052	19	
2	03	16 Dec	24°57'	65°31'	079	1126	2806	5319	490	946	38	K1
3	04	18 Dec	19°50'	67°24'	043	2245	4030	7722	none	unkn	lost	K2,D1; Wire parted. Core and dredge lost.
4	05	20 Dec	19°53'	68°08'	043	1547	3480	6621	450	611	25	D2
5	06	22 Dec	20°26'	73°20'	080	0123	1849	3475	366	458	31	
6	07	22 Dec	19°57'	73°49'	044	0822	1988	3744	458	494	24	
		1961										
7	09	1 Jan	25°39'	84°09'	081	0841	80	154	575	unkn	none	D3, core stretched approx, 30cms particularly between 0 - 60 cms.
8	10	3 Jan	25°20'	84°31'	081	1457	520	975	365	520	17	K3, D4
9	11	4 Jan	24°33'	86°51'	081	0508	1050	1966	40	unkn	19	D5
10	12	5 Jan	23°04'	90°46'	082	1457	1200	2244	600	520	64	K4, D6
11	13	6 Jan	24°22'	91°36'	082	0952	1983	3723	671	977	23	D7
12	15	7 Jan	25°51'	92°29'	082	1527	1430	2670	282	463	37	K5
13	16	8 Jan	26°30'	94°37'	082	0837	1025	1916	360	672	23	K6, D8
14	17	13 Jan	27°36'	94°11'	082	2129	405	761	535	778	25	K7, D9
15	18	16 Jan	24°33'	91°09'	082	1422	1962	3687	955	unkn	25	TG1
16	19	17 Jan	23°27'	90°16'	082	c1100	872	1630	24	13	none	Core stretched approx. 12 cms.
17	20	18 Jan	23°02'	90°42'	082	0915	1215	2272	415	unkn	34	
18	21	19 Jan	23°33'	92°25'	082	1146	1949	3662	649	855	23	K8
19	22	23 Jan	23°49'	90°44'	082	0036	1972	3706	828	1190	15	TG2
20	23	26 Jan	24°02'	91°25'	082	0308	1984	3729	895	1098	18	TG3

*unkn =Penetration over corehead

**C.M. =Corrected Meters

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1961	Position Lat. North	Position Long. West	Msdn Sq.	Local time of hit	Depth at hit Fms.	Depth at hit C.M.**	Length of good core (centimeters)	Penetration of core (centimeters)	Trigger core length (centimeters)	Data & Remarks
21	24	30 Jan	20°45'	84°17'	081	1927	2397	4530	1040	1221	6	TG4
22	25	2 Feb	21°14'	83°00'	081	1046	2286	4315	342	366	26	K9; core stretched approx. 4 cm.
23	26	2 Feb	20°47'	83°27'	081	2035	2386	4508	925	unkn*	16	K10
24	27	3 Feb	20°31'	84°03'	081	0811	2405	4544	1041	unkn*	17	K11; core stretched approx. 25 cm.
25	28	3 Feb	20°01'	84°22'	081	1655	2411	4550	1640	unkn*	17	
26	29	4 Feb	19°40'	84°52'	045	0321	2418	4570	1425	1844	5	
27	30	4 Feb	19°25'	85°13'	045	1051	2417	4568	694	275	None	
28	32	5 Feb	18°23'	86°21'	045	1141	2306	4352	960	458	14	
29	33	5 Feb	17°51'	86°57'	045	1924	2106	3969	960	unkn	14	K12
30	34	6 Feb	18°14'	85°46'	045	0941	2382	4501	954	763	16	
31	35	7 Feb	17°01	84°44'	045	1008	1328	2485	360	unkn	13	K13-14, D10
32	37	8 Feb	18°01'	84°10'	045	0415	2712	5143	950	unkn	19	
33	38	8 Feb	18°22'	84°00'	045	1030	1880	3537	300	335	None	D11
34	39	9 Feb	17°13'	82°50'	045	0204	1055	1977	570	unkn	27	
35	40	9 Feb	17°49'	82°55'	045	1455	2719	5156	719	845	27	TG5-6, K15A
36	42	10 Feb	18°21	82°19'	045	0320	2160	4071	662	1038	26	TG7
37	43	10 Feb	18°37'	81°59'	045	1603	2525	4779	827	915	26	TG8
38	44	11 Feb	18°32'	81°31'	045	1445	2020	3806	430	824	20	TG9
39	45	13 Feb	11°46'	80°26'	045	2050	1830	3437	385	unkn	26	TG10
40	46	19 Feb	06°08'	79°54'	008	2030	1657	3106	1072	unkn*	21	TG1A
41	47	20 Feb	05°58'	79°15'	008	1435	1840	3444	1497	1830	18	TG2A
42	48	21 Feb	03°32'	81°11'	009	2332	975	1814	1120	1158	16	
43	49	23 Feb	01°52'	82°37'	009	0332	1687	3150	1090	1768	18	TG3A

*unkn=Penetration over corehead
**C.M.=Corrected Meters

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1961	Position Lat. South	Long. West	Msdn Sq.	Local time of hit	Depth at hit fms.	C.M.**	Penetration length of good core centimeters	Penetration of core centimeters	Trigger core length centimeters	Data & Remarks
44	50	25 Feb	03°34'	85°07'	308	1006	1796	3358	969	855	22	
45	51	26 Feb	07°10'	85°50'	308	2020	2180	4087	1098	unkn	21	T1
46	53	4 Mar	22°21'	78°56'	379	1036	2463	4627	1192	975	44	TG4A
47	54	6 Mar	28°41'	75°45'	379	1552	2315	4371	916	1129	40	
48	56	12 Mar	33°32'	72°59'	415	1552	2861	5374	30	unkn	21	Messenger failed to trip; no free fall. Shipboard core length was 13 cm. Added length probably due to crumbly condition of the core.
49	57	12 Mar	33°31'	73°00'	415	1950	2856	5365	590	732	none	
50	58	13 Mar	34°30'	74°19'	415	1557	2180	4080	1114	1007	41	T2
51	59	14 Mar	36°15'	76°51'	415	1644	2156	4032	1113	1190	31	T3
52	60	15 Mar	37°13'	77°44'	415	1516	2217	4147	482	855	49	T4
53	61	16 Mar	38°15'	76°00'	415	1436	2123	3968	1070	1312	40	T5
54	62	21 Mar	37°57'	75°09'	415	1041	2268	4247	1043	1281	34	T6
55	63	22 Mar	40°32'	75°09'	451	1132	1950	3636	403	426	3	T7
56	65	23 Mar	43°20'	75°20'	451	1158	802	1483	496	201	43	T9
57	69	24 Mar	47°00'	75°56'	451	1841	1670	3105	262	503	32	T13
58	73	25 Mar	49°25'	78°46'	451	2151	2070	3866	1225	1281	37	
59	75	28 Mar	53°34'	72°29'	487	1503	189	349	80	unkn	none	T17
60	76	28 Mar	53°48'	71°45'	487	1744	138	254	57	unkn	none	T18
61	77	28 Mar	53°55'	71°17'	487	1940	210	388	387	564	14	
62	78	29 Mar	52°59'	70°31'	487	0402	45	83	380	unkn	none	T19
63	79	29 Mar	53°21'	70°36'	487	0629	136	251	831	975	20	T20

*unkn = Penetration over corehead
**C.M. = Corrected Meters

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1961	Position Lat. South	Position Long. West	Msdn Sq.	Local time of hit	Depth at hit Fms.	Depth at hit C.M.**	Penetration length of good core (centimeters)	Penetration of core (centimeters)	Trigger core length (centimeters)	Data & Remarks
64	80	29 Mar	53°23'	70°55'	487	0816	82	152	245	274	40	T21
65	81	29 Mar	53°38°	70°50'	487	1004	132	243	310	unkn	none	T22
66	82	29 Mar	53°47'	70°17'	487	1526	155	286	558	701	17	T23
67	83	29 Mar	53°38'	69°55'	486	1741	24	44	167	unkn	1	T24
68	84	29 Mar	53°28'	69°33'	486	1913	25	46	468	579	14	T25
69	85	29 Mar	53°27'	69°57'	486	2047	15	27	324	274	none	T26
70	86	29 Mar	53°34'	70°17'	487	2219	145	268	840	975	30	T27
71	87	1 Apr	52°40'	70°05'	487	1542	18	33	288	213	none	T28
72	88	1 Apr	52°44'	69°54'	486	1720	14	26	65	183	none	T29
73	89	1 Apr	52°40'	69°52'	486	1817	12	22	48	91	none	T30
74	90	1 Apr	52°35'	69°48'	486	1915	8	15	270	unkn	none	T31
75	91	1 Apr	52°42'	69°45'	486	2022	25	46	245	290	5	T32
76	92	2 Apr	52°49'	67°35'	486	1306	35	64	173	91	none	T33
77	93	2 Apr	52°30'	68°56'	486	1958	25	46	245	unkn	none	T34
78	94	2 Apr	52°19'	68°07'	486	2124	22	40	274	244	none	T35
79	95	2 Apr	52°22'	69°20'	486	2257	23	42	190	unkn	none	T36
80	96	3 Apr	52°39'	69°49'	486	0113	20	37	180	213	none	T37
81	97	3 Apr	53°35'	70°23'	487	1000	73	135	18	unkn	none	T38
82	98	3 Apr	53°47'	70°18'	487	1147	148	272	815	1006	14	T39
83	99	3 Apr	53°52'	70°22'	487	1323	133	245	577	671	23	
84	100	3 Apr	54°01'	70°16'	487	1441	315	582	1130	unkn*	35	
85	101	3 Apr	54°01'	70°07'	487	1600	150	277	752	792	24	
86	102	4 Apr	53° 3'	70°14'	487	2102	145	268	111	unkn	none	
87	103	13 Apr	54°21'	71°42'	487	1115	280	515	406	488	32	
88	104	15 Apr	57°02'	74°29'	487	1402	2179	4067	770	640	53	

*unkn = Penetration over corehead

**C.M. = Corrected Meters

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1961	Position Lat. South	Position Long. West	Msdn Sq.	Local time of hit	Depth at hit Fms.	Depth at hit C.M.**	Penetration length of good core (centimeters)	Penetration of core (centimeters)	Trigger core length (centimeters)	Data & Remarks
89	105	16 Apr	59°18'	74°17'	487	0845	2365	4407	338	unkn	49	
90	106	16 Apr	60°08'	74°56'	523	1925	2450	4570	470	427	32	T40
91	107	17 Apr	61°11'	75°56'	523	0952	2463	4595	1265	792	52	
92	108	17 Apr	62°11'	75°07'	523	2214	2195	4083	755	732	36	
93	112	20 Apr	62°02'	68°15'	522	1433	2115	3931	642	701	47	
94	114	21 Apr	62°48'	62°06'	522	1819	357	650	382	549	20	T43
95	115	22 Apr	62°57'	60°37'	522	0905	85	153	329	unkn	4	T44
96	116	23 Apr	62°33'	59°26'	521	1514	321	584	490	unkn*	24	T45
97	116.1	26 Apr	60°59'	60°27'	522	2005	2277	4230	821	610	30	
98	117	4 May	54°53'	67°57'	486	1338	123	225	572	unkn*	13	T46
99	118	4 May	55°07'	66°30'	486	1840	40	73	465	unkn	none	T47
100	119	4 May	55°12'	66°15'	486	2002	30	55	245	unkn	none	T49
101	120	4 May	55°14'	66°07'	486	2052	57	104	300	unkn	none	T50
102	122	4 May	55°20'	65°52'	486	2233	532	980	408	549	none	T52-54
103	123	5 May	55°28'	66°17'	486	1045	53	97	110	unkn	none	T55
104	124	6 May	56°34'	62°41'	486	1823	2155	4013	360	unkn	none	TG, T56
105	125	10 May	54°54'	60°13'	486	0656	420	770	735	157	none	K14.1
106	126	11 May	54°44'	55°39'	485	2235	961	1767	1140	unkn	none	T61
107	127	13 May	51°08'	55°22'	485	2056	830	1527	-200	unkn	none	K15, T64
108	128	14 May	50°18'	54°11'	485	0737	820	1509	87	unkn	none	T65
109	129	18 May	41°39'	59°53'	449	0900	40	73	698	unkn	none	K16, T67
110	130	18 May	41°16'	60°03'	450	1214	38	70	490	unkn	none	K17, T68
111	131	18 May	40°56'	60°10'	450	1508	37	68	275	unkn	none	K18, T69
112	132	18 May	40°32'	60°19'	450	1811	32	59	404	unkn	none	K19, T70
113	133	18 May	40°11'	60°27'	450	2112	25	46	175	unkn	none	K20, T71

*unkn = Penetration over corehead

**C.M. = Corrected Meters

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1961	Position Lat. South	Position Long. West	Msdn Sq.	Local time of hit	Depth at hit Fms.	Depth at hit C.M.**	Penetration length of good core (centimeters)	Penetration of core (centimeters)	Trigger core length (centimeters)	Data & Remarks
114	134	19 May	39°20'	61°08'	414	0541	8	15	450	unkn	none	T72
115	135	23 May	39°47'	61°08'	414	0033	13	24	130	unkn	none	T73
116	136	23 May	41°27'	59°33'	449	1308	39	71	245	unkn	none	K21,T74
117	137	23 May	41°41'	59°19'	449	1641	45	82	418	unkn	none	K22,T75
118	138	23 May	41°57'	59°03'	449	2037	44	81	278	unkn	none	T76
119	139	23 May	42°15	58°45'	449	0007	50	91	245	unkn	none	T77
120	140	24 May	42°28'	58°31'	449	0335	124	227	2	unkn	none	T78-79
121	141	26 May	43°58'	52°09'	449	1204	3078	5796	1190	1356	28	TG, T80
122	142	27 May	44°33'	49°19'	448	1315	2842	5342	1199	1356	39	T81
123	143	28 May	45°22'	46°58'	448	1008	2810	5279	1170	unkn*	30	T82
124	144	31 May	48°34'	36°04'	447	1115	2768	5203	290	unkn	6	T83
125	145	1 Jun	50°15'	35°53'	483	0946	2512	4690	735	884	26	T84
126	148	6 Jun	47°35'	43°21'	448	1211	2927	5628	1060	1250	38	TG5, T85
127	149	7 Jun	48°03'	45°06'	448	1146	3156	5939	880	1036	none	TG6
128	150	9 Jun	47°06'	51°46'	449	1425	3235	6093	335	914	52	TG7
129	151	11 Jun	45°29'	60°06'	450	0914	124	227	no core	unkn	none	T86
130	152	11 Jun	45°21'	60°27'	450	1126	59	108	340	unkn	none	T87
131	153	11 Jun	45°11'	60°55'	450	1407	58	106	230	unkn	none	T88
132	154	11 Jun	45°02'	60°18'	450	1630	58	106	237	unkn	none	T89
133	155	11 Jun	44°53'	61°43'	450	1906	56	102	490	unkn	none	T90
134	156	11 Jun	44°45'	62°11'	450	2155	54	99	540	unkn	none	T91
135	157	12 Jun	44°37'	62°40'	450	0040	53	97	215	unkn	6	T92
136	158	12 Jun	44°35'	63°07'	450	0328	52	95	174	122	10	T93
137	159	12 Jun	44°33'	63°33'	450	0621	50	91	470	107	10	T94;core stretched 75cms.
138	160	12 Jun	44°30'	63°59'	450	0910	47	86	148	122	14	T95

*unkn = Penetration over corehead

**C.M. = Corrected Meters

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1961	Position Lat. South	Long. West	Msdn Sq.	Local time of hit	Depth at hit Fms.	C.M.**	length of good core	Penetration of core	Trigger core length	Data & Remarks
									centimeters			
139	161	12 Jun	44°28'	64°25'	450	1123	44	81	136	122	14	T96
140	162	13 Jun	44°29'	60°59'	450	0817	55	101	245	unkn	none	T97
141	163	13 Jun	44°28'	60°45'	450	1008	56	102	550	unkn	none	T98
142	164	13 Jun	44°25'	59°54'	449	1543	83	152	398	unkn	none	T99
143	165	13 Jun	44°23'	59°53'	449	1637	94	172	152	unkn	none	D12, T100
144	166	19 Jun	40°34'	55°10'	449	0107	2185	4114	456	823	7	
145	171	27 Jun	34°25'	52°19'	413	2301	41	77	229	unkn	none	T102
146	172	28 Jun	34°21'	51°07'	413	0042	60	114	698	594	13	T103
147	173	28 Jun	33°09'	49°52'	412	2250	830	1546	600	unkn*	20	
148	175	3 Jul	21°49'	35°43'	375	1515	2376	4468	1154	1280	none	
149	176	4 Jul	19°57'	34°03'	339	1330	2221	4172	260	274	27	
150	177	5 Jul	18°09'	32°44'	339	1125	2375	4466	1225	unkn	37	
151	178	10 Jul	05°23'	21°26'	302	1352	2780	5246	1144	1219	33	TG10
152	179	11 Jul	03°09°	19°23'	301	1951	2740	5168	1224	1280	19	TG11
153	180	12 Jul	01°34'	19°16'	301	1916	2355	4425	1297	1402	23	
			North	West								
154	181	13 Jul	00°23'	17°58'	002	1938	1917	3590	991	1341	39	
155	182	13 Jul	00°20'	17°59'	002	2226	1677	3135	872	unkn	36	
156	183	14 Jul	03°26'	18°31'	002	1945	2655	5004	1290	unkn	17	
157	184	16 Jul	09°20'	18°38'	002	1250	2175	4083	1418	1829	33	
158	185	17 Jul	12°24'	18°55'	038	1126	2315	4351	913	1219	35	TG12
159	186	20 Jul	16°59'	20°03'	039	1203	1815	3401	775	671	25	T105
160	187	22 Jul	21°22'	24°02'	075	1107	2573	4864	1130	1341	32	
161	188	23 Jul	23°15'	26°43'	075	1305	2815	5334	715	701	31	
162	189	24 Jul	24°58'	28°58'	075	1204	2900	5498	450	701	36	
163	190	26 Jul	27°58'	34°08'	076	0904	2715	5140	785	945	26	

*unkn = Penetration over corehead

** C.M.= Corrected Meters

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1961	Position Lat. North	Position Long. West	Msdn Sq.	Local time of hit	Depth at hit Fms.	Depth at hit C.M.**	Penetration length of good core (centimeters)	Penetration of core (centimeters)	Trigger core length (centimeters)	Data & Remarks
164	192	27 Jul	29°37'	36°55'	076	1230	2350	4436	468	457	22	TG13
165	193	29 Jul	32°45'	41°54'	113	0644	2085	3929	759	762	18.5	TG14
166	194	30 Jul	34°56'	45°21'	113	1624	2235	4211	908	1158	35	
167	198	4 Aug	42°30'	59°06'	150	1107	2315	4346	1163	1265	20	TG15
168	199	12 Aug	43°59'	58°51'	150	2135	75	139	none	unkn	none	Core consists of a jar sample containing 8 small rock pebbles
169	200	13 Aug	43°23'	59°39'	150	0957	1150	2128	905	1219	none	
170	201	13 Aug	43°34'	60°04'	151	1456	84	156	332	400	34	T109
171	202	14 Aug	42°51'	61°44'	151	1247	576	1062	395	671	35	
172	204	15 Aug	43°58'	63°02'	151	0647	123	228	676	701	22	
173	205	18 Aug	44°03'	63°03'	151	1824	116	213	1300	1372	17	
174	206	19 Aug	44°51'	60°58'	151	0930	120	221	1100	1219	15	
175	207	19 Aug	44°50'	60°37'	151	1235	152	279	340	366	18	T110
176	208	19 Aug	44°50'	60°15'	151	1538	148	272	1038	unkn	8	T111
177	209	20 Aug	44°30'	57°07'	150	0855	190	350	196	213	22	T112
178	211	21 Aug	43°23'	54°52'	150	1151	2140	4003	1030	1067	30	TG16
179	212	22 Aug	46°31'	58°04'	150	1821	248	455	1300	1280	10	T113
180	213	23 Aug	46°39'	58°40'	150	1234	223	409	465	518	18	T114
181	214	24 Aug	45°53'	57°30'	150	0844	251	460	1250	1265	4	
182	215	26 Aug	45°29'	52°32'	150	1115	53	97	98	76	none	
183	216	26 Aug	44°57'	52°15'	150	1450	37	68	530	unkn	none	T115
184	217	27 Aug	46°42'	50°47'	150	1238	58	106	3	10	none	
185	218	27 Aug	46°41'	51°30'	150	1610	44	81	227	unkn	none	
186	219	27 Aug	46°40'	52°12'	150	1935	54	99	196	46	none	
187	220	28 Aug	49°53'	53°02'	150	1908	143	263	127	183	none	
188	221	29 Aug	50°30'	52°19'	186	1050	120	221	365	366	12	

*unkn = Penetration over corehead

**C.M. = Corrected Meters

VEMA - 17 CORE INDEX

# of Core	Ship Stn.	Date 1961	Position Lat. North	Position Long. West	Msdn Sq.	Local time of hit	Depth at hit Fms.	Depth at hit C.M.**	Penetration length of good core (centimeters)	Penetration of core (centimeters)	Trigger core length (centimeters)	Data & Remarks
189	222	29 Aug	50°57'	51°24'	186	1919	145	266	245	152	none	
190	223	30 Aug	51°20'	50°36'	186	1125	140	257	100	730	none	
191	224	31 Aug	55°14'	48°50'	185	1819	2020	3770	none	122	17	TG17; Core consists of a handful of clay pebbles.
192	225	1 Sep	58°23'	47°46'	185	2203	1700+	3161+	1007	1219	36	TG18, T116
193	226	3 Sep	60°44'	45°45'	221	1356	225	413	1340	1341	17	TG19, T117
194	227	3 Sep	60°43'	45°54'	221	1528	177	325	1562	1158	17	
195	228	3 Sep	60°42'	46°01'	221	1632	161	295	440	701	11	
196	229	6 Sep	60°44'	57°50'	222	1200	1520	2821	1034	183	25	TG20
197	230	8 Sep	57°51'	54°06'	186	1921	1827	3400	6	unkn	27	TG21, T118
198	231	9 Sep	55°49'	52°27'	186	1336	1788	3327	1192	1219	45	
199	232	10 Sep	53°42'	55°36'	186	2131	79	146	380	137	none	
200	233	11 Sep	51°08'	58°01'	186	1946	110	202	1305	1219	12	T120
201	234	12 Sep	49°49'	61°46'	151	1932	111	204	unkn	unkn	9	Core tubes separated from corehead and were not recovered.
202	235	12 Sep	49°37'	61°49'	151	2132	140	257	1200	1372	11	
203	236	13 Sep	48°41'	60°00'	151	1117	187	343	560	792	30	TG22
204	238	14 Sep	47°58'	61°58'	151	1002	28	51	590	unkn	none	
205	239	14 Sep	47°36'	63°00'	151	1905	28	51	6	30	none	
206	240	15 Sep	48°01'	64°01'	151	1408	42	77	472	213	6	
207	241	16 Sep	46°58'	62°05'	151	1126	28	51	6	13	none	
208	242	16 Sep	46°27'	61°12'	151	1836	18	33	245	unkn	none	
209	243	24 Sep	40°24'	63°10'	151	1821	2453	4617	424	640	35	
210	244	25 Sep	39°15'	63°09'	115	1029	2649	5011	280	274	none	
211	245	26 Sep	37°04'	62°55'	115	1048	2659	5032	451	631	36	TG23

*unkn = Penetration over corehead

**C.M. = Corrected Meters

VEMA - 17 HEAT FLOW - THERMOGRAD

TG #	Ship Stn.	Core #	Date 1961	Position Lat. North	Position Long. West	Msdn Sq.	PDR Depth at Hit Fms.	PDR Depth at Hit C.M.**	# of Probes in Sediment
1	18	15	16 Jan	24°33'	91°09'	082	1962	3687	0
2	22	19	23 Jan	23°49'	90°44'	082	1972	3706	0
3	23	20	26 Jan	24°02'	91°25'	082	1984	3729	0
4	24	21	30 Jan	20°45'	84°17'	081	2397	4530	0
5	40	35	9 Feb	17°49'	82°55'	045	2719	5156	0
6	40	35	9 Feb	17°49'	82°55'	045	2719	5156	0
7	42	36	10 Feb	18°21'	82°19'	045	2160	4071	0
8	43	37	10 Feb	18°37'	81°59'	045	2525	4779	0
9	44	38	11 Feb	18°32'	81°31'	045	2020	3806	0
10	45	39	13 Feb	11°46'	80°26'	045	1830	3437	0
1A	46	40	19 Feb	06°08'	79°54'	008	1657	3106	0
2A	47	41	20 Feb	05°58'	79°15'	008	1840	3444	0
3A	49	43	23 Feb	01°52'	82°37'	009	1687	3150	0
				South	West				
4A	53	46	4 Mar	22°21'	78°56'	379	2463	4627	0
-	124	104	6 May	56°34'	62°41'	486	2155	4013	0
-	141	121	26 May	43°58'	52°09'	449	3078	5796	0
5	148	126	7 Jun	47°35'	43°21'	448	2927	5628	0
6	149	127	7 Jun	48°03'	45°06'	448	3156	5939	0
7	150	128	9 Jun	47°06'	51°46'	449	3235	6093	0
10	178	151	10 Jul	05°23'	21°26'	302	2780	5246	0

VEMA - 17 HEAT FLOW - THERMOGRAD

TG #	Ship Stn.	Core #	Date 1961	Position Lat. North	Position Long. West	Msdn Sq.	P D R Depth at Hit Fms.	P D R Depth at Hit C.M.**	# of Probes in Sediment
11	179	152	11 Jul	03°09'	19°23'	301	2740	5168	0
12	185	158	17 Jul	12°24'	18°55'	038	2315	4351	0
13	193	164	27 Jul	29°37'	36°55'	076	2350	4436	0
14	193	165	29 Jul	32°45'	41°54'	113	2085	3929	0
15	198	167	4 Aug	42°30'	59°06'	150	2315	4346	1
16	211	178	21 Aug	43°23'	54°52'	150	2140	4003	0
17	224	191	31 Aug	55°14'	48°50'	185	2020	3770	0
18	225	192	1 Sep	58°23'	47°46'	185	1700+	3161+	0
19	226	193	3 Sep	60°44'	45°45'	221	225	413	3
20	229	196	6 Sep	60°44'	57°50'	222	1520	2821	0
21	230	197	8 Sep	57°51'	54°06'	186	1827	3400	0
22	236	203	13 Sep	48°41'	60°00'	151	187	343	0
23	245	211	26 Sep	37°04'	62°55'	115	2659	5032	3

TGRAD STATION V17-019
060 44.2 N 045 45.4 W
CORE STATION 193

SEDIMENT TEMPERATURES

DEPTH METERS	TEMPERATURE CENTIGRADE
2.21	0.314
8.77	0.655
12.07	0.875

SEDIMENT CONDUCTIVITIES

DEPTH METERS	CONDUCTIVITY CGS
1.22	2.01
4.23	2.11
7.08	2.13
10.00	2.23

TGRAD STATION V17-023
037 04 N 062 57 W
CORE STATION 211

SEDIMENT TEMPERATURES

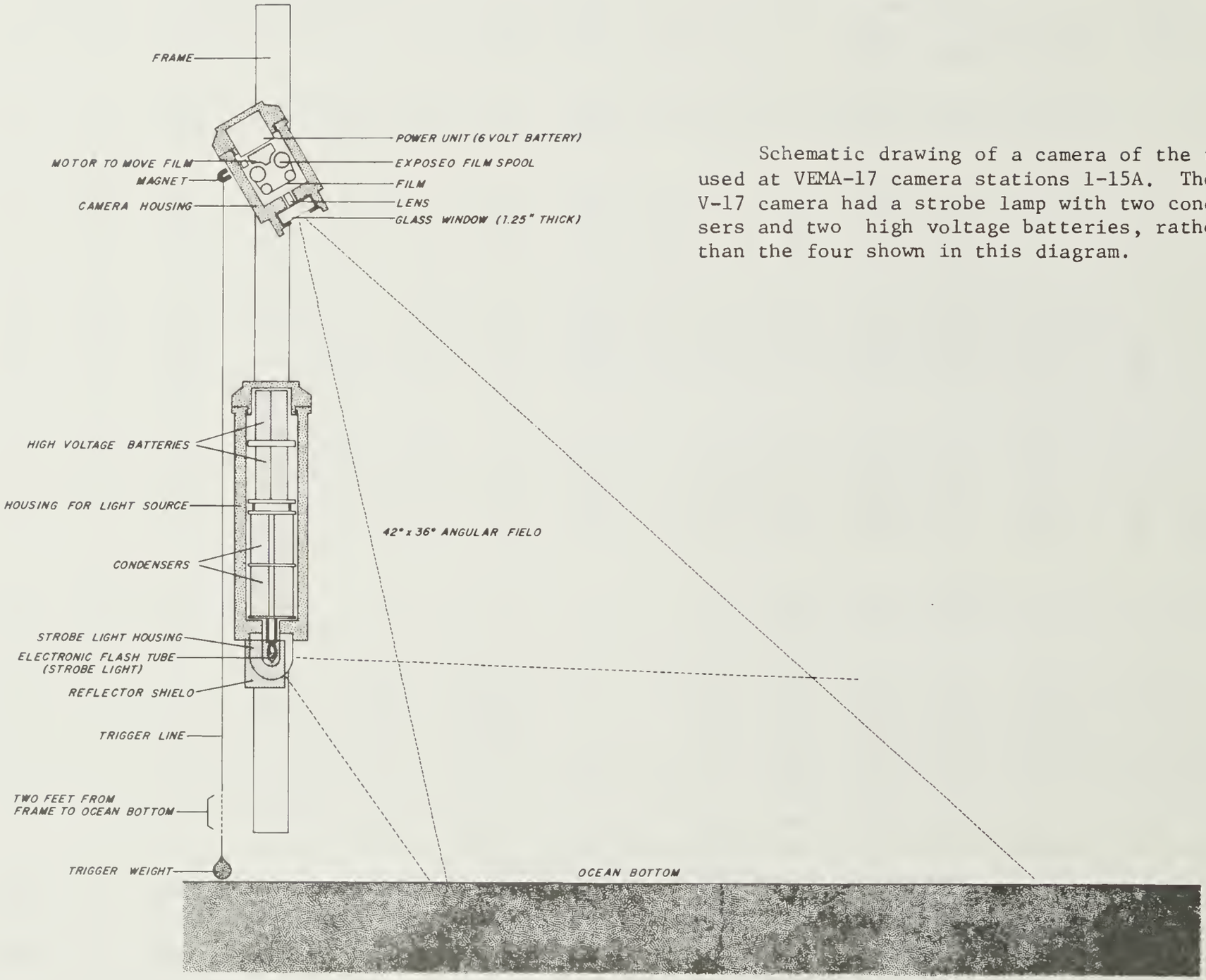
DEPTH METERS	TEMPERATURE CENTIGRADE
1.96	0.165
3.51	0.265
5.74	0.335

SEDIMENT CONDUCTIVITIES

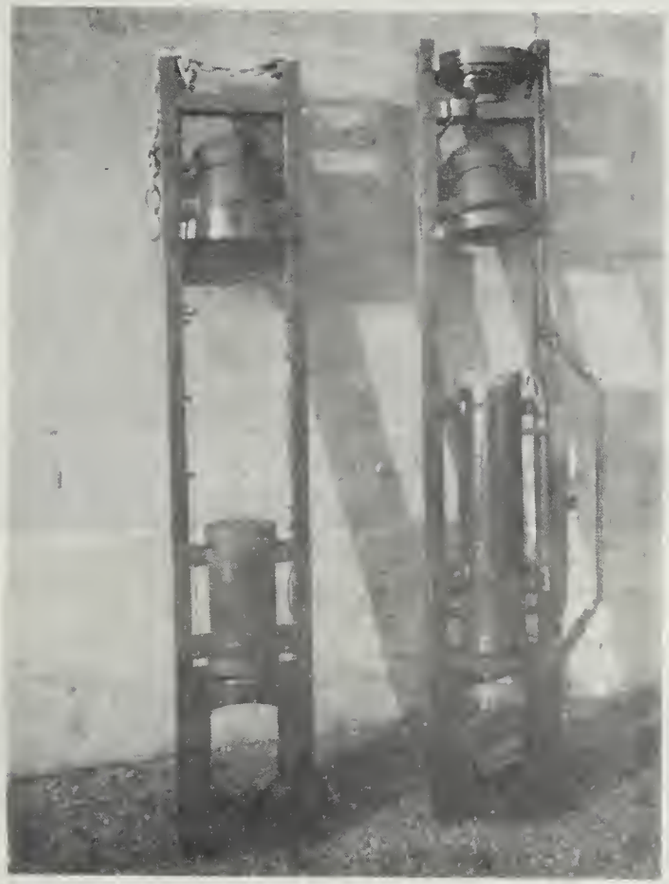
DEPTH METERS	CONDUCTIVITY CGS
0.87	3.24
2.05	2.86
2.90	2.89
3.90	3.43

VEMA - 17 CAMERA DATA

K Stn.	Ship Stn.	Date 1960	Position Lat. North	Long. West	Msdn Sq.	TIME Over	Hit	Free	Surface	PDR Depth Fms. Over	Hit	Free	Surface	Number Hits	Good	Data
1	3	16 Dec	24°57'	65°31'	079	1045	1141	1220	1320	2796	2860		2820	10	0	C2
2	4	18 Dec	19°50'	67°24'	043	1325	1545	1740	1955	4208	4260	4200	4320	2	0	C3, D1
		1961														
3	10	3 Jan	25°20'	84°31'	081	1500	1520	1620	1625	520	530	560	592	16	0	C8, D4
4	12	5 Jan	23°04'	90°46'	082	1445	1500	1550	1620	1160	1140	1120	1110	14	6	C10, D6
5	15	7 Jan	25°51'	92°29'	082	1439	1504	1527	1600	1475	1420	1400	1390	35	17	C12
6	16	8 Jan	26°30'	94°37'	082	0810	0827	1043	1100	1012	1020	1087	1114	32	28	C13, D8
7	17	13 Jan	27°36'	94°11'	082	2045	2103	2225	2230	405	410	420	420	34	27	C14, D9
8	21	19 Jan	23°33'	92°25'	082	1102	1132	1158	1240	1950	1952	1951	1953	19	6	C18
9	25	2 Feb	21°14'	83°00'	081	0900	1330	1336	1557	2140	2315	2316	2335	7	0	C22
10	26	2 Feb	20°47'	83°27'	081	2030	0104	0126	0239	2386	2388	2399	2393	6	4	C23
11	27	3 Feb	20°31'	84°03'	081	0654	--	--	1021	2405	2405	2405	2405	4	5	C24
12	33	5 Feb	17°51'	86°57'	045	1916	2037	2207	--	2103	2108	2108	--	10	2	C29
13	35	7 Feb	17°01'	84°44'	045	0818	--	--	0921	1248	--	--	1250	6	0	C31, D10
14	35	7 Feb	17°01'	84°44'	045	0924	1002	1009	1054	1252	1315	1327	1400	--	5	
15A	40	9 Feb	17°49'	82°55'	045	0912	--	--	Lost	2840	--	--	--	--	0	C35
			South													
14.1	125	10 May	54°54'	60°13'	486	--	--	--	--	--	--	--	--	--	8	C105
15	127	13 May	51°08'	55°22'	485	2200	--	--	2242	843	--	--	--	--	4	C107, T64
16	129	18 May	41°39'	59°53'	449	0901	--	--	0940	40	40	40	40	40	2	C109, T67
17	130	18 May	41°16'	60°03'	450	1203	--	--	1300	38	38	38	36	--	0	C110, T68
18	131	18 May	40°56'	60°10'	450	1515	--	--	1545	38	40	38	37	--	1	C111, T69
19	132	18 May	40°52'	60°19'	450	1808	--	--	1845	31	32	32	30	--	1	C112, T70
20	133	18 May	40°41'	60°27'	450	2111	2113	3146	2148	24	24	24	24	--	1	C113, T71
21	136	23 May	41°27'	59°33'	449	1306	--	--	1339	39	39	39	39	--	1	C116, T74
22	137	23 May	41°41'	59°19'	449	1639	1641	1705	1707	44	44	44	44	--	0	C117, T75
						Numbers 23-99 skipped										
100	203	20 Aug	42°56'	61°44'	151	1700	--	--	1735	255	--	--	280	--	16	D21
101	210	20 Aug	44°26'	57°15'	150	1214	--	--	1240	162	--	--	195	--	19	D24
102	No camera station taken															
103	237	13 Sep	48°36'	59°43'	150	1323	--	--	1348	110	--	--	108	--	15	D32



Schematic drawing of a camera of the type used at VEMA-17 camera stations 1-15A. The V-17 camera had a strobe lamp with two condensers and two high voltage batteries, rather than the four shown in this diagram.



Cameras with and without pingers (right and left). The camera lenses are 35 mm, f/3.5 Leitz Summarons. The cameras point 30° from the frame. The strobe energy is 100 joules (watt-seconds). The longer lower housing on the pinger camera holds the power supply for the pinger as well as that for the strobe. Cameras like this were used at VEMA-17 camera stations 1 through 15A.



Wide-angle camera (right) and strobe light (left), shown with protective shield removed. The camera lens has a paraxial focal length of 28.2 mm, an aperture of f/11, and a field in water of 75°. The strobe-light energy is 100 joules (watt-seconds). Both units point vertically downward. This type of camera was used at VEMA-17 camera stations 14.1 to 103.



K4-2



K4-3



K4-4



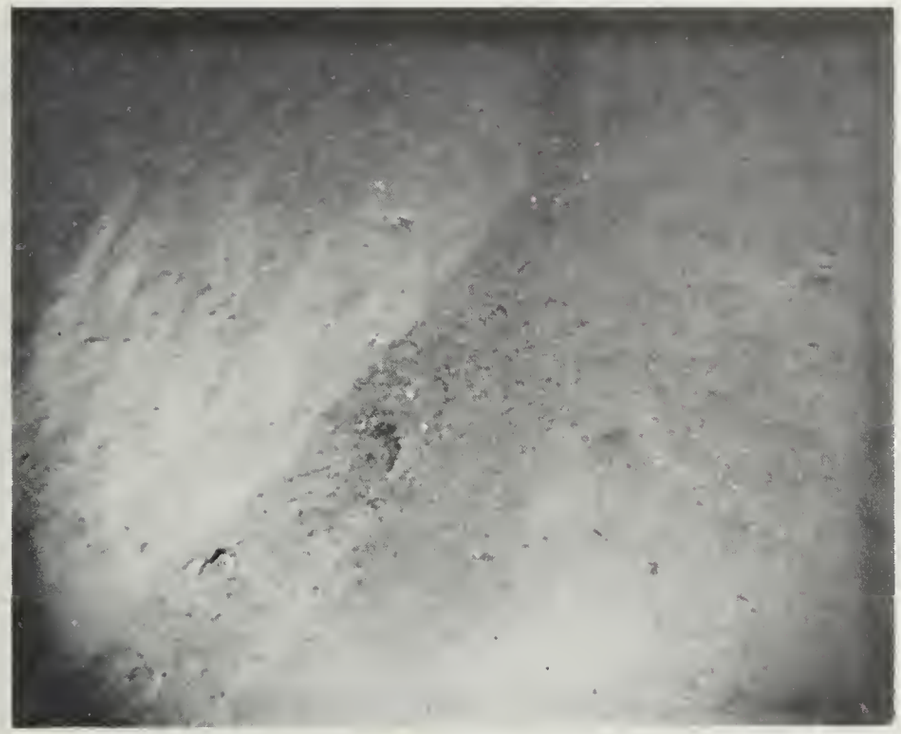
K4-5



K4-6



K5-1



K5-2



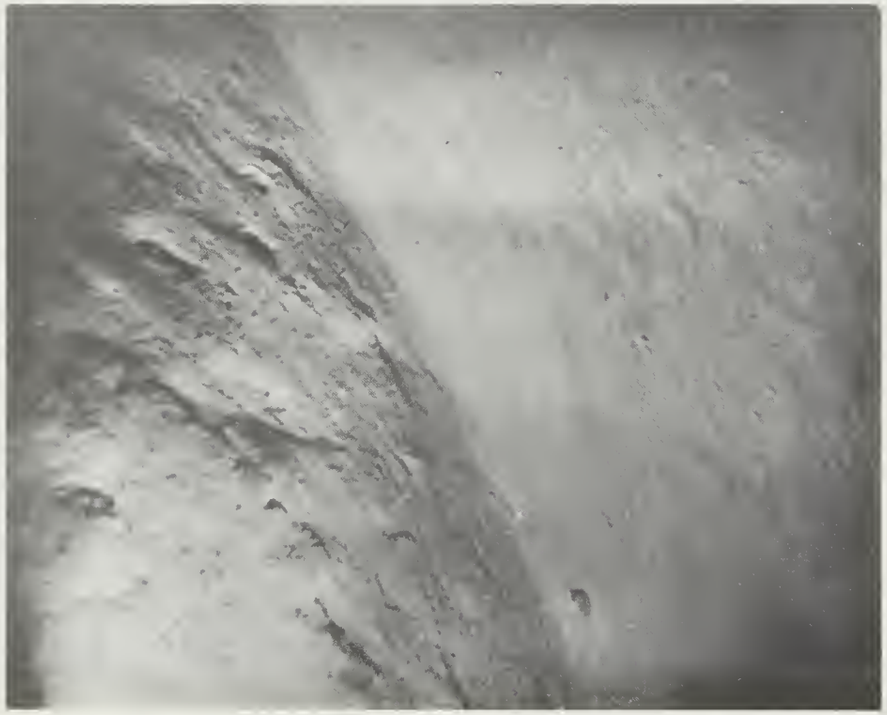
K5-3



K5−4



K5−5



K5−6



K5−7



K5-12



K5-13



K5-14



K5-15



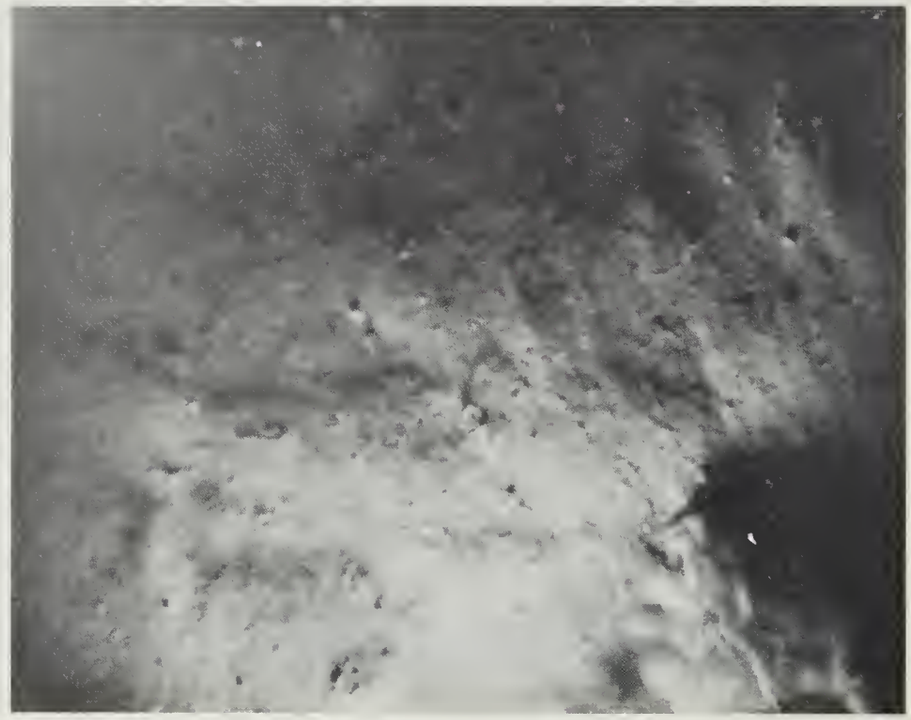
K5–8



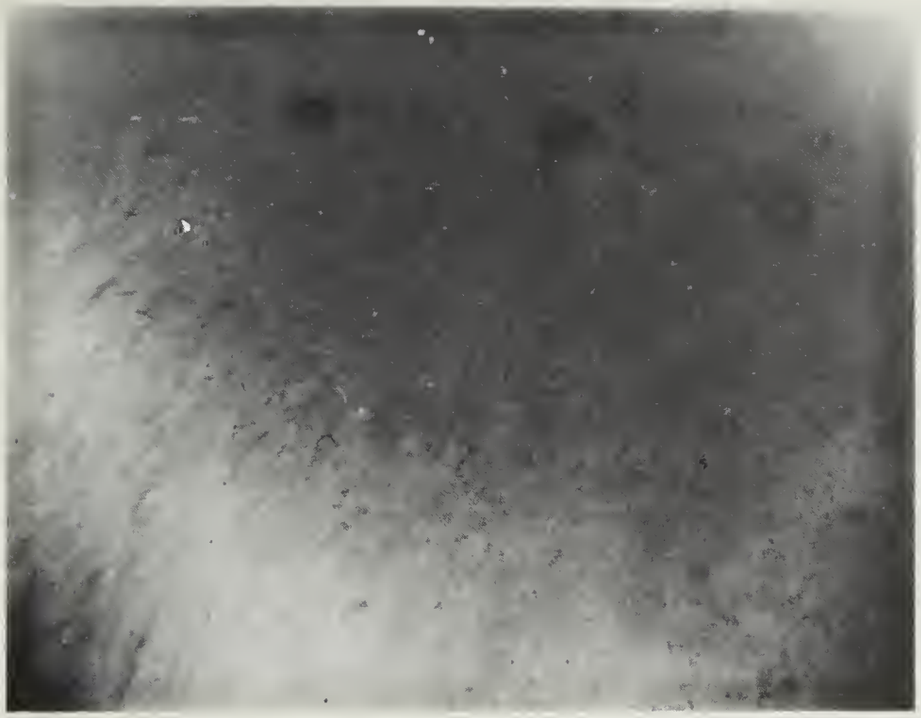
K5–9



K5–10



K5-11



K5-16



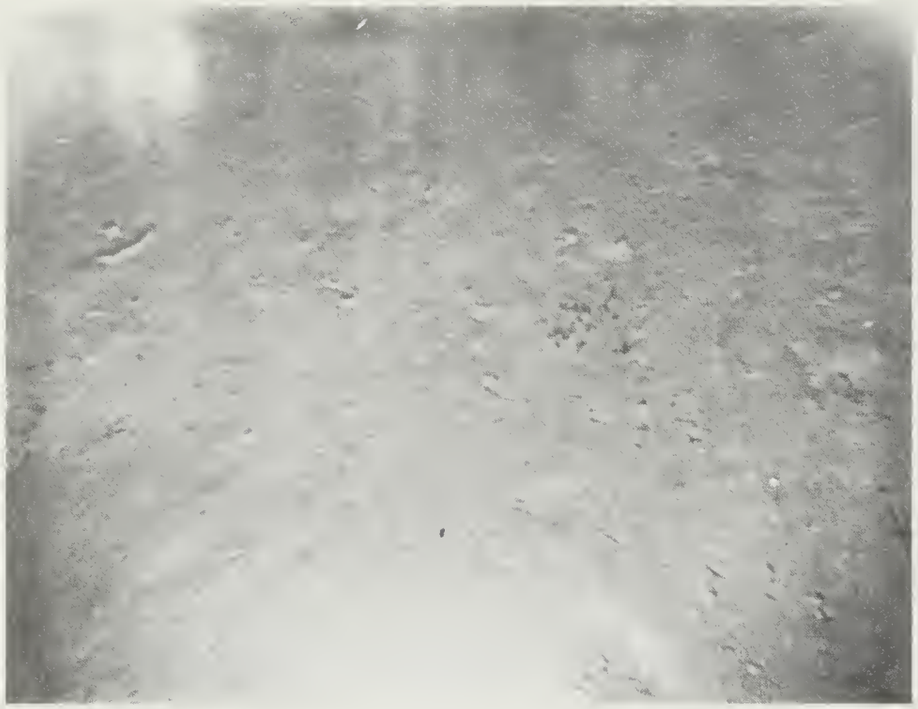
K5-17



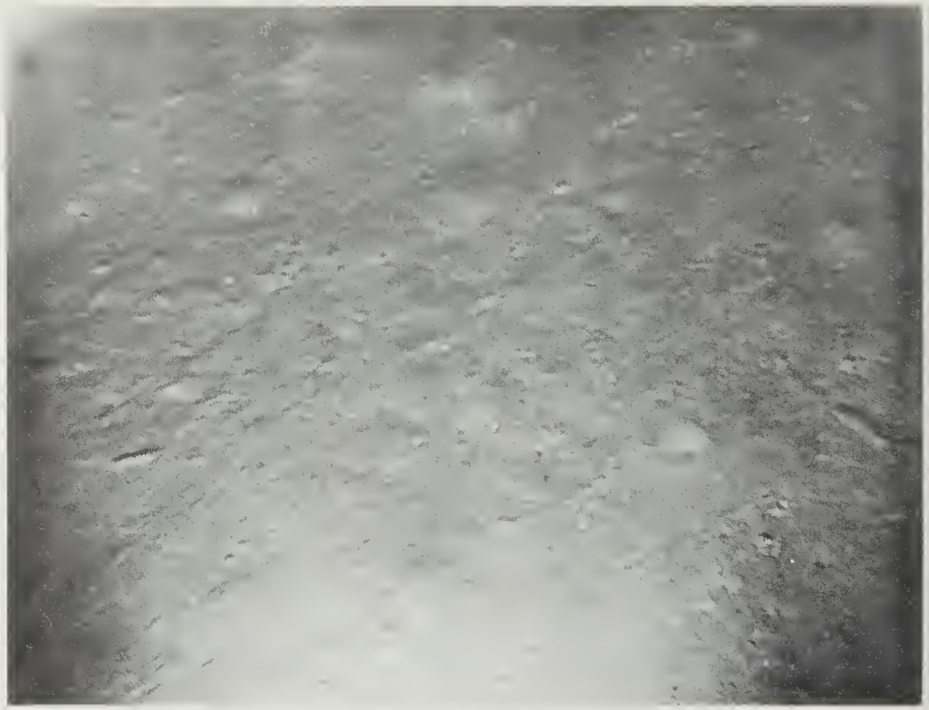
K6-1



K6-2



K6-4



K6-5



K6-6



K6-7



K6-8



K6-9



K6-11



K6-12



K6-13



K6—14



K6-15



K6-16



K6-17



K6-18



K6-19



K6-20



K6-21



K6-22



K6-23



K6-24



K6–25



K6–26



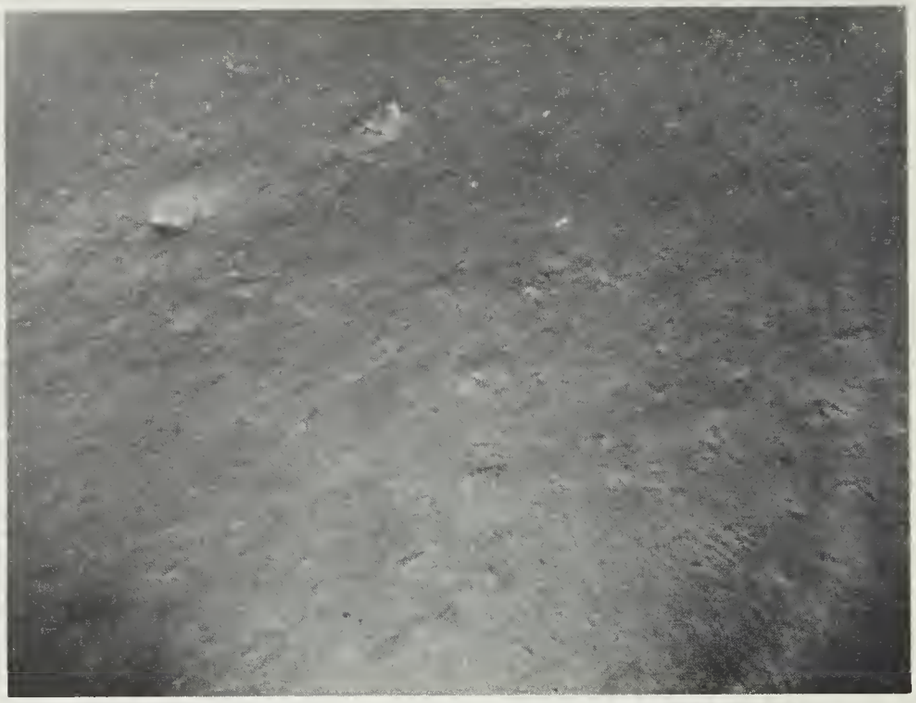
K6–27



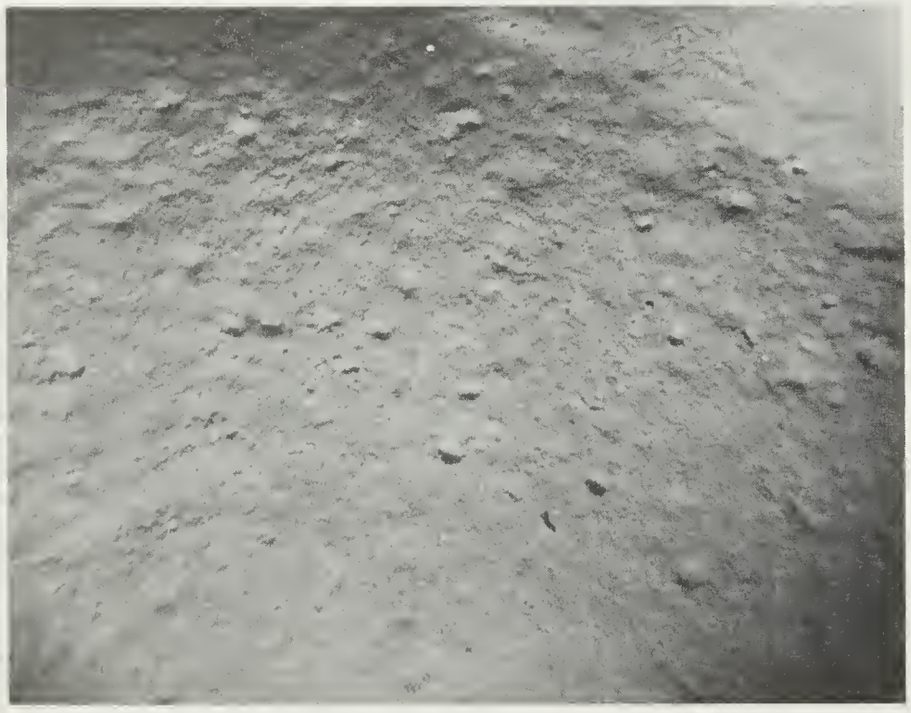
K6–28



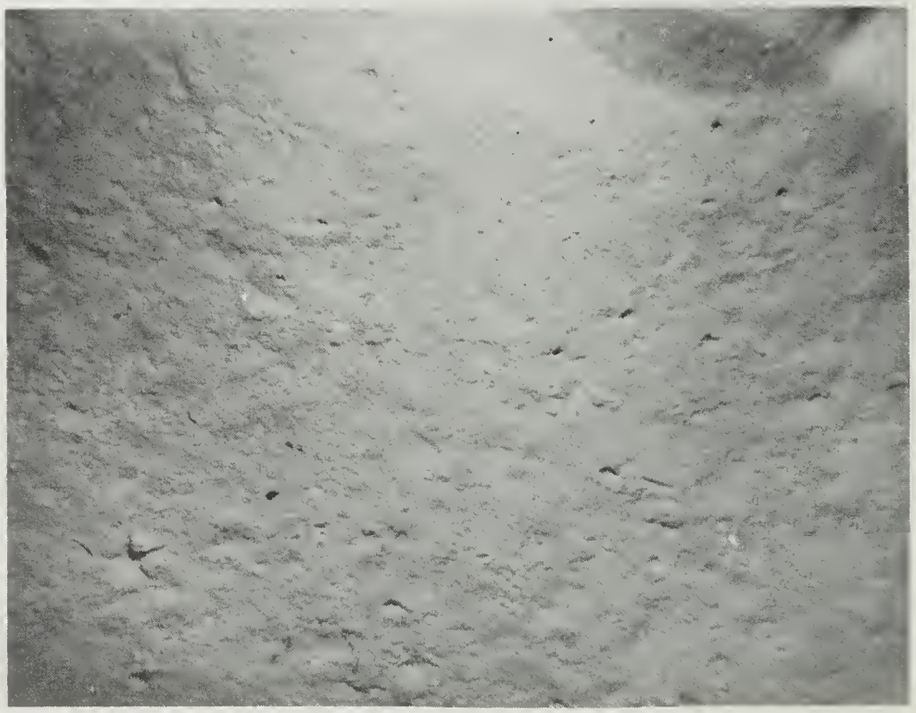
K6-29



K6-30



K7-1



K7-2



K7-3



K7-4



K7-5



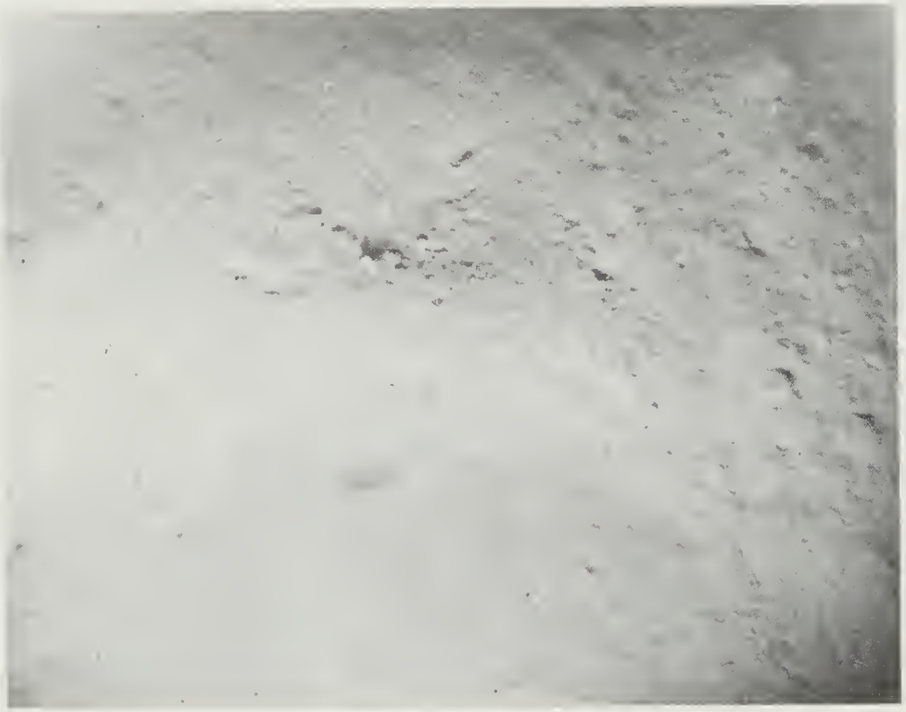
K7-6



K 7–7



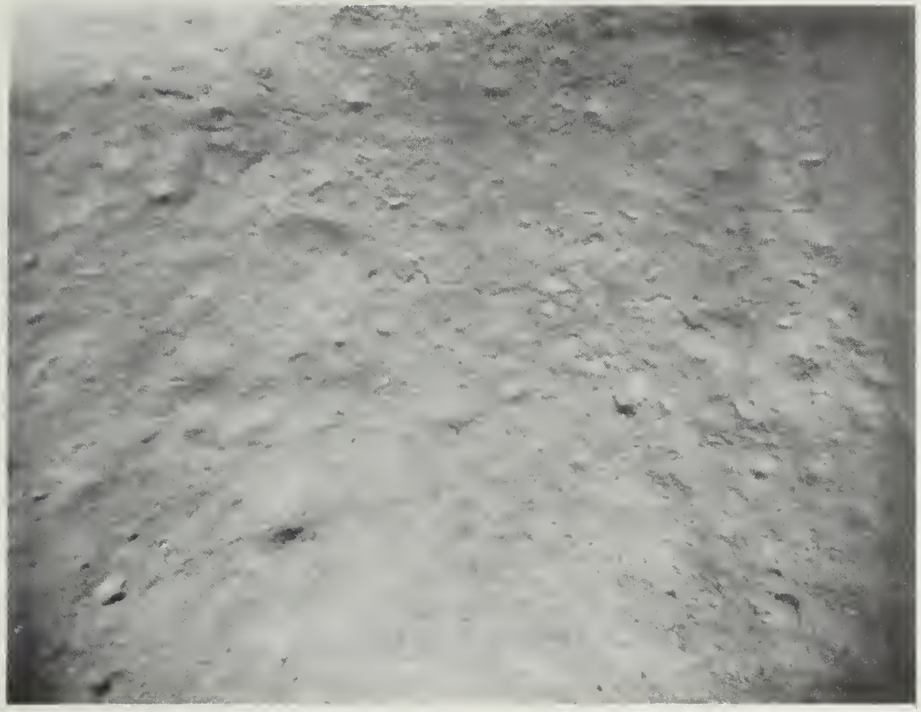
K7–8



K7–9



K7–10



K7-12



K7-13



K7-14



K7-16



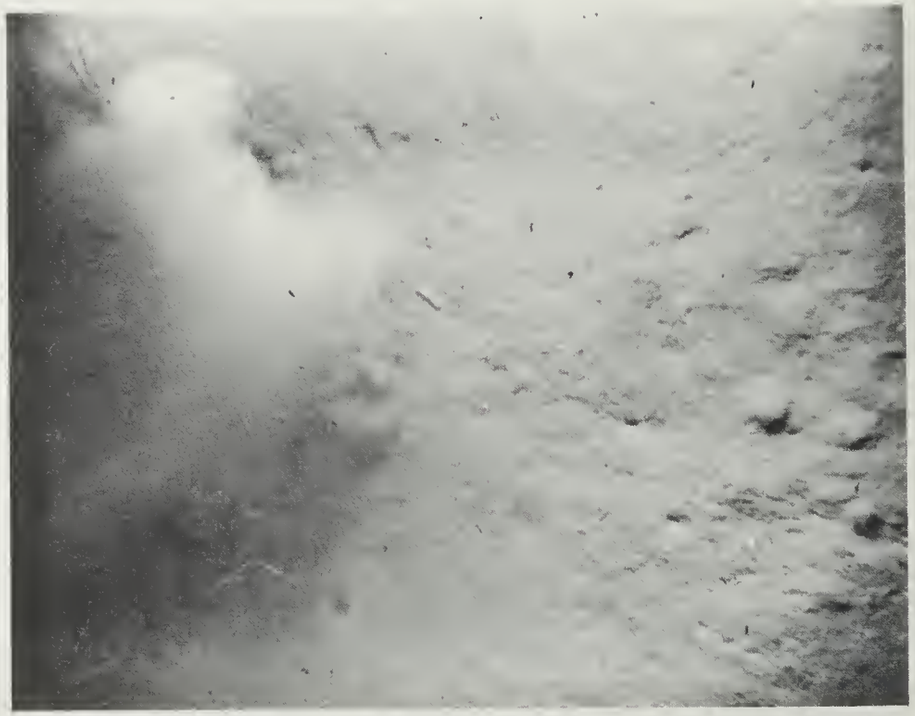
K7-17



K7-18



K7-19



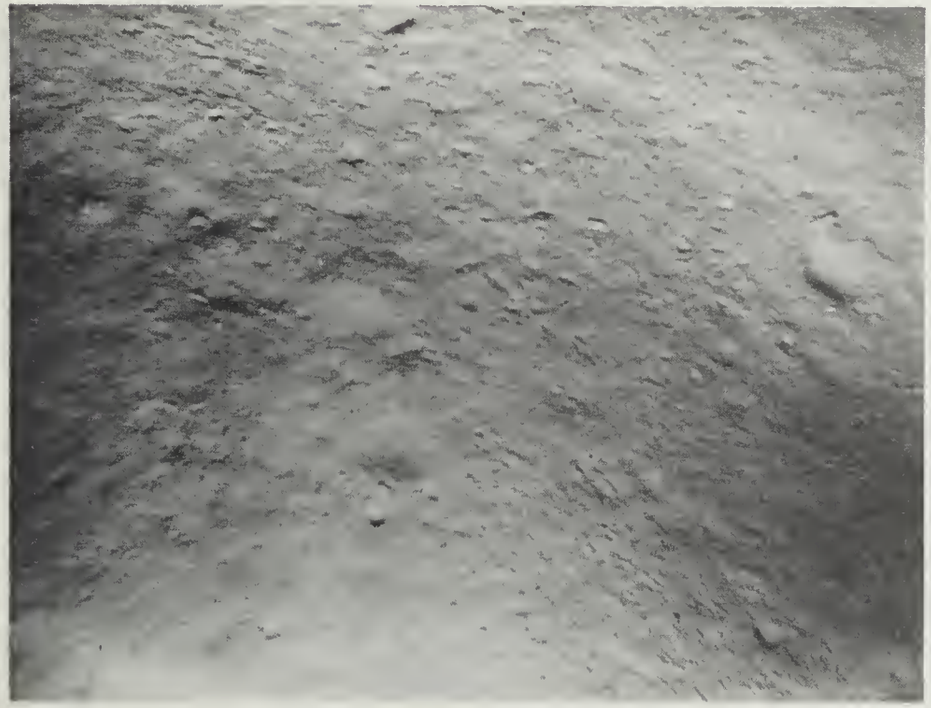
K7-20



K7-23



K7-24



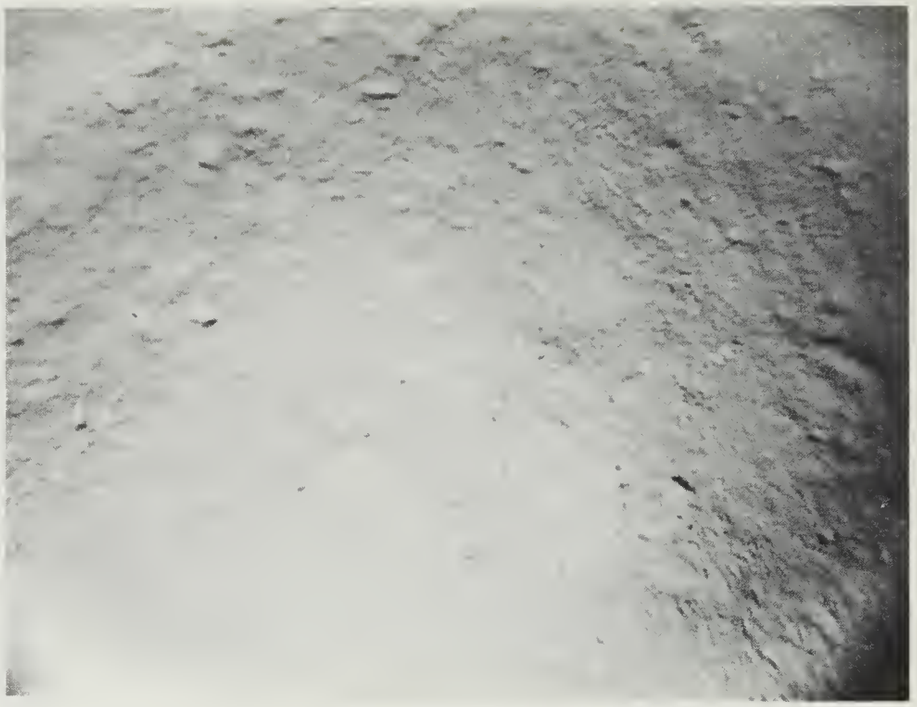
K7-25



K7-26



K7-27



K7-28



K7-29



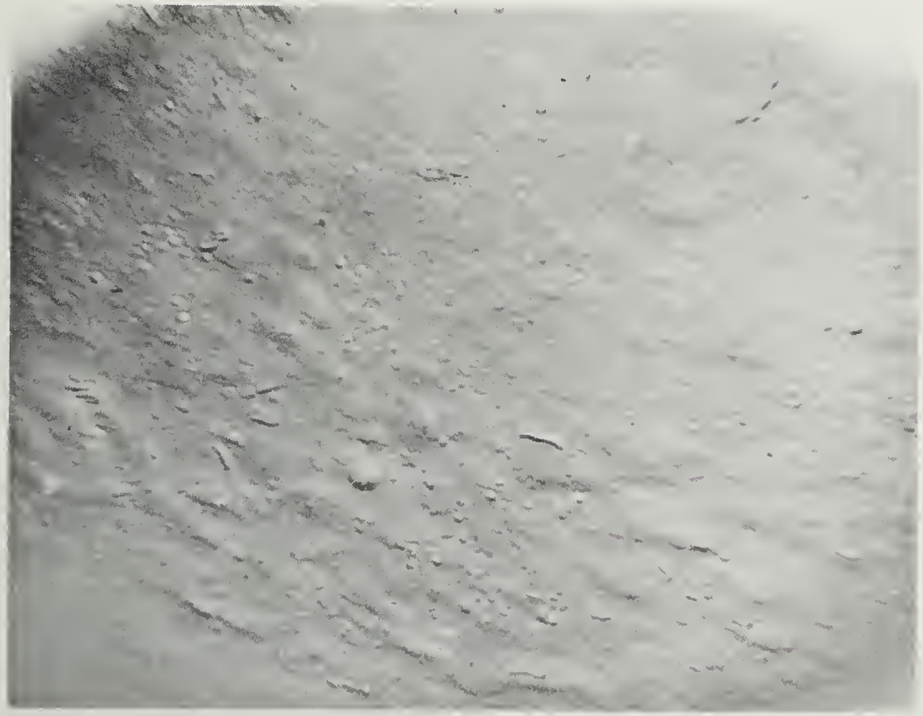
K7-30



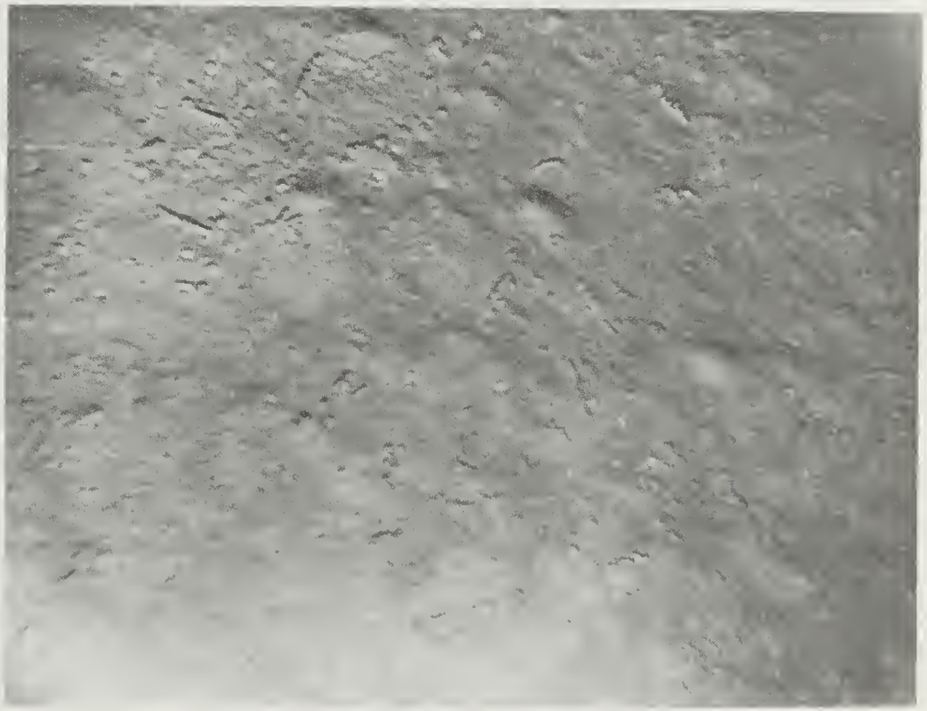
K7−32



K8−1



K8−2



K8−3



K8-4



K8-5



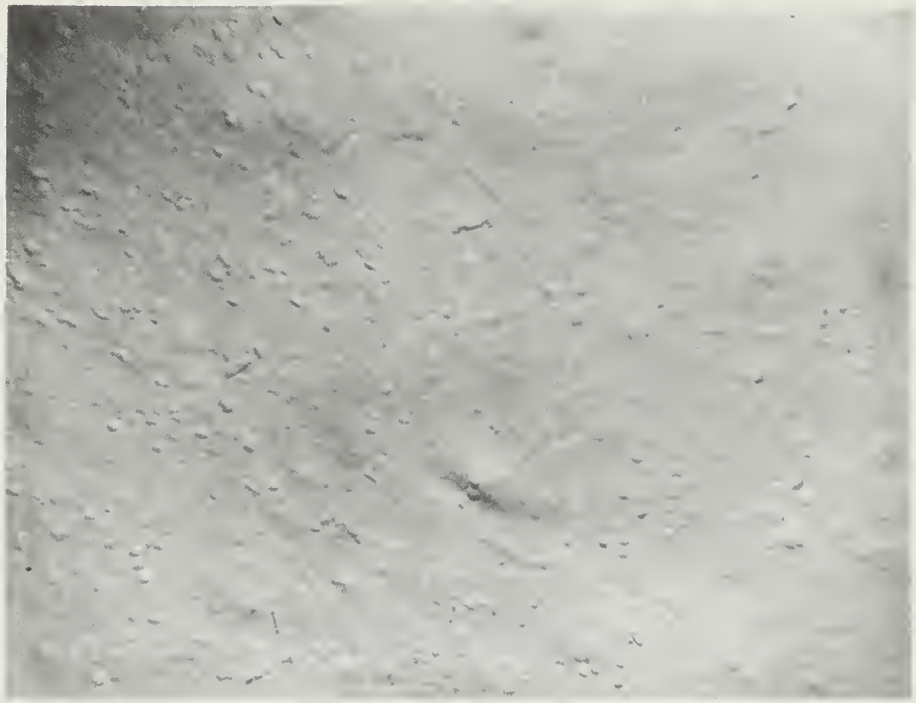
K8-6



K8-7



K 8—8



K 8—9



K 8—10



K 8—11



K8-12



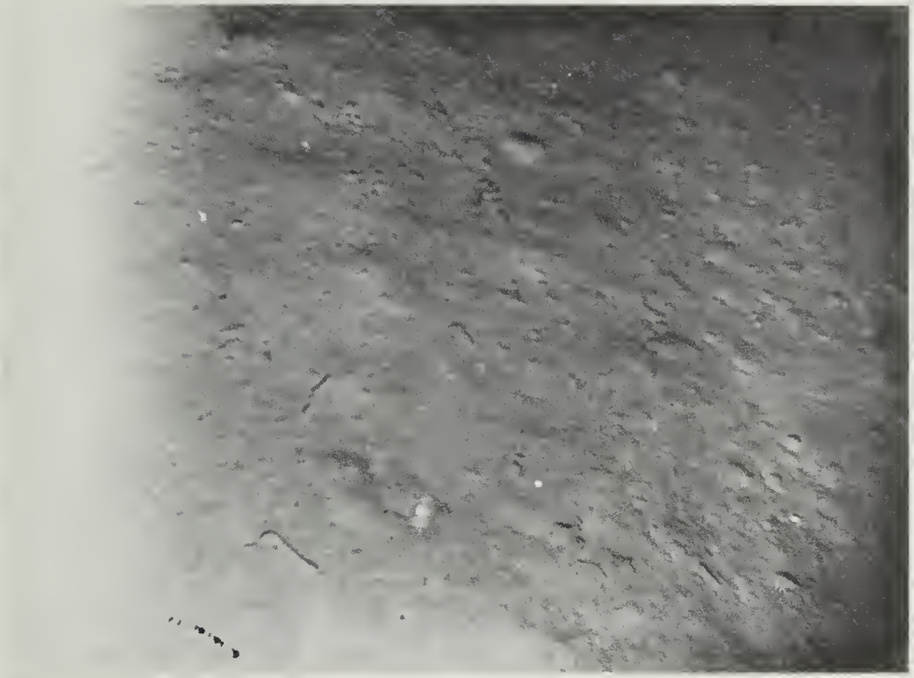
K8-13



K8-14



K8-15



K8-16



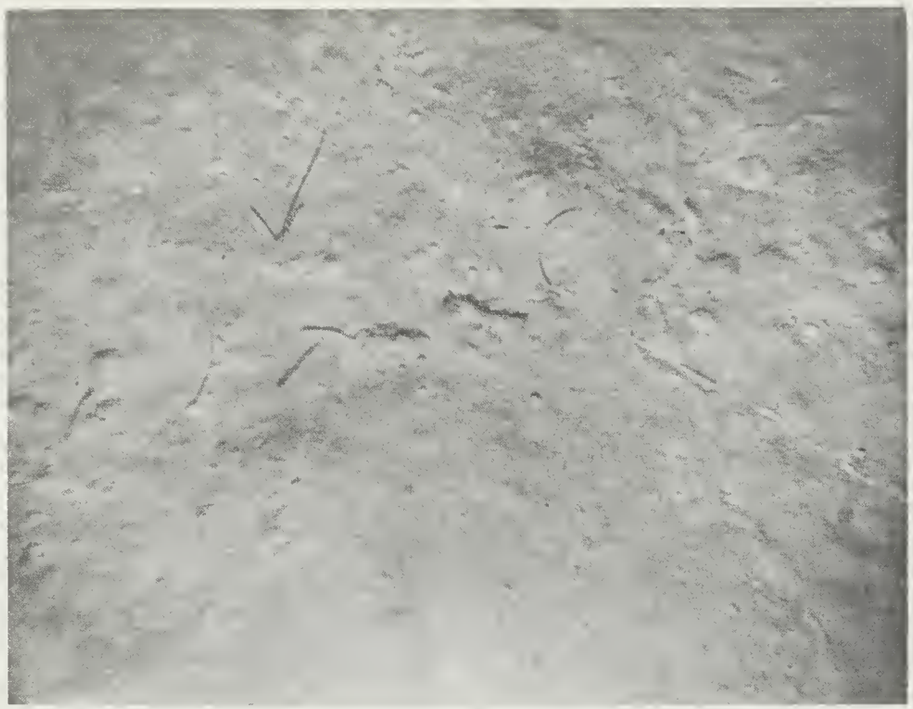
K10-1



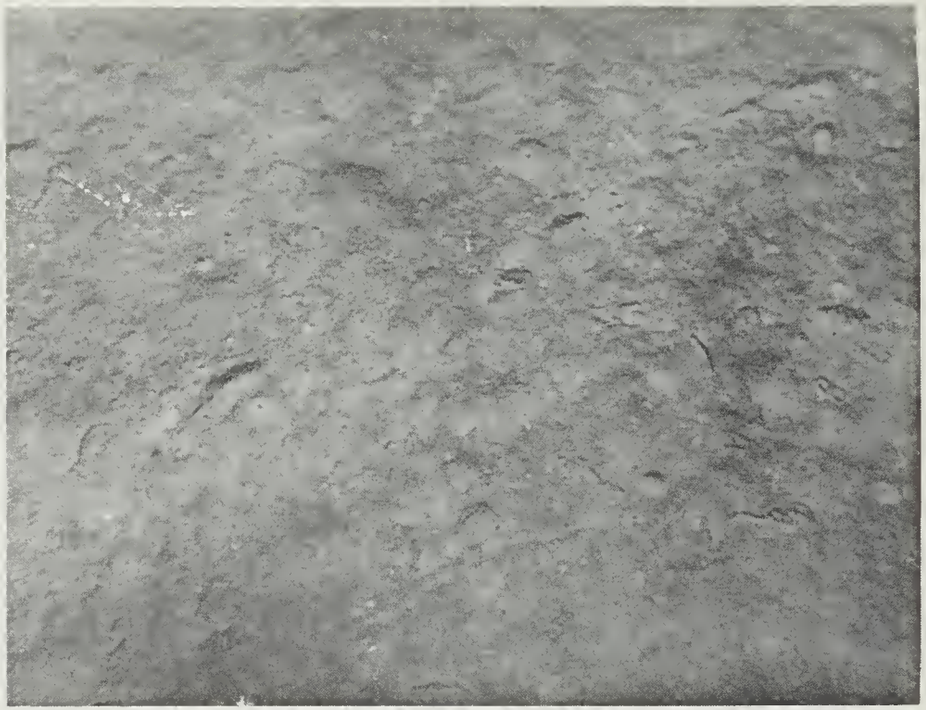
K10-2



K10-3



K10-4



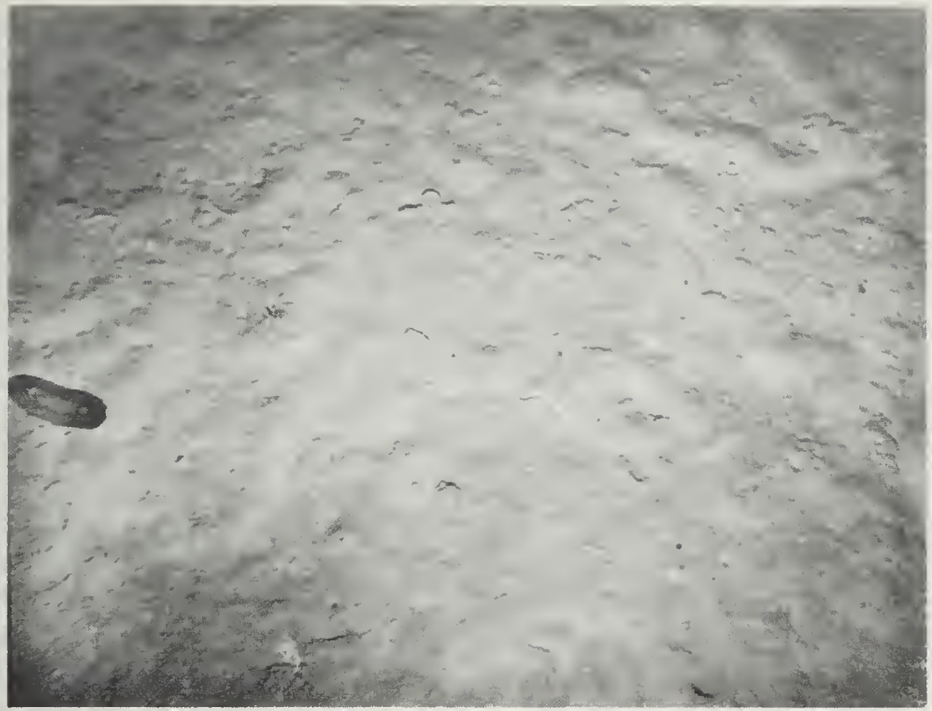
K11-1



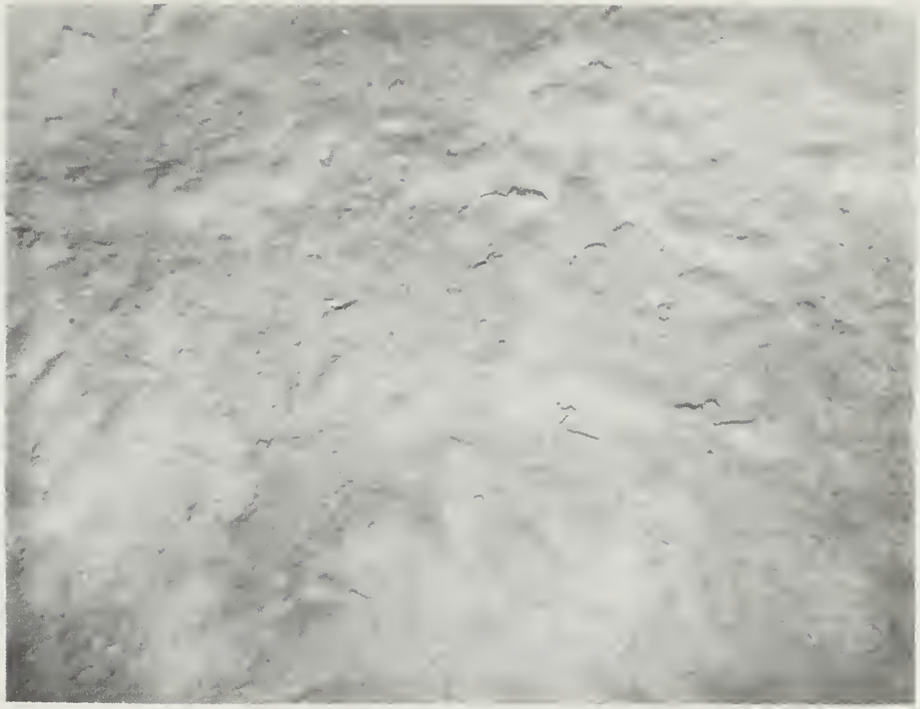
K11-2



K11-3



K11-4



K11-5



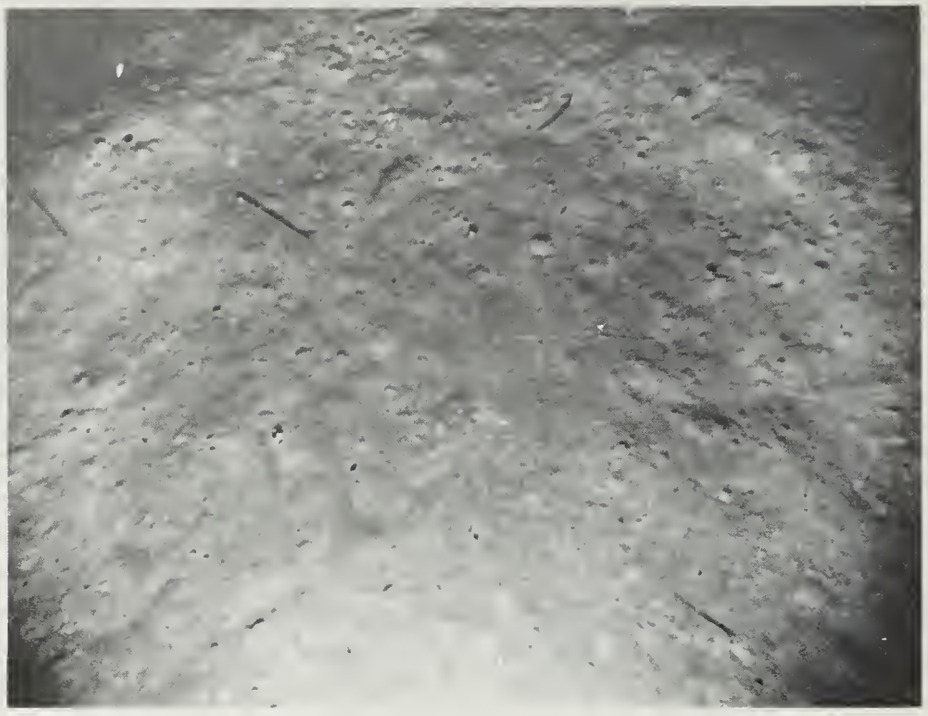
K12-1



K12-2



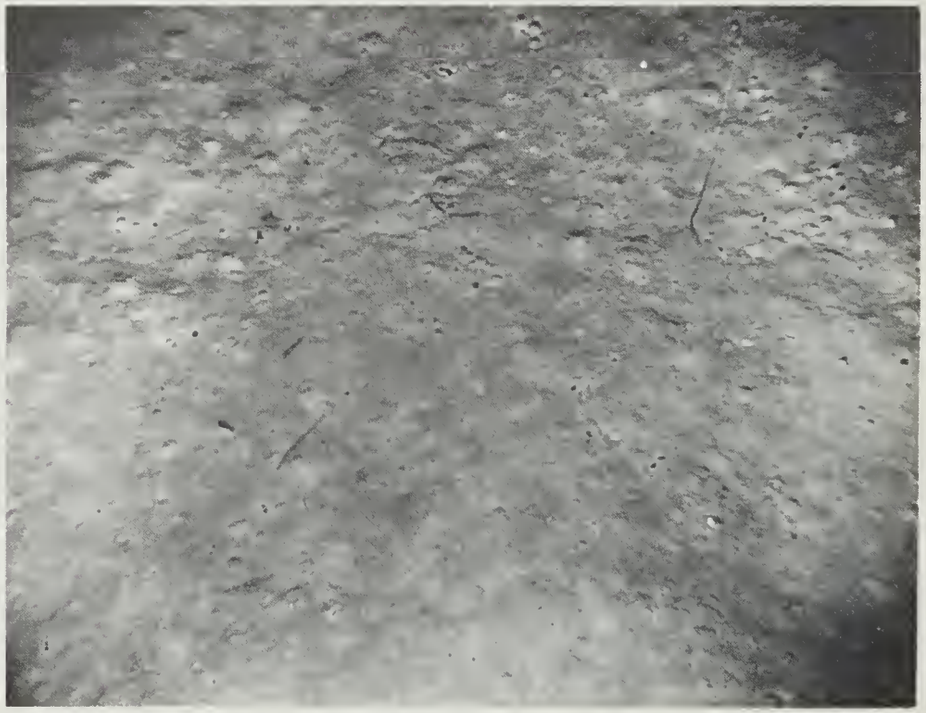
K14-1



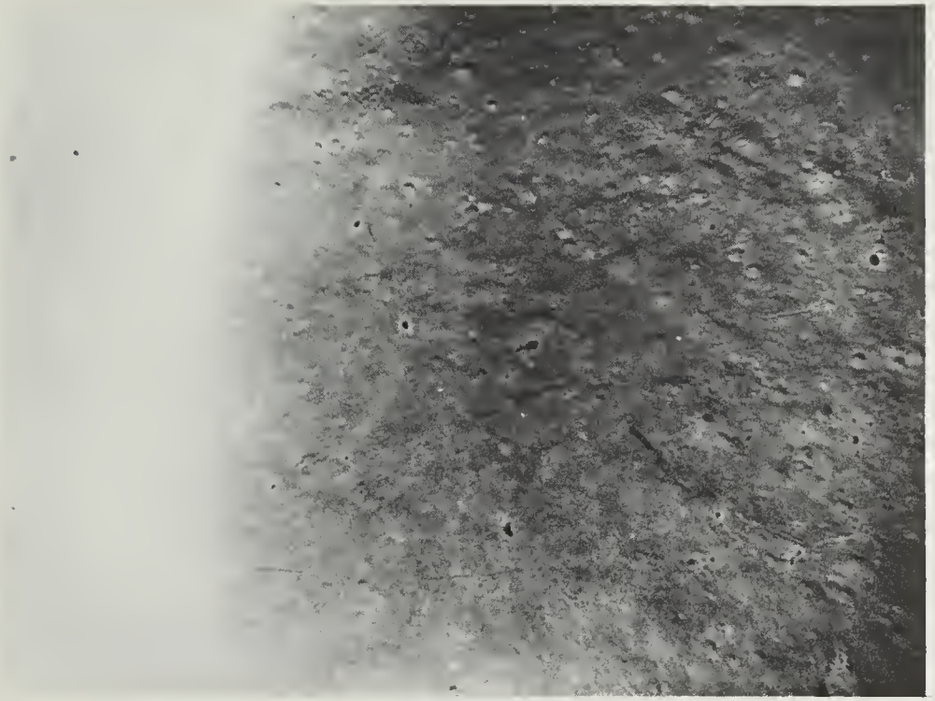
K14-2



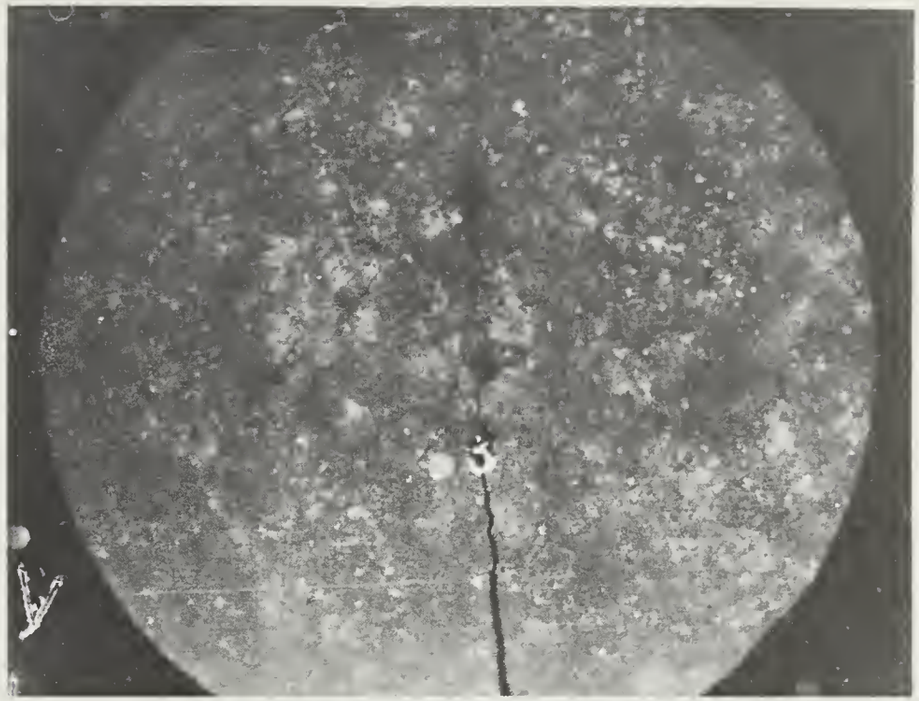
K14-3



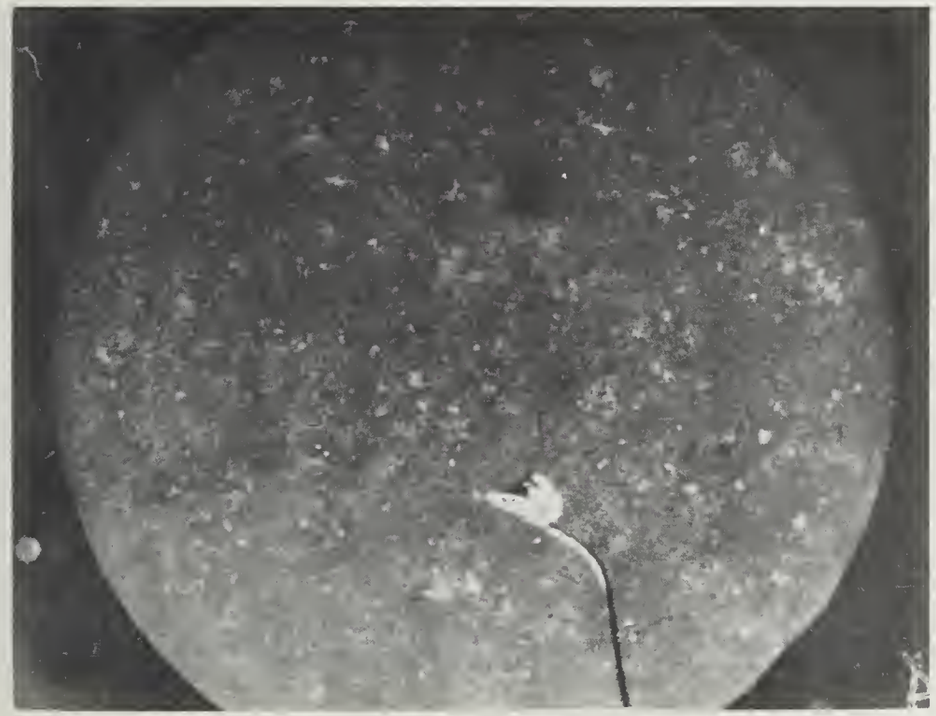
K 14-4



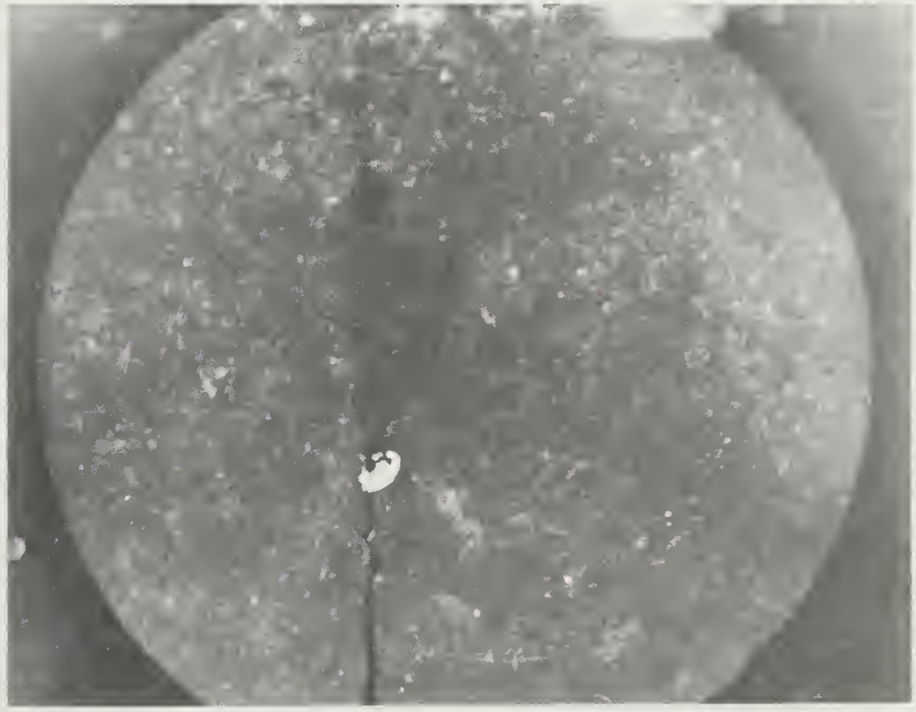
K14-5



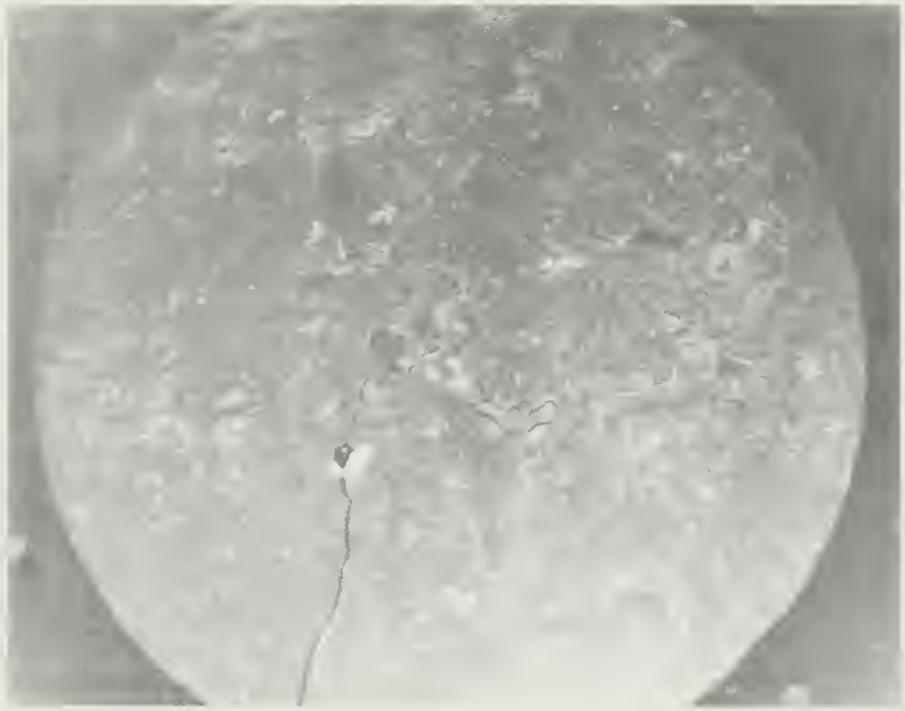
K14.1-1



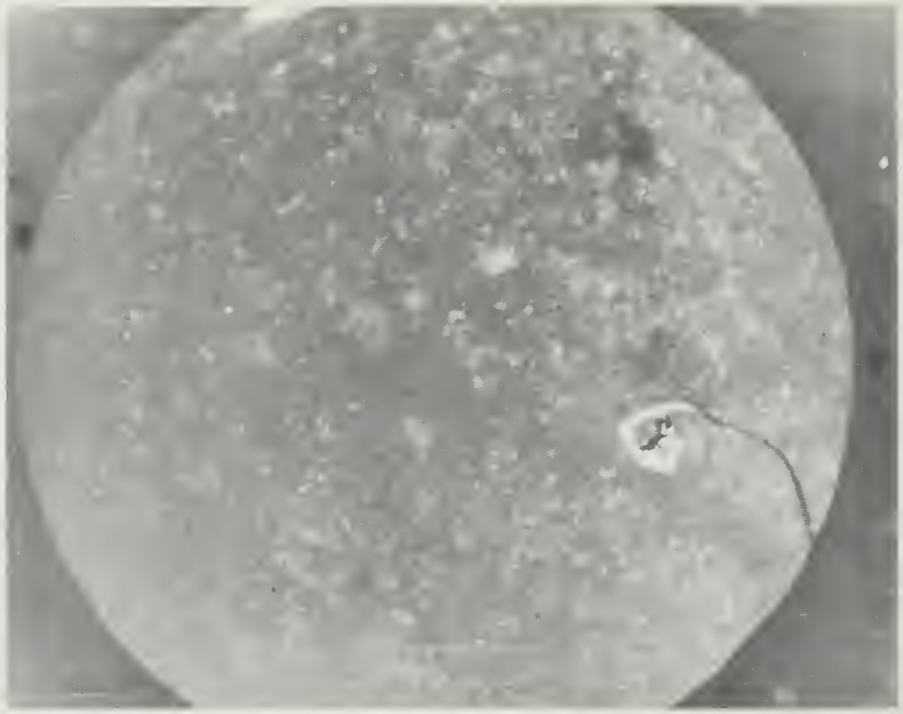
K14.1-2



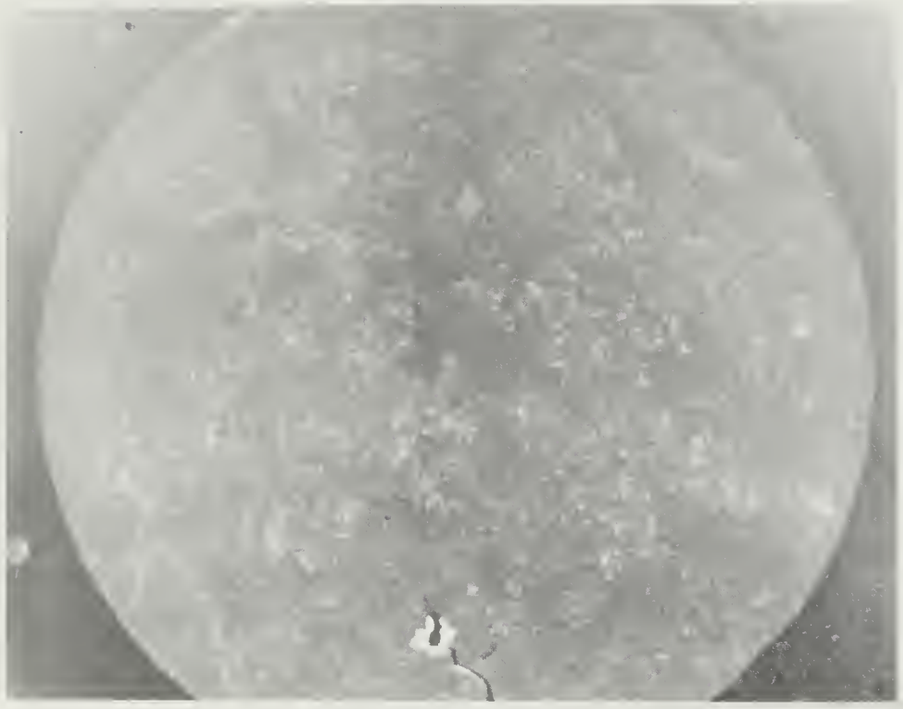
K14.1-3



K14.1-4



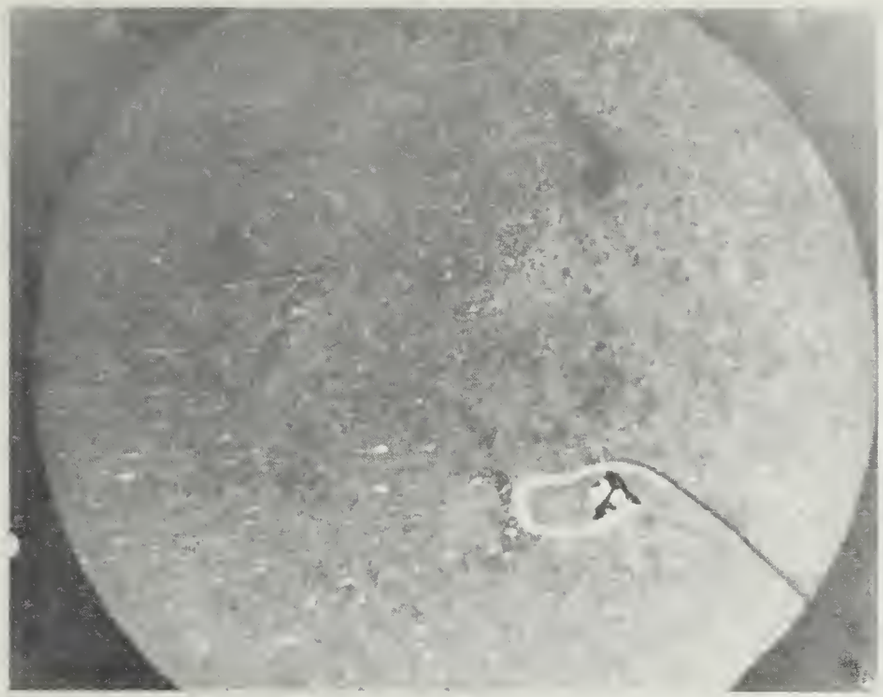
K14.1-5



K14.1-11



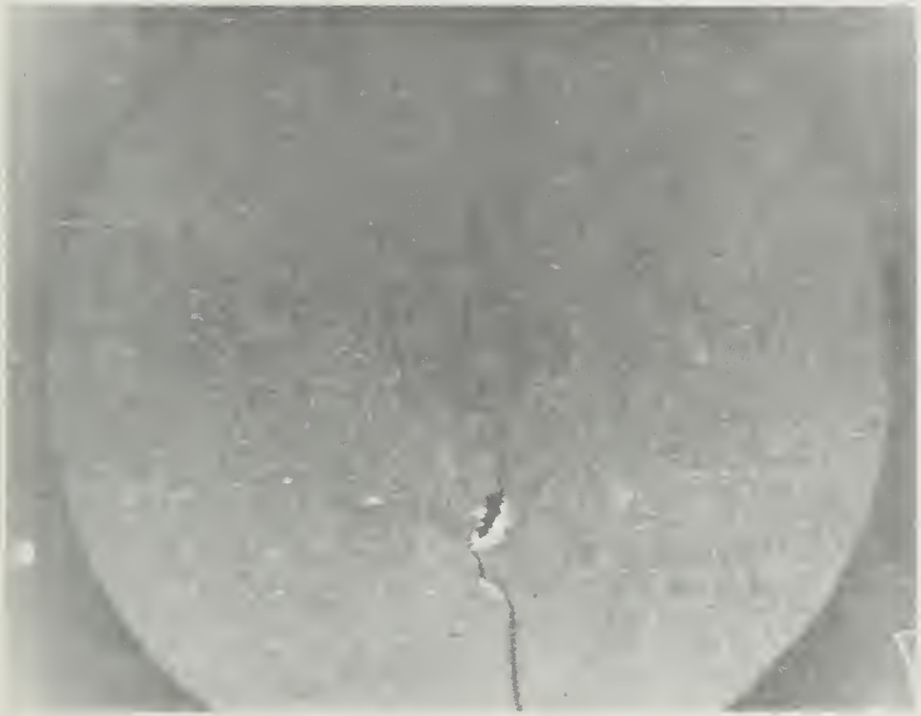
K14.1-12



K 15—1



K 15—4



K15-6



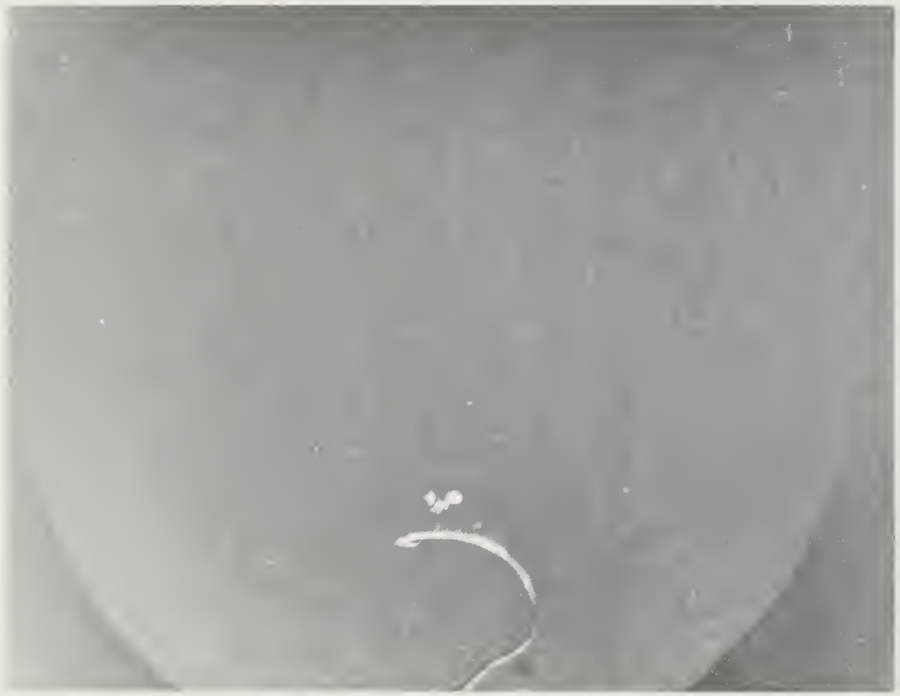
K15-23



K16-2



K16-11



K18-2



K19-1



K20-1



K21-2



K100-2



K100-4



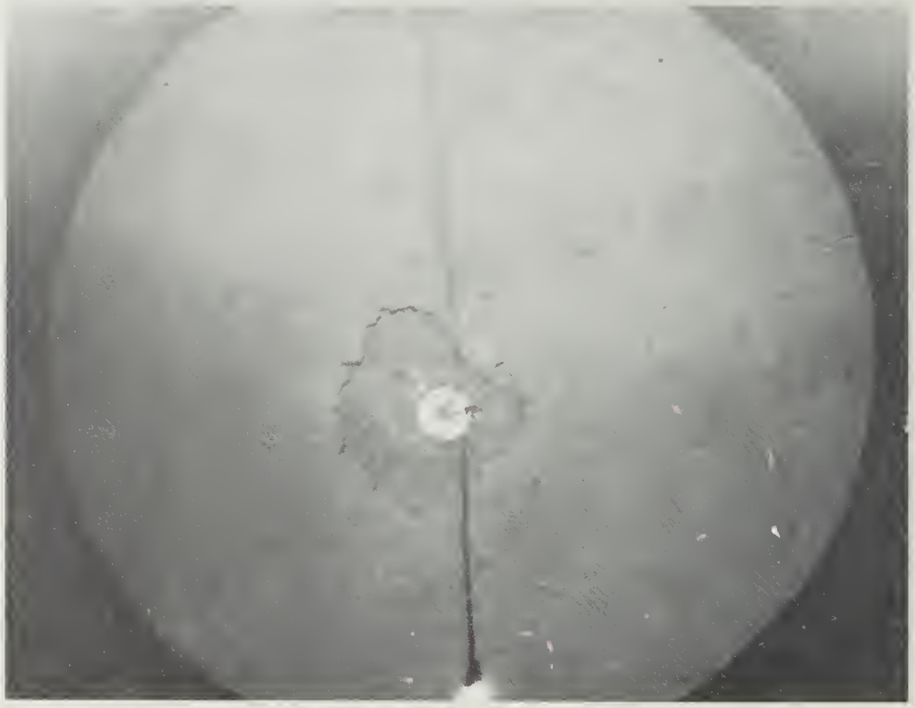
K100-5



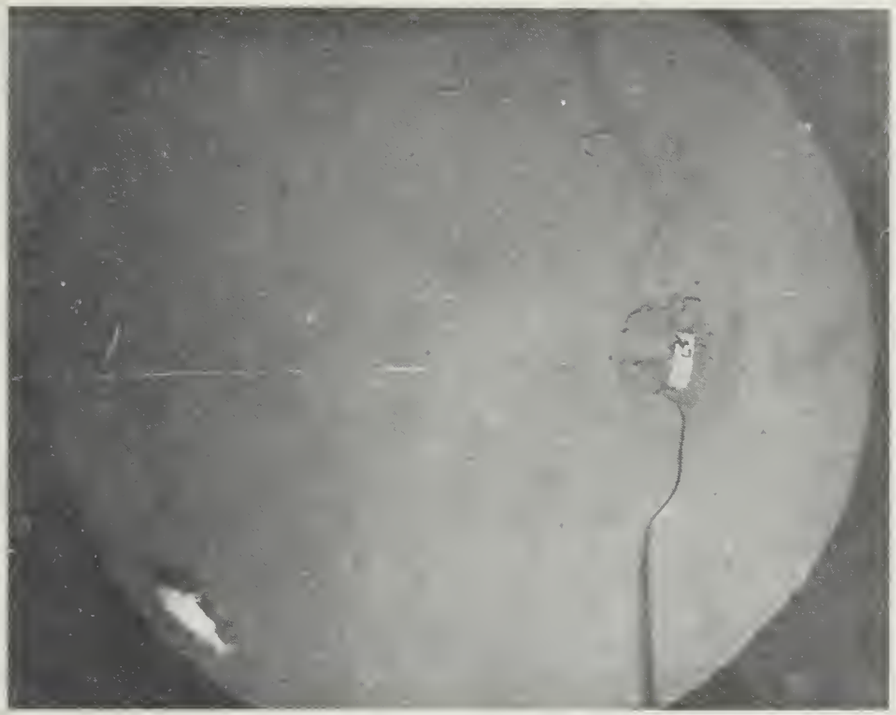
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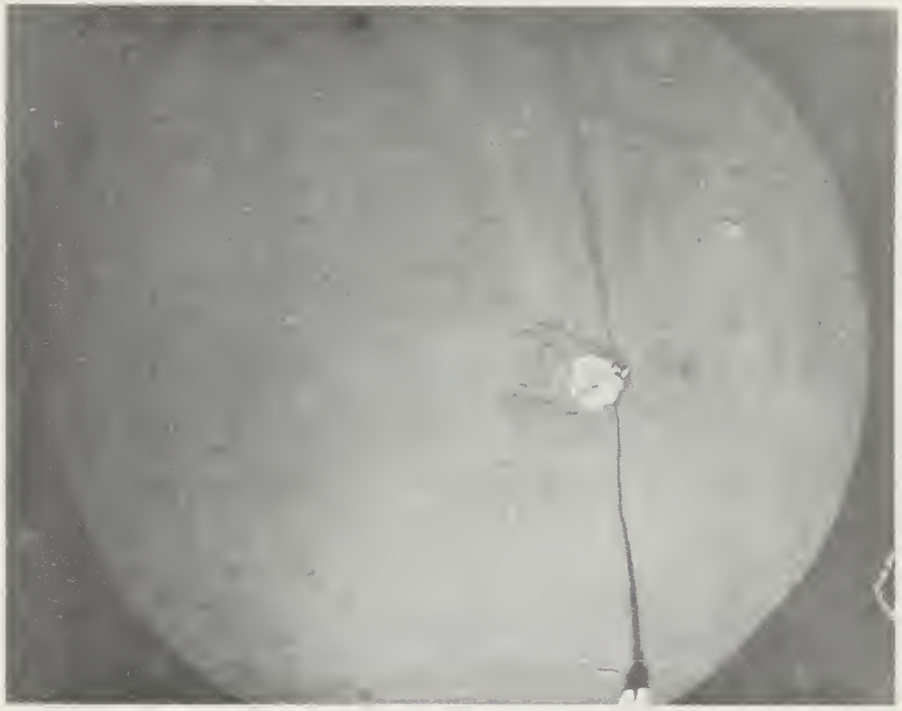
K100-7



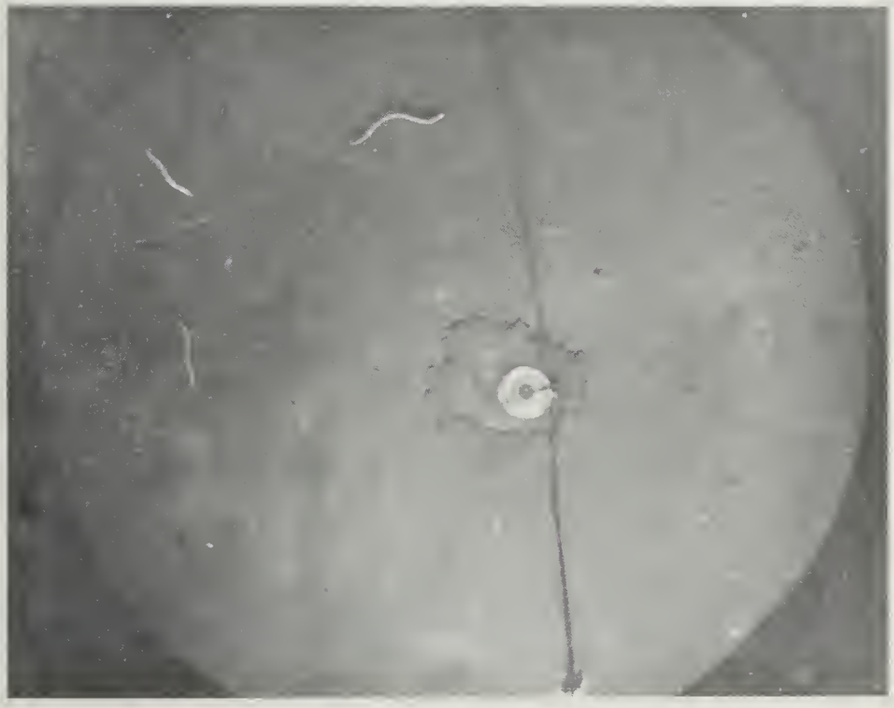
K100-8



K100-9



K100-10



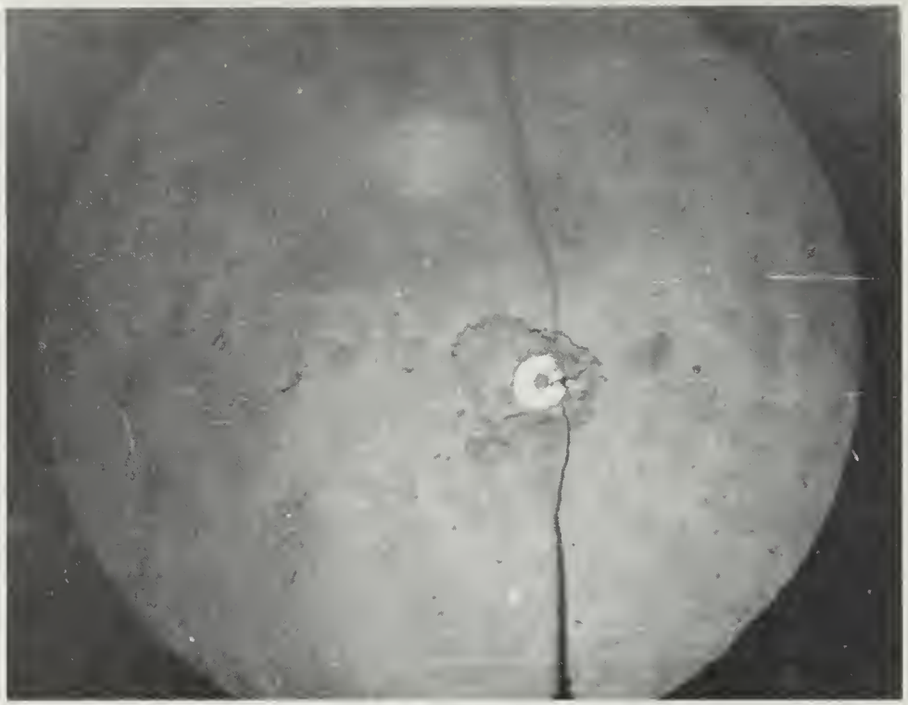
K100-11



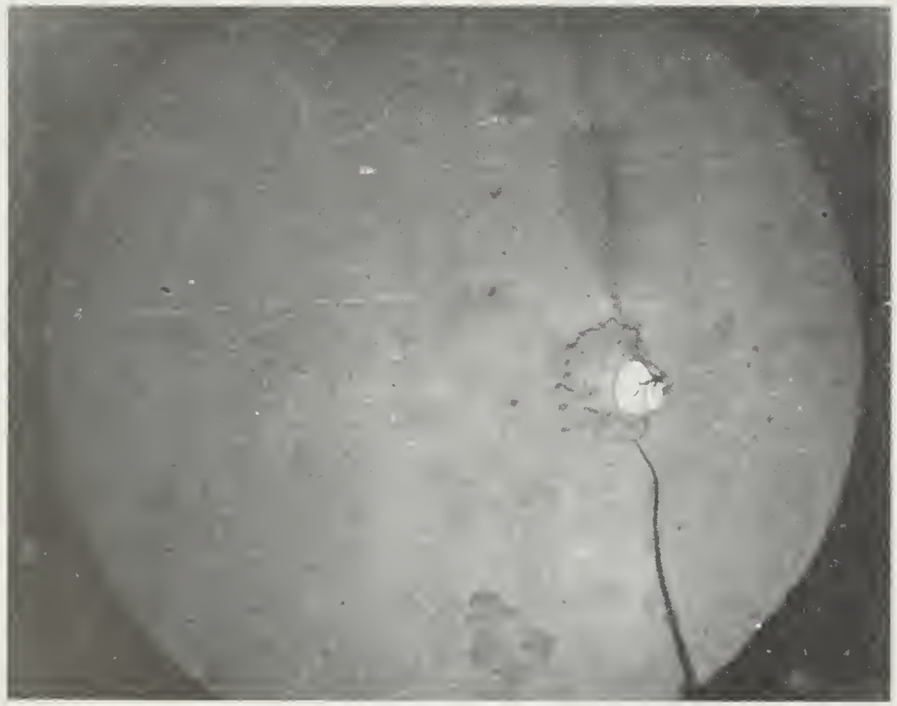
K100-12



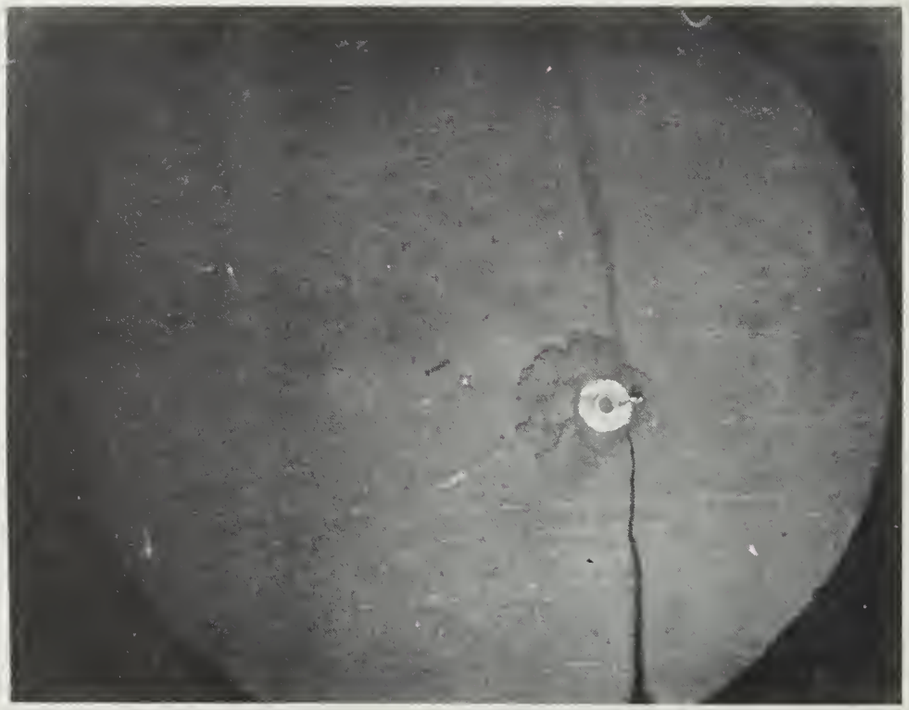
K100-13



K100-14



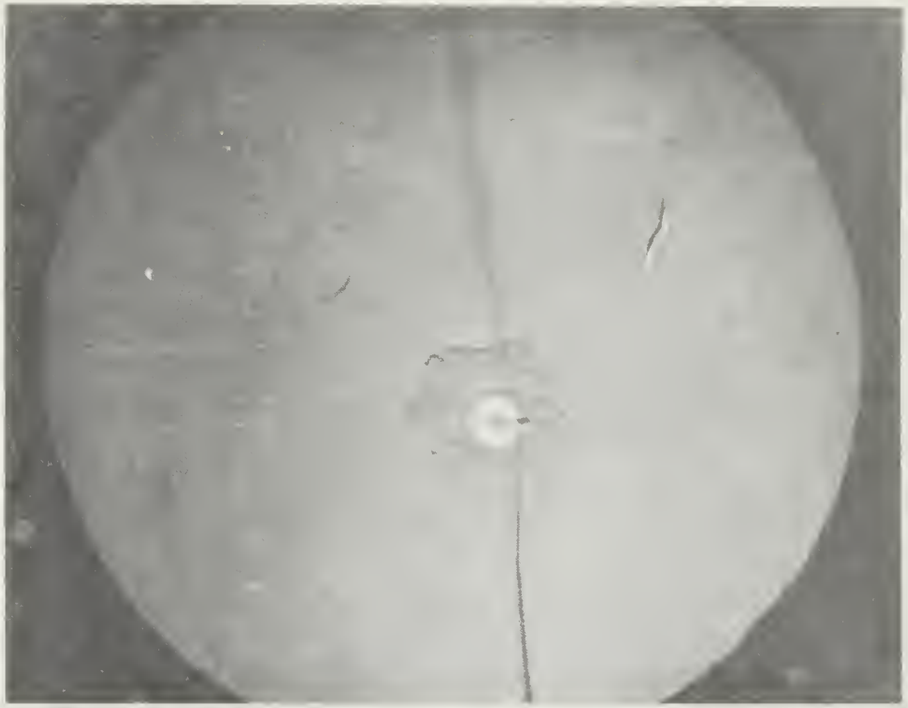
K100-15



K100-17



K100-18



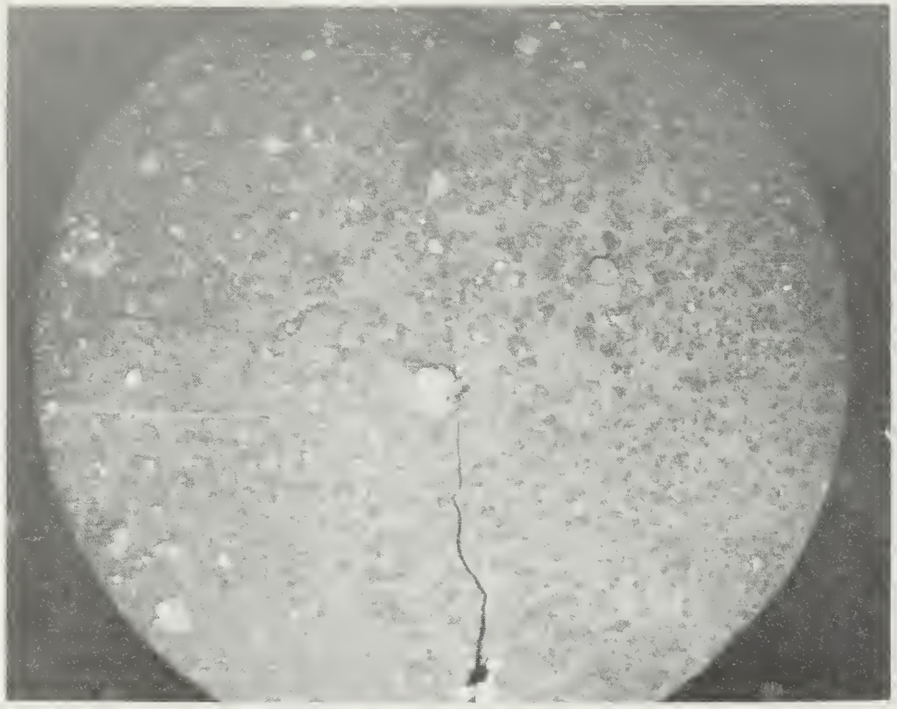
K100-19



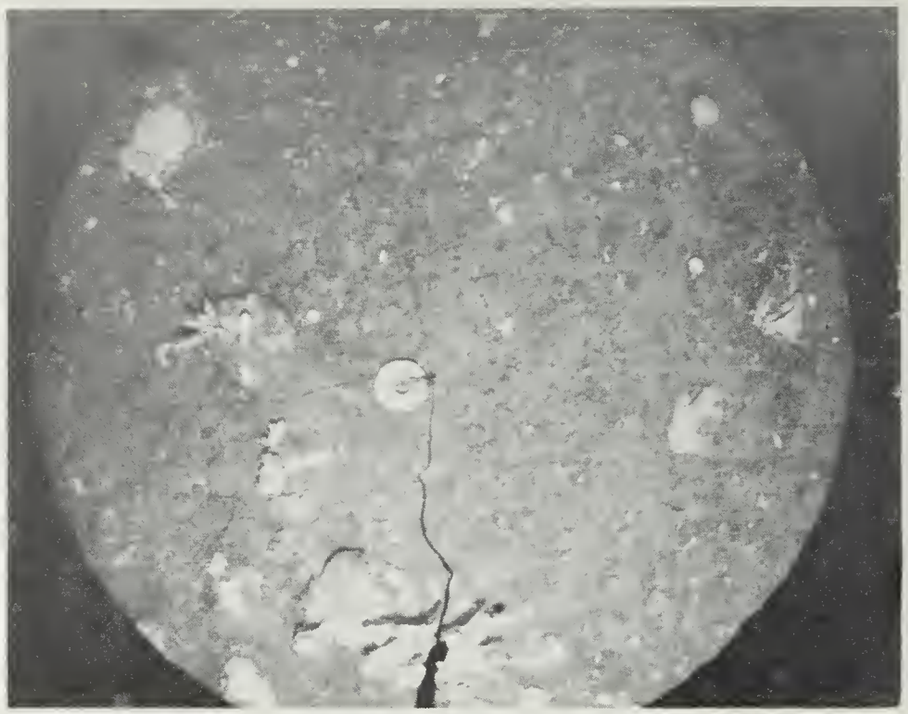
K101-1



K101-2



K101-3



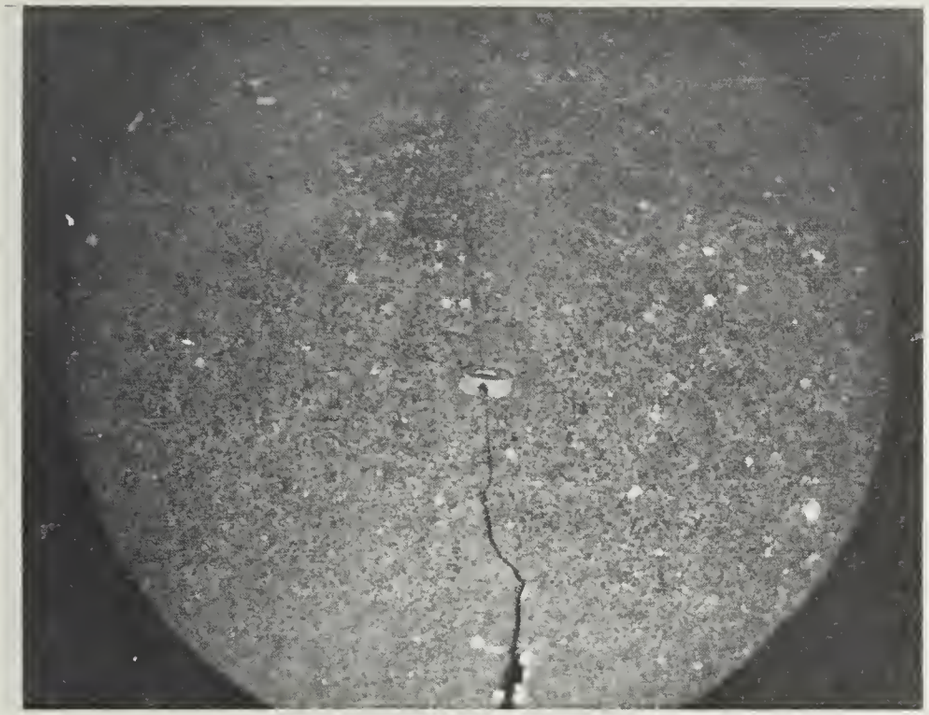
K101-4



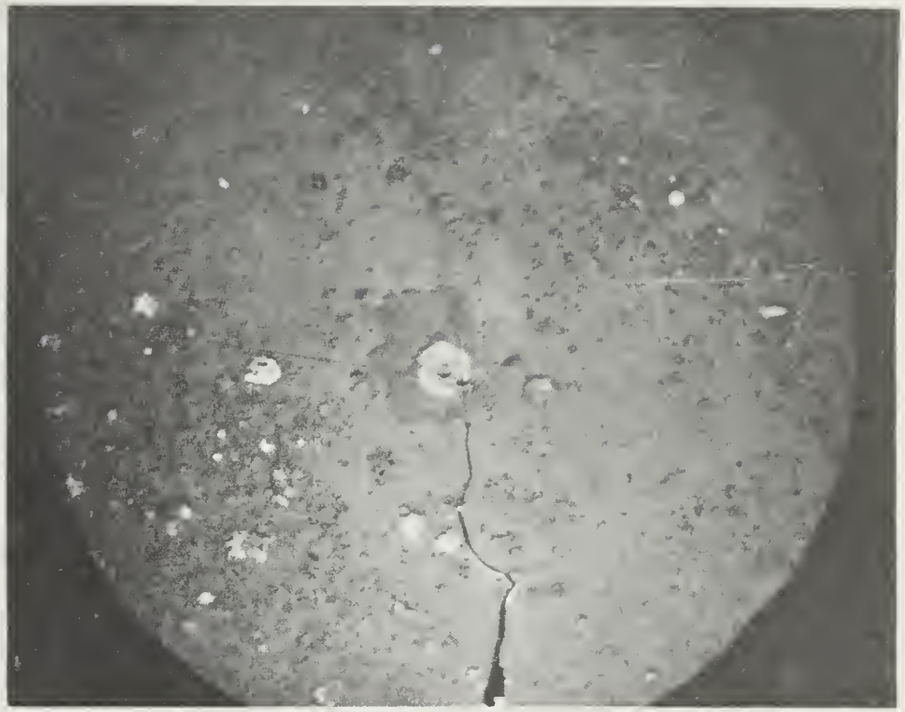
K101-5



K101-6



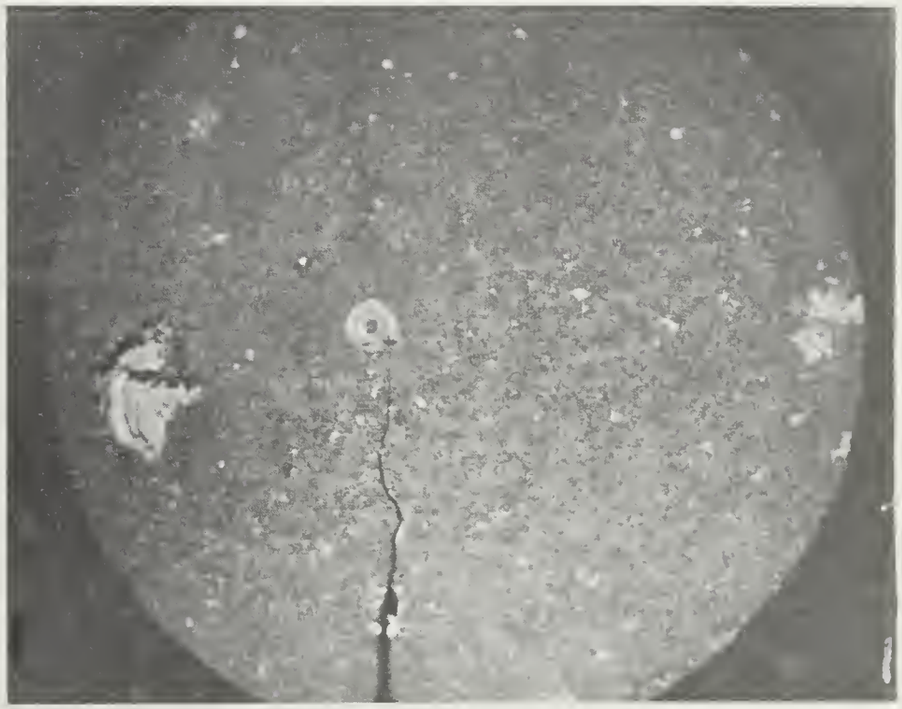
K101-7



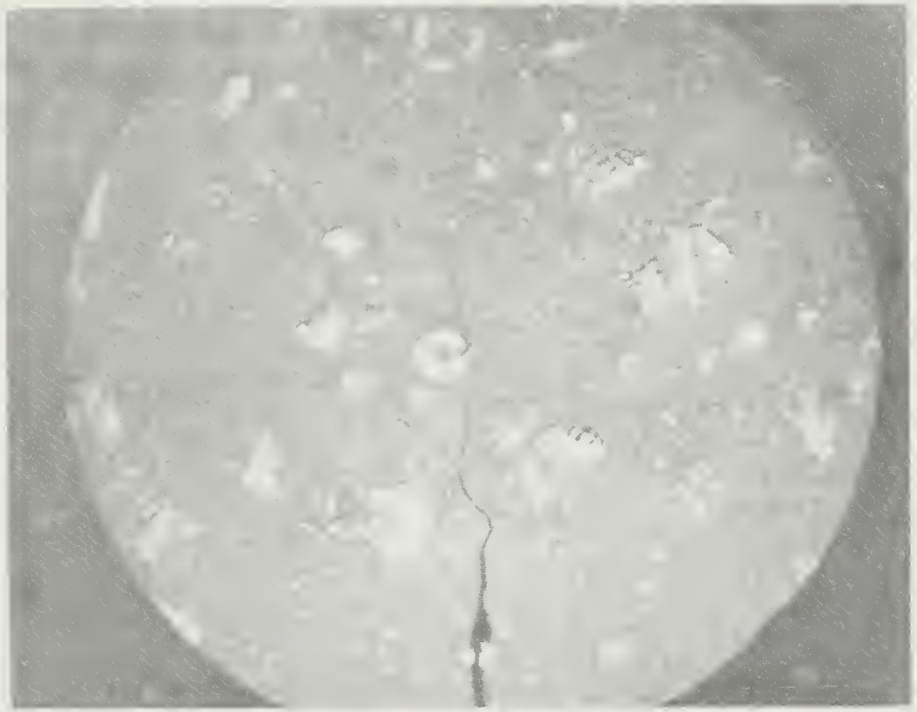
K101-8



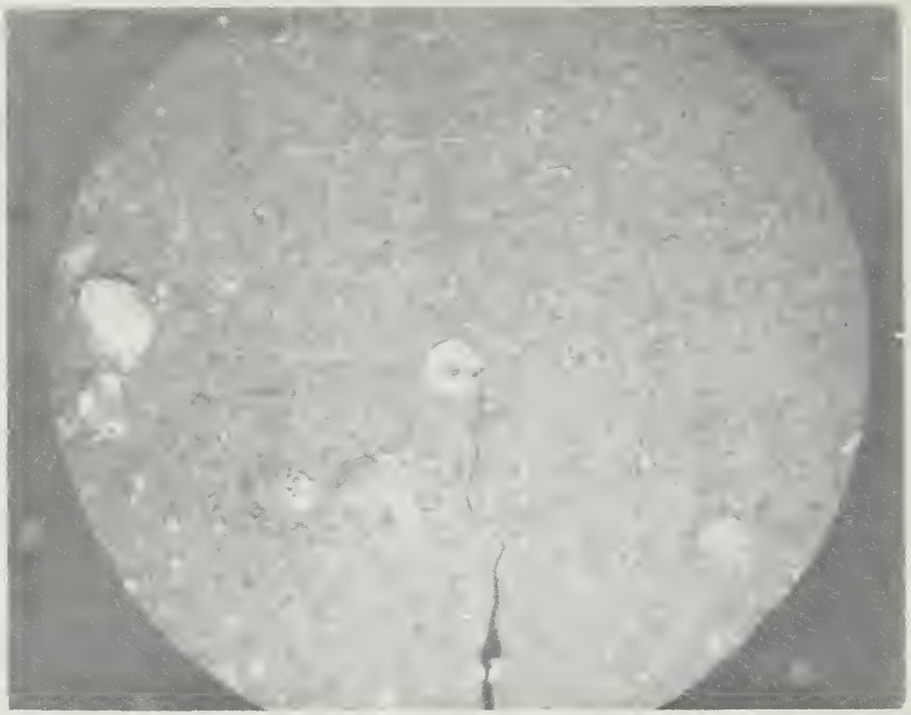
K101-9



K101-10



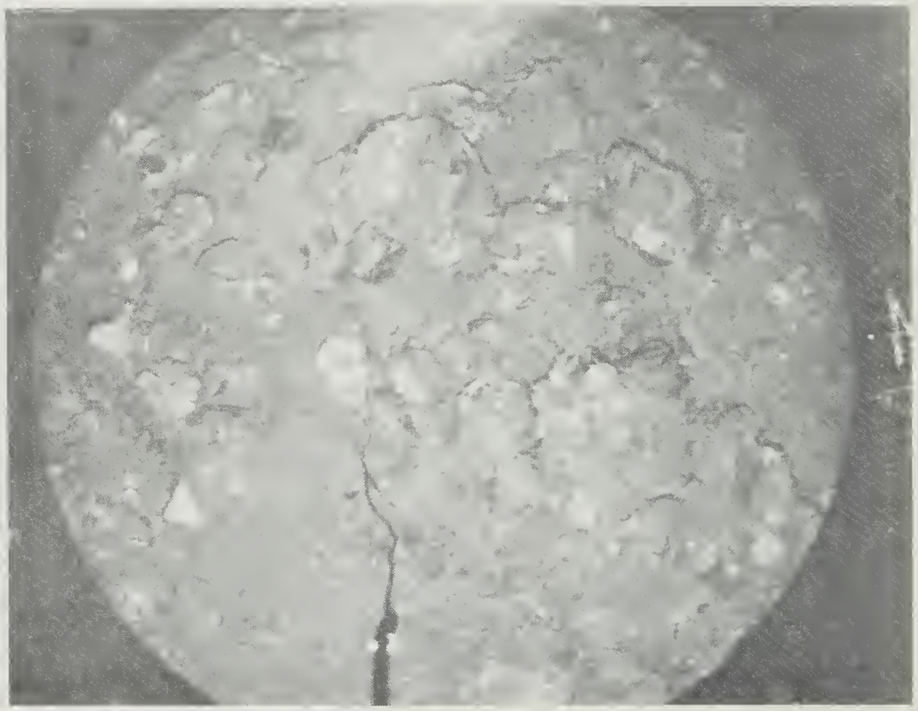
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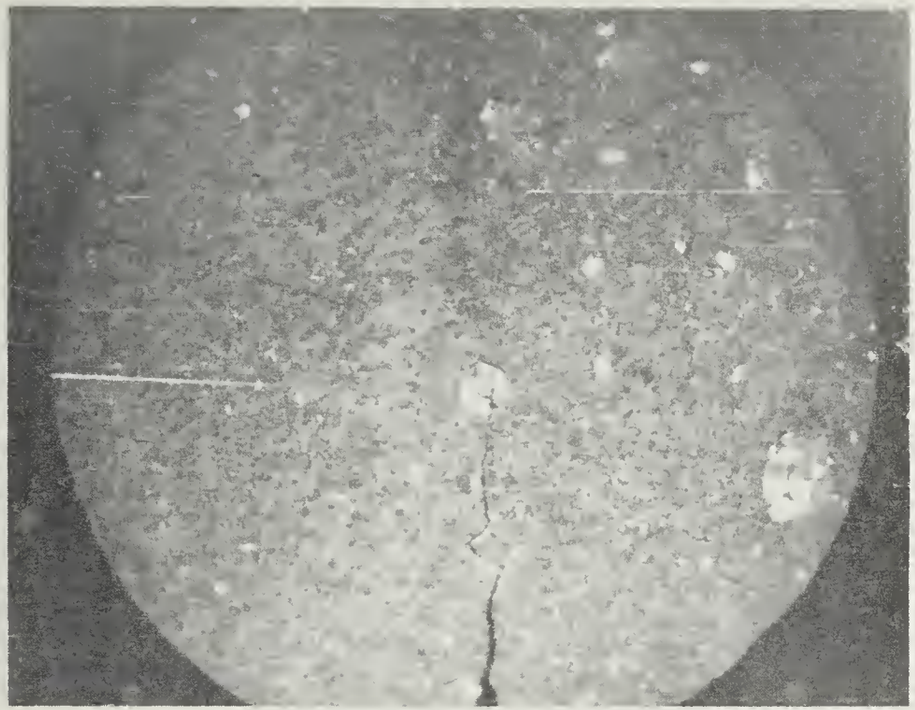
K101-12



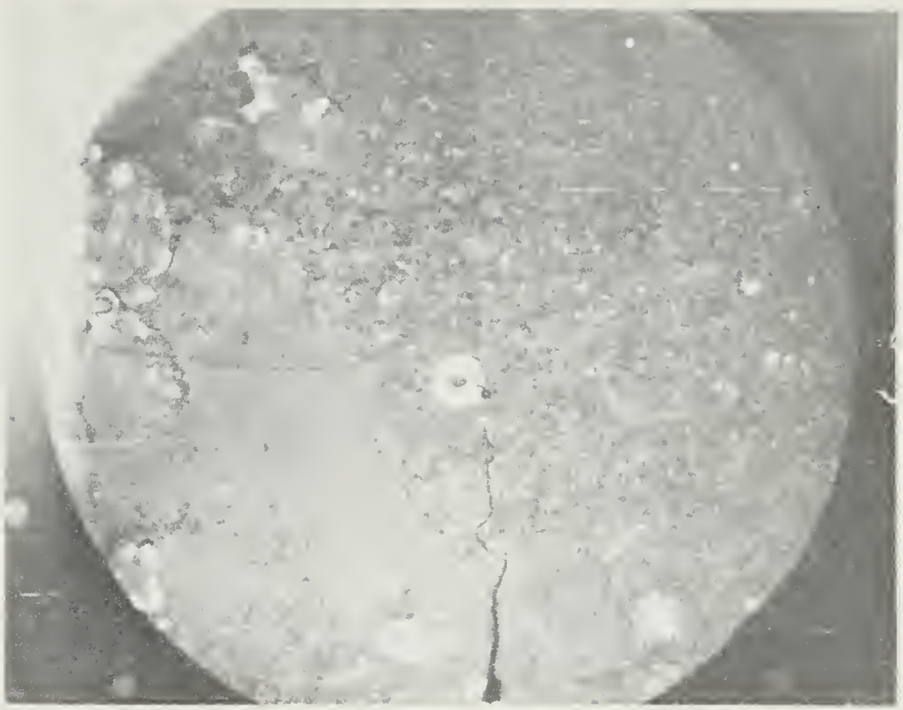
K101-13



K101-14



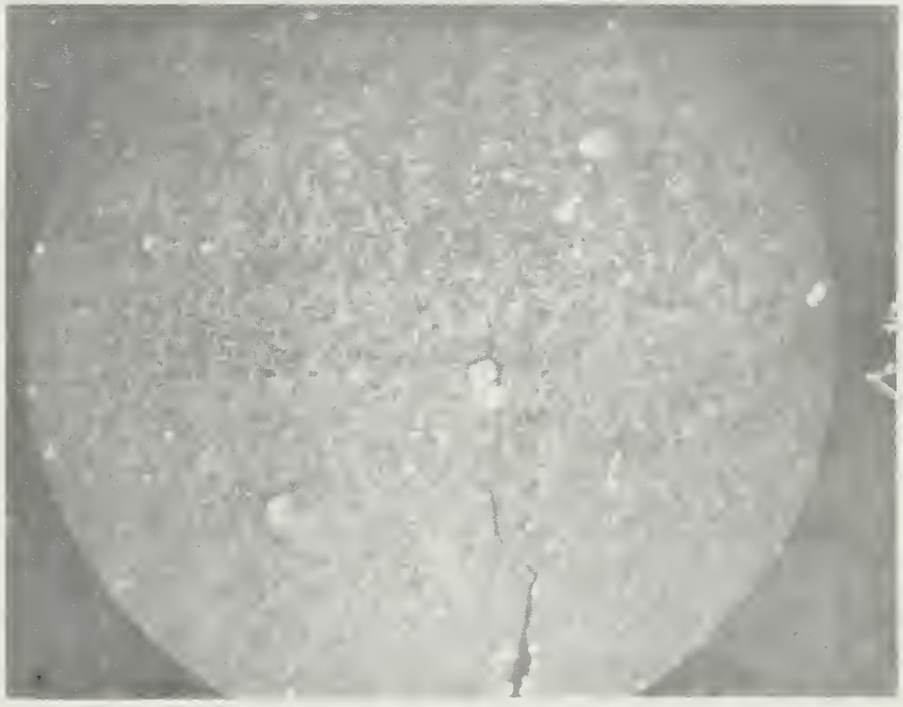
K101-15



K101-16



K101-17



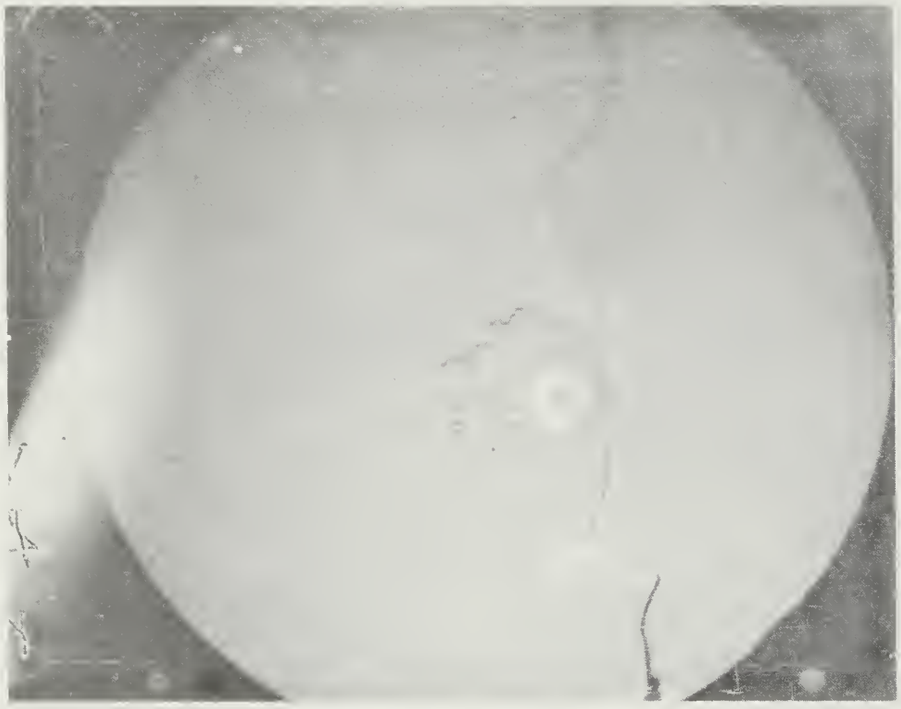
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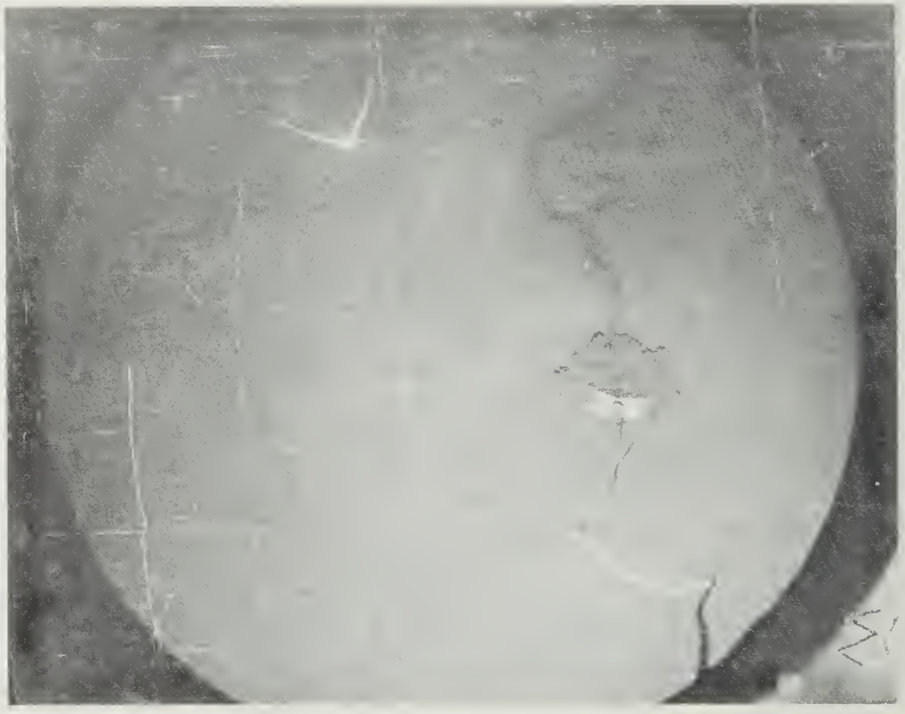
K101-20



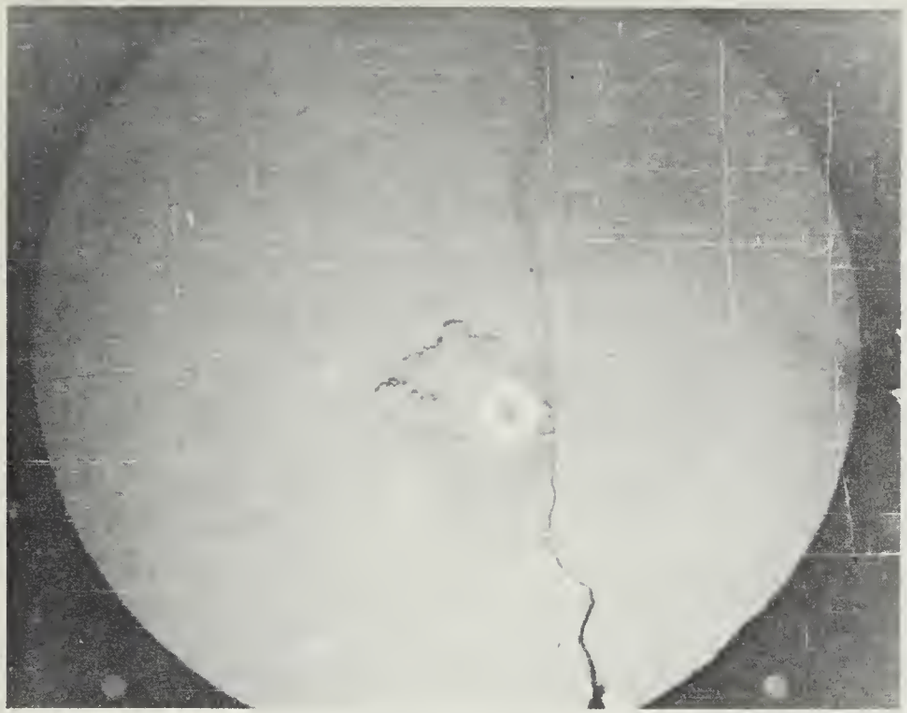
K103-3



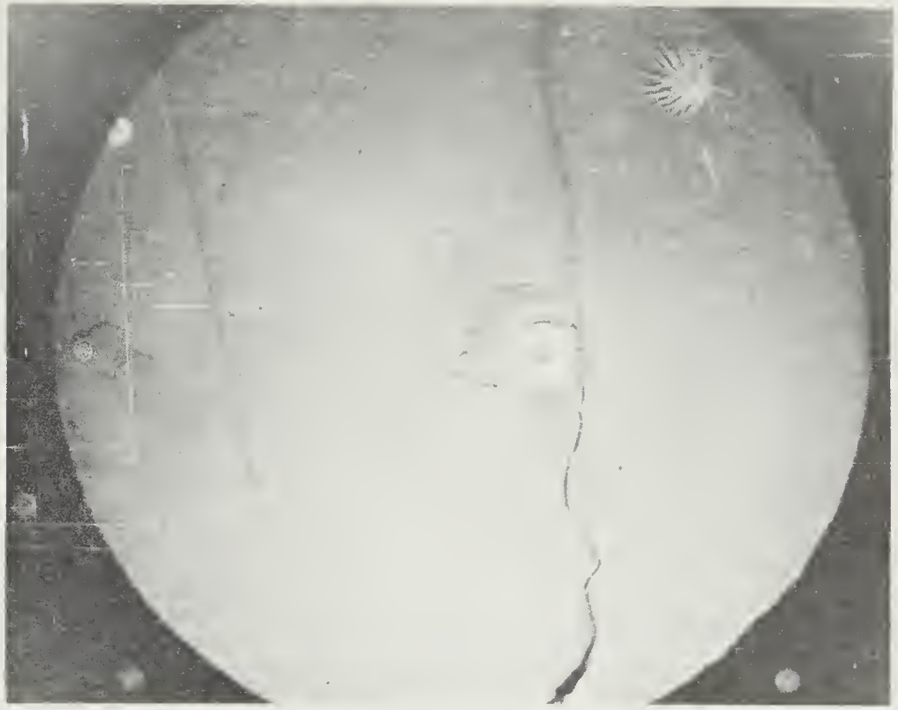
K103-4



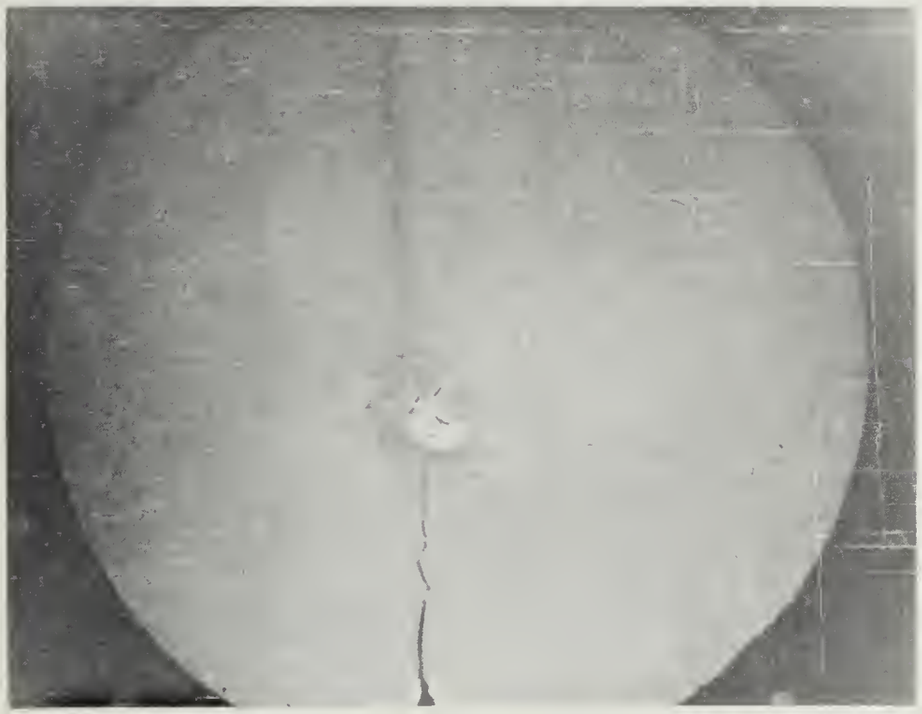
K103-5



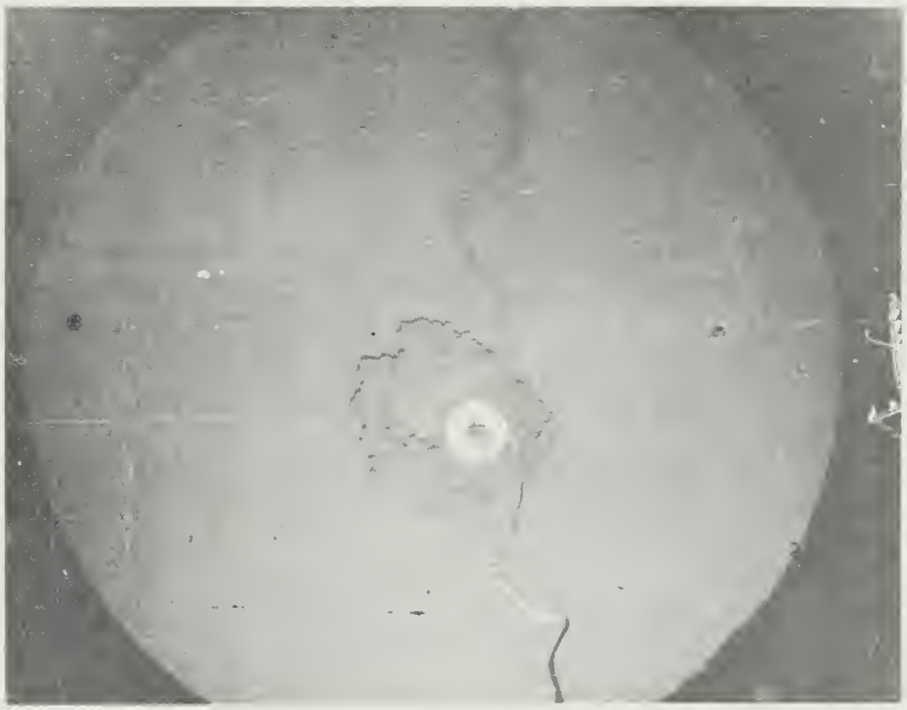
K103-6



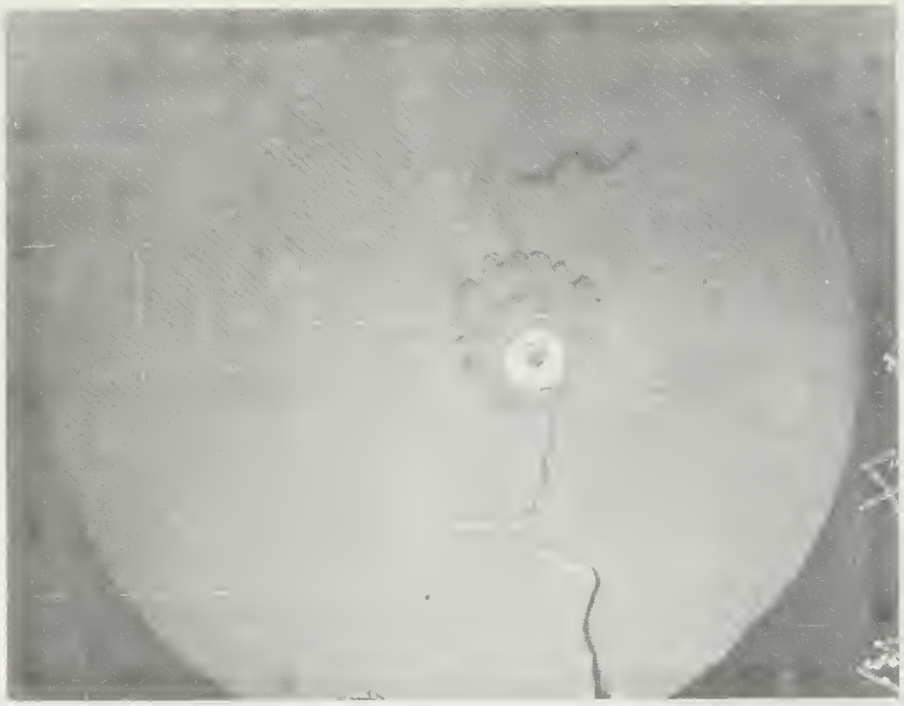
K103-7



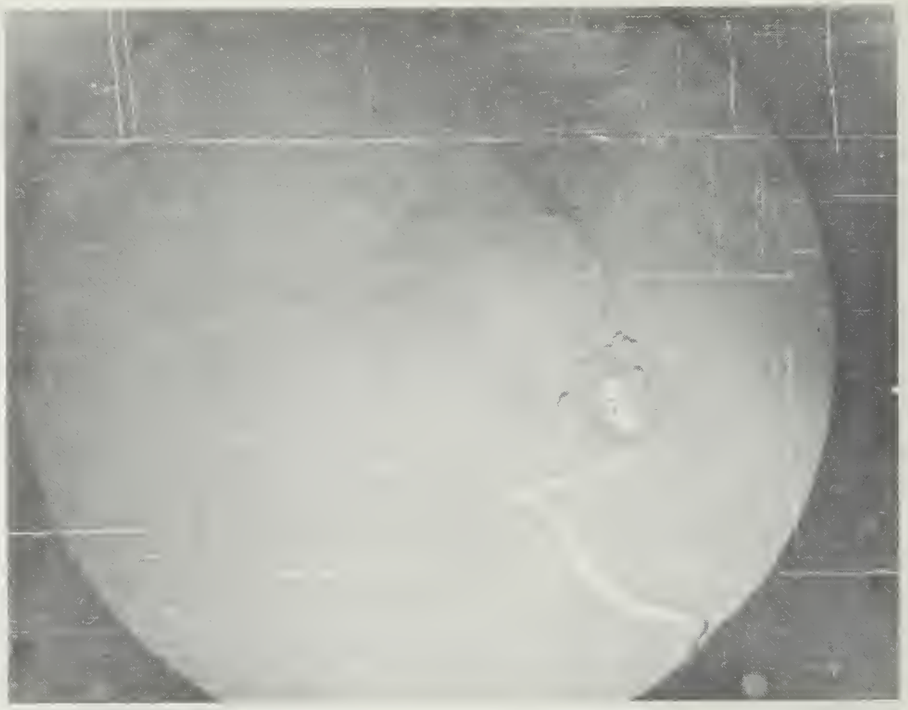
K103-8



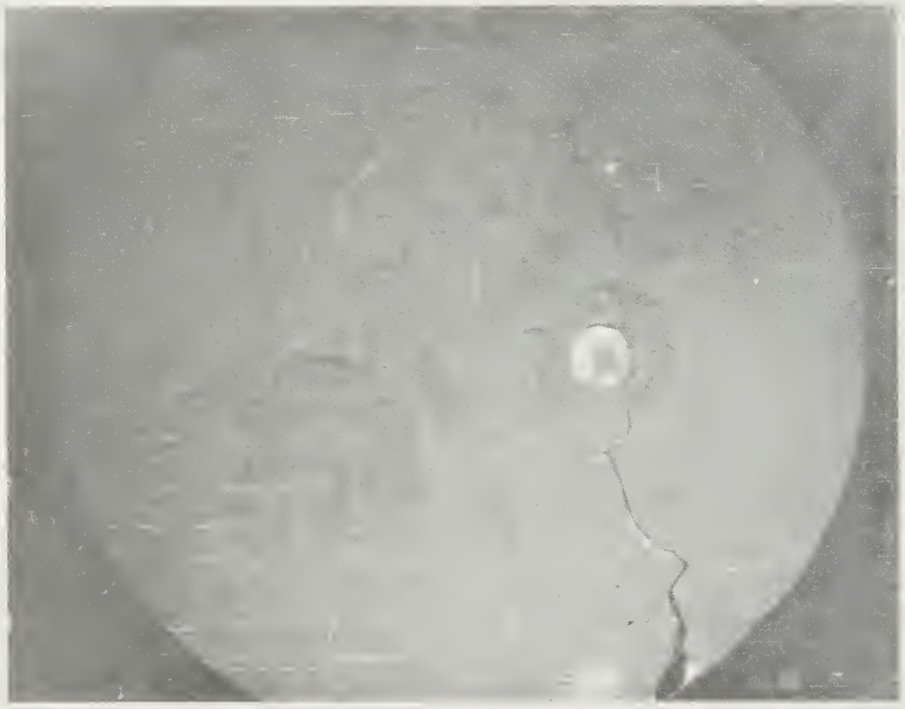
K103-9



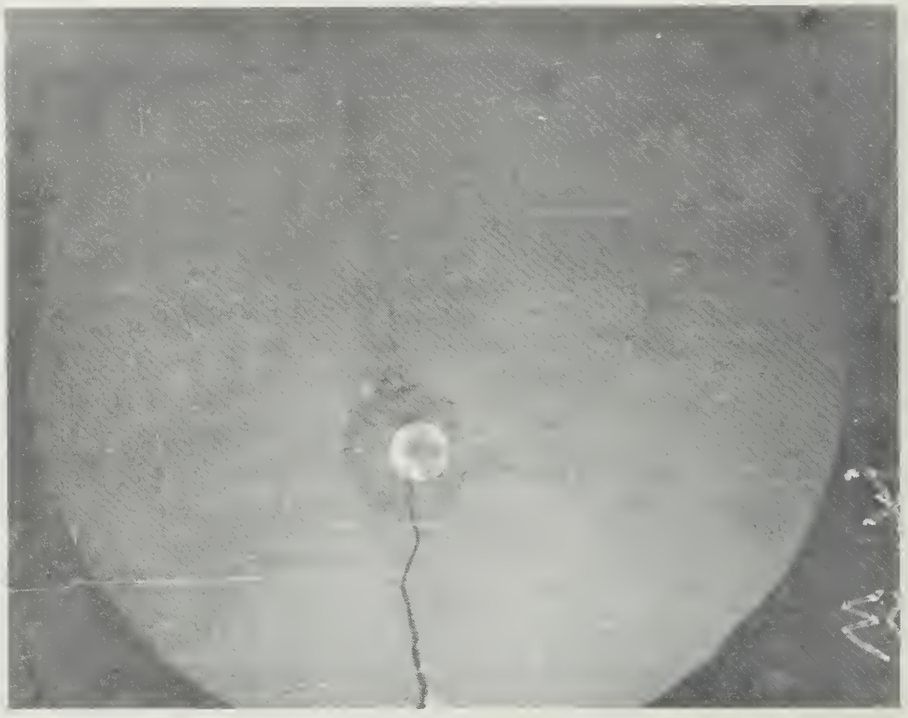
K103-10



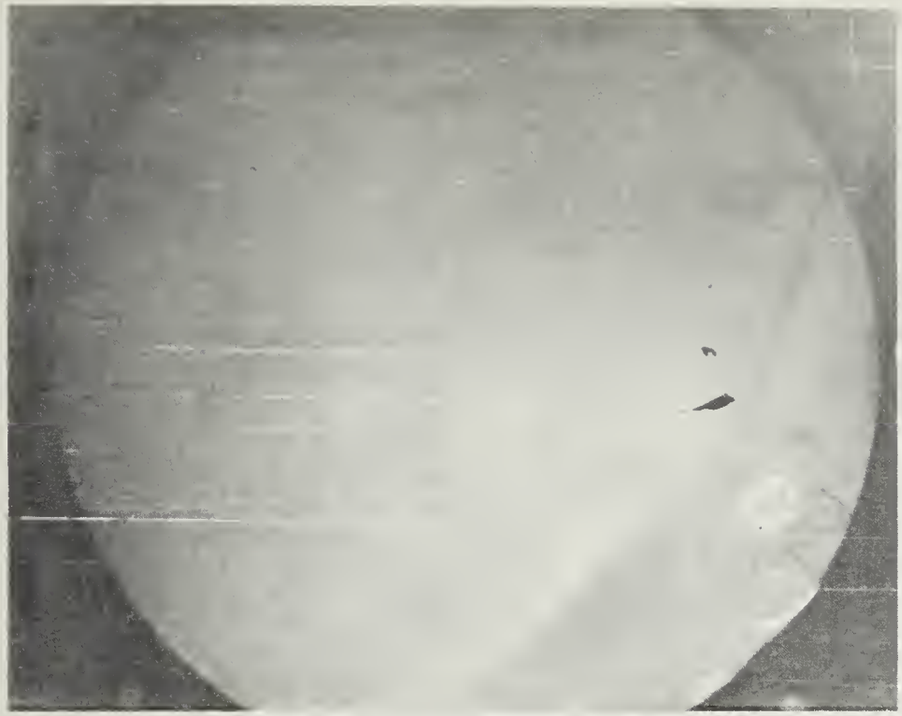
K103-12



K103-14



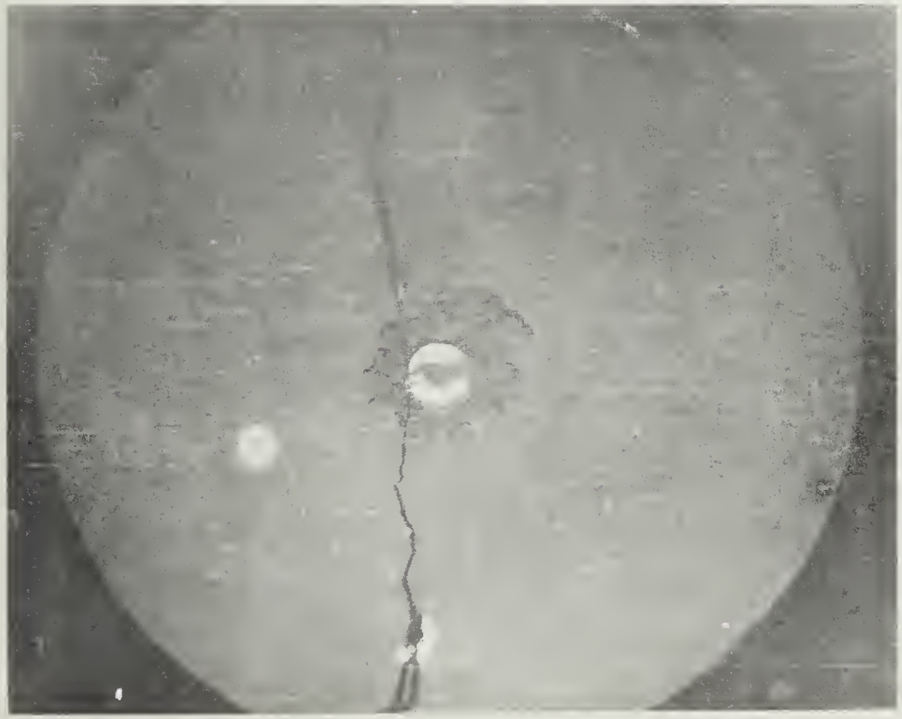
K103-15



K103-16



K103-17



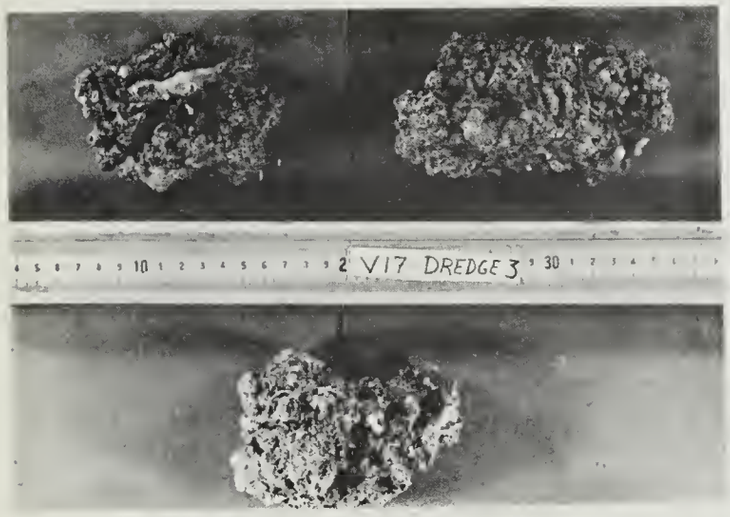
K103-18

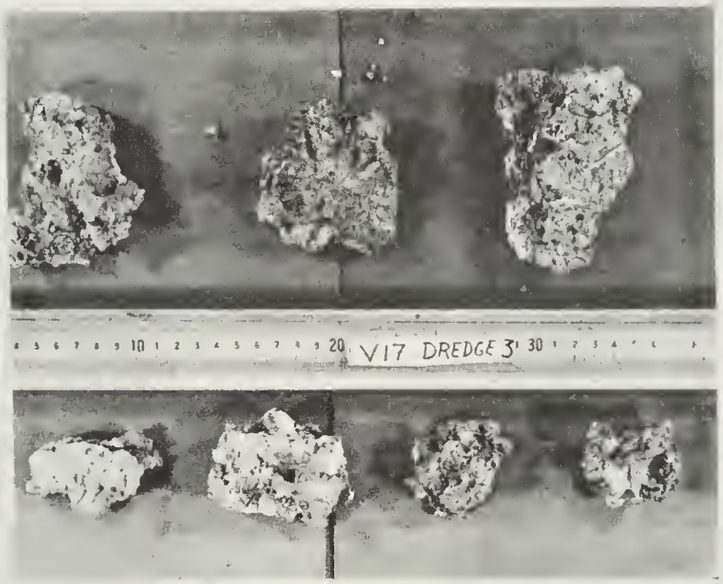
VEMA - 17 DREDGE

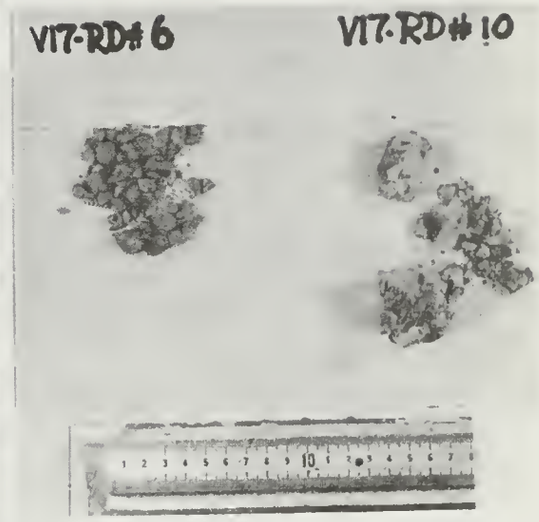
Dredge #	Stn #	Date 1960	Position Lat.	Long.	Msdn Sq.	TIME Over	Hit	Free	Sur*	PDR DEPTH FMS Over	Hit	Free	Sur*	Amount Sample	Corr. Data
1	4	18 Dec	19°50'	67°24'	043	2123	2245	-	-	3943	4030	-	-	Lost	C3, dredge lost
2	5	20 Dec	19°53'	68°08'	043	1417	1547	1617	1835	3450	3480	3470	3385	0	C4
		1961													
3	9	1 Jan	25°39'	84°09'	081	0837	0841	0914	0919	80	80	80	80	-	C7
4	10	3 Jan	25°20'	84°31'	081	1442	1457	1525	1556	523	520	530	510	0	C8
5	11	4 Jan	24°33'	86°51'	081	0348	0508	0518	0610	1150	1050	1025	1000	0	C9
6	12	5 Jan	23°04'	90°46'	082	1430	1457	1534	1609	1150	1200	1030	1720	A*	C10, K4
7	13	6 Jan	24°22'	91°36'	082	0919	0952	1002	1123	1982	1983	1982	1981	0	C11
8	16	8 Jan	26°30'	94°37'	082	0812	0837	0852	0921	1012	1025	1052	1077	0	C13, K6
9	17	13 Jan	27°36'	94°11'	082	2116	2129	2159	2210	410	405	418	418	0	C14
10	35	7 Feb	17°01'	84°44'	045	0945	1008	-	1100	1285	1328	-	1415	1 gal	C31
11	38	8 Feb	18°22'	89°00'	045	0952	1030	1047	1215	2090	1890	1880	1620	8 oz.	C33
12	165	13 Jun	44°23'	59°53'	449	1655	1656	1742	1745	99	100	142	143	B*	
13	167	19 Jun	40°34'	55°10'	449	0240	0316	0330	0340	1460	1442	1274	1260	0	
14	168	19 Jun	38°58'	55°17'	413	1403	1412	1426	1431	332	327	326	330		
15	169	19 Jun	38°13'	55°19'	413	1850	1905	1911	1915	118	135	148	160	0	
16	170	19 Jun	38°13'	55°19'	413	1938	1945	2015	2020	204	201	181	180	0	
17	170	19 Jun	38°13'	55°19'	413	2045	2052	2100	2105	244	244	247	246	0	T101
18	198.4	12 Aug	44°14'	59°03'	150	1530	1535	1552	1557	99	100	103	103	A*	
19	198.5	12 Aug	44°02'	59°02'	150	1741	1751	1755	1840	440	478	478	438	0	
20	201.1	13 Aug	43°28'	60°04'	151	1630	-	-	1702	180	180	-	198	A*	
21	203	14 Aug	42°56'	61°44'	151	1632	1639	-	1650	224	240	-	249	0	
22	203.1	14 Aug	42°58'	61°51'	151	1835	1841	-	1910	172	189	-	210	A*	
23	209.1	20 Aug	44°27'	57°14'	150	1055	1059	1110	1110	167	122	144	144	A*	
24	210	20 Aug	44°26'	57°15'	150	1132	1136	1149	1149	159	149	143	143	A*	

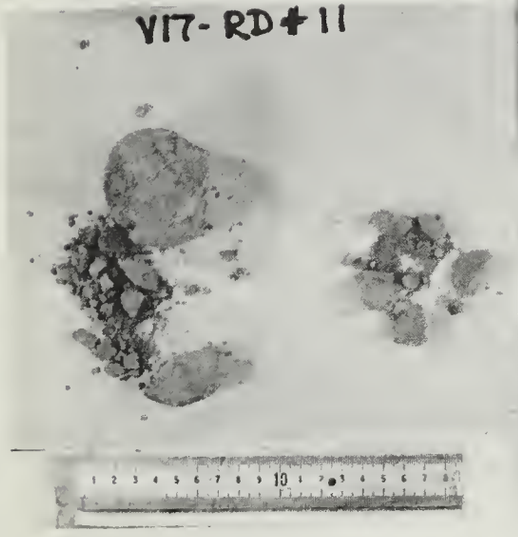
VEMA - 17 DREDGE

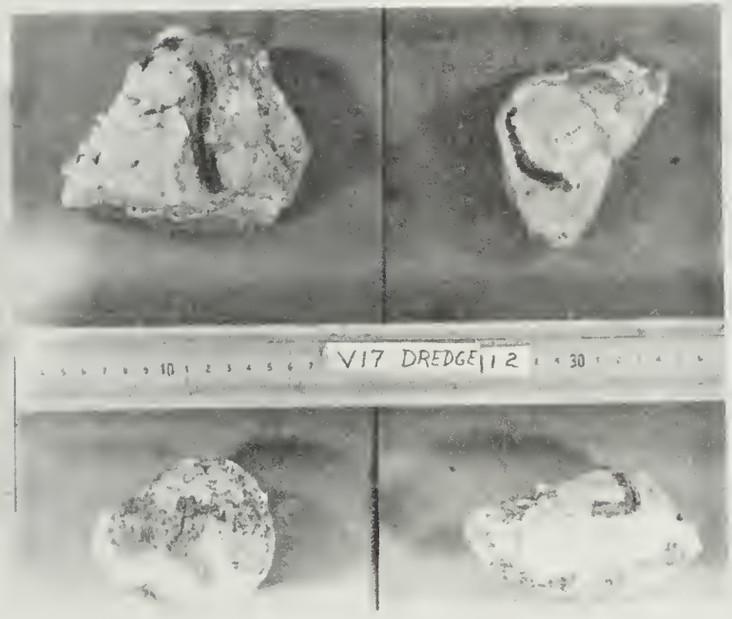
Dredge #	Stn #	Date 1961	Position Lat.	Long.	Msdn Sq.	TIME Over	TIME Hit	TIME Free	TIME Sur*	PDR DEPTH FMS Over	PDR DEPTH FMS Hit	PDR DEPTH FMS Free	PDR DEPTH FMS Sur*	Amount Sample	Corr. Data
25	210.1	20 Aug	44°23'	57°18'	150	1252	1300	-	1354	205	247	-	367	A*	
26	210.2	20 Aug	44°24'	57°19'	150	1410	1415	1430	1435	257	195	193	205	A*	
27	210.3	20 Aug	44°39'	56°42'	150	1741	1745	1805	1809	212	213	213	213	A*	
28	210.4	20 Aug	44°50'	56°18'	150	2003	2010	2024	2028	201	200	199	199	0	
29	228.1	4 Sep	60°27'	48°31'	221	1838	1843	1852	1859	202	184	196	197	0	
30	231.1	10 Sep	54°47'	53°38'	186	0851	0857	-	0920	273	263	-	259	A*	
31	231.2	10 Sep	54°27'	54°08'	186	1246	1249	1306	1310	119	118	119	120	A*	
32	237	13 Sep	48°36'	59°43'	150	1256	1259	1317	1320	115	113	110	108	A*	K103
33	240.3	16 Sep	47°31'	62°59'	151	0205	0207	0211	0213	27	26	25	25	A*	

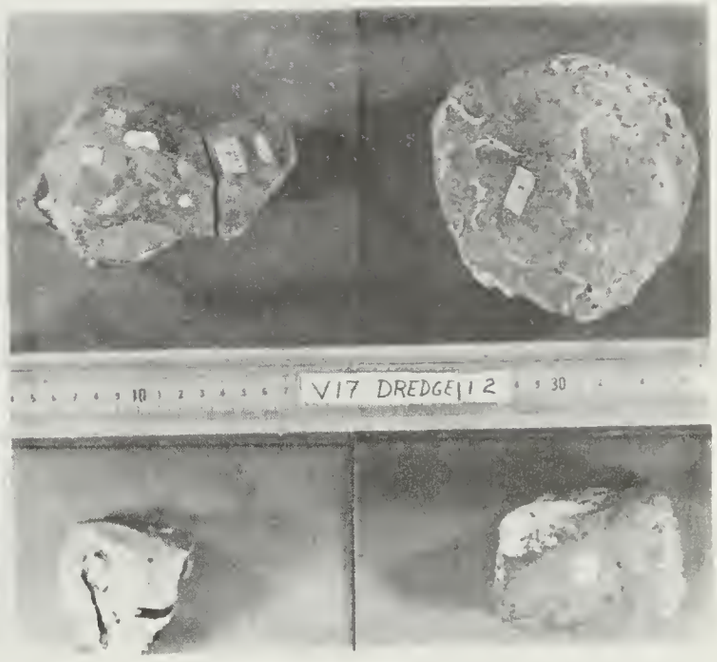

V17 DREDGE 3

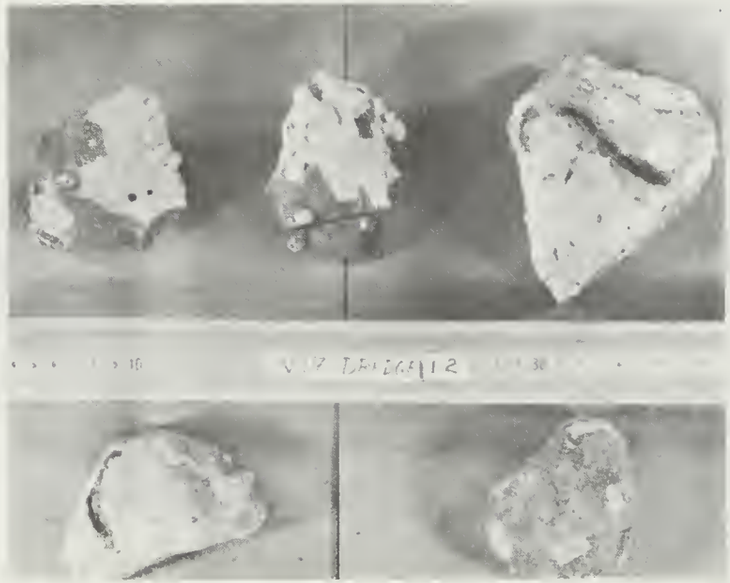

V17 DREDGE 3


V17-RD# 6
V17-RD# 10


V17- RD# 11


V17 DREDGE 12

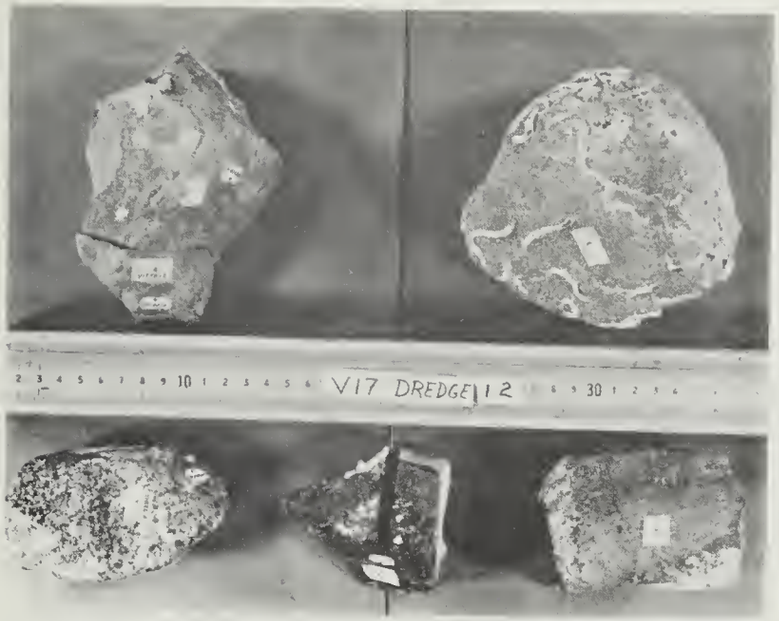

V17 DREDGE 12

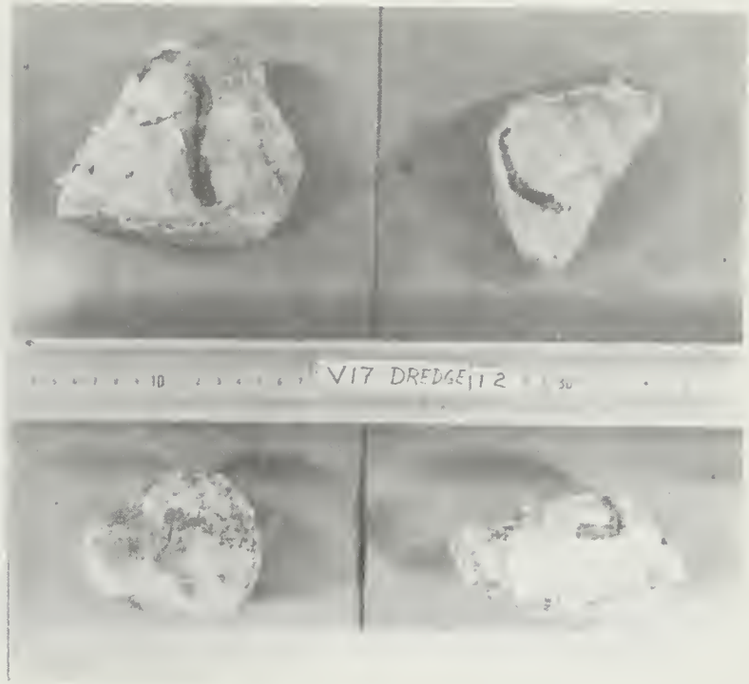



V17 DREDGE 12

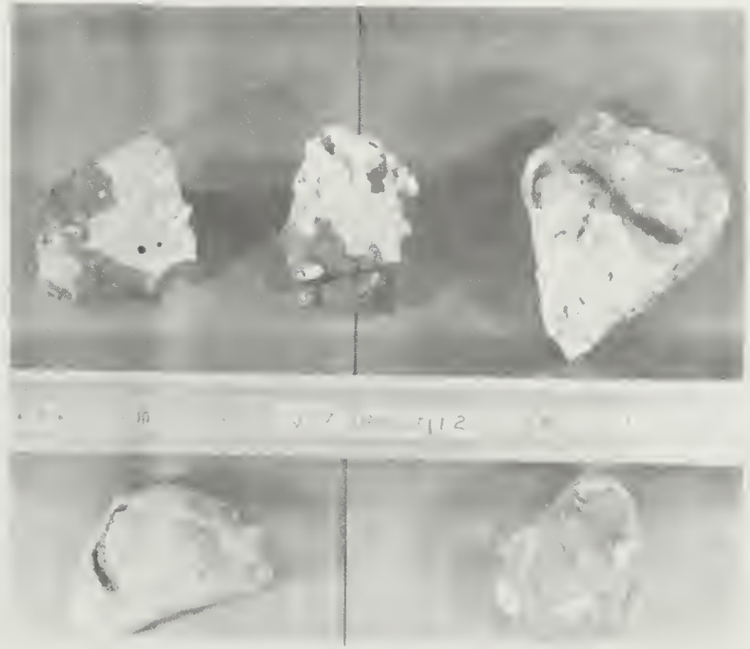

V17 DREDGE 12

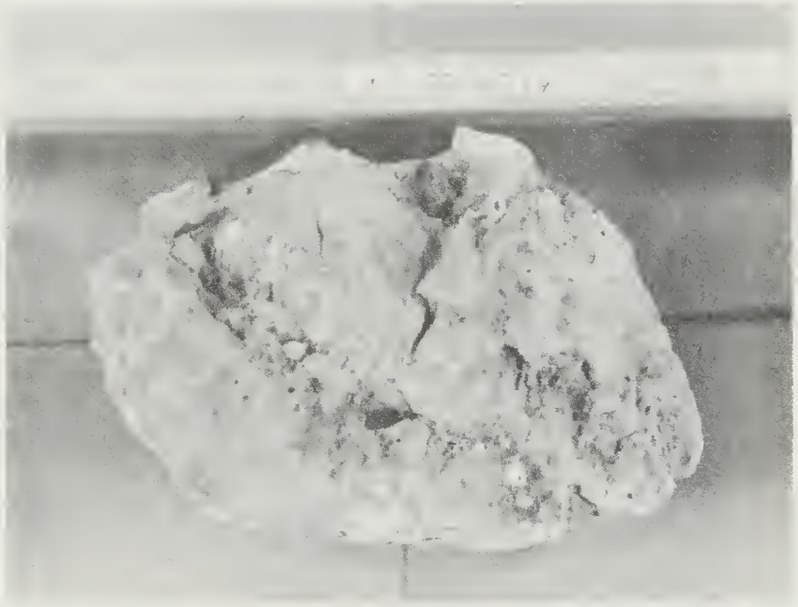

V17 DREDGE 12


V17 DREDGE 12


V17 DREDGE 12


V17 DREDGE 12



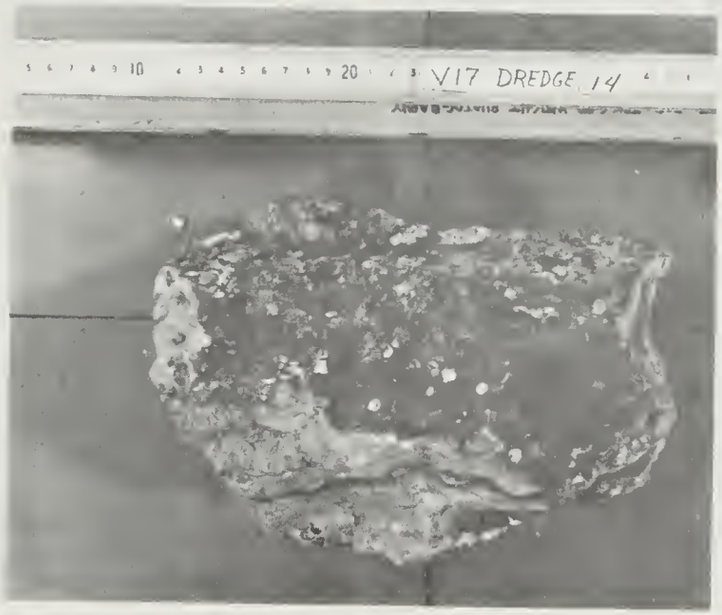


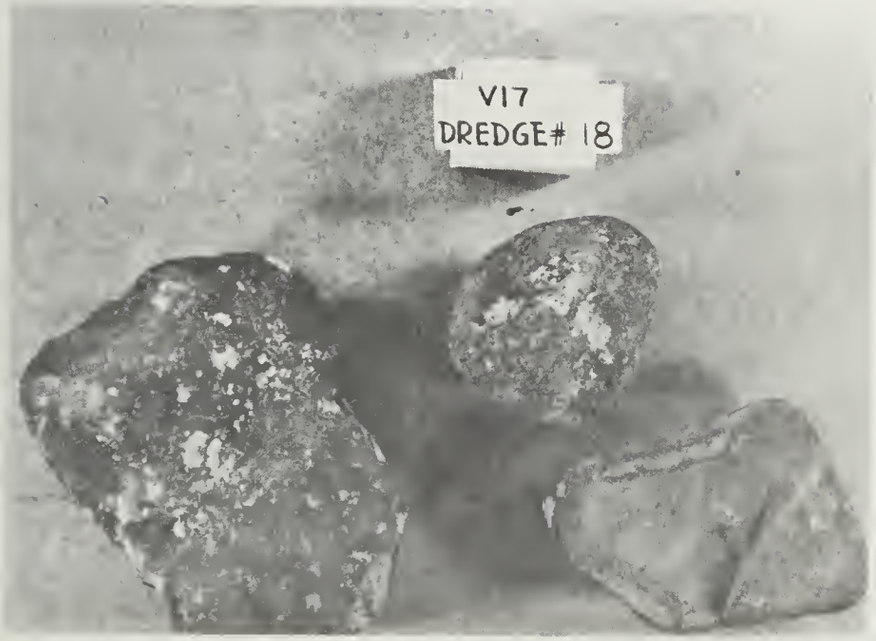

V17 DREDGE 14

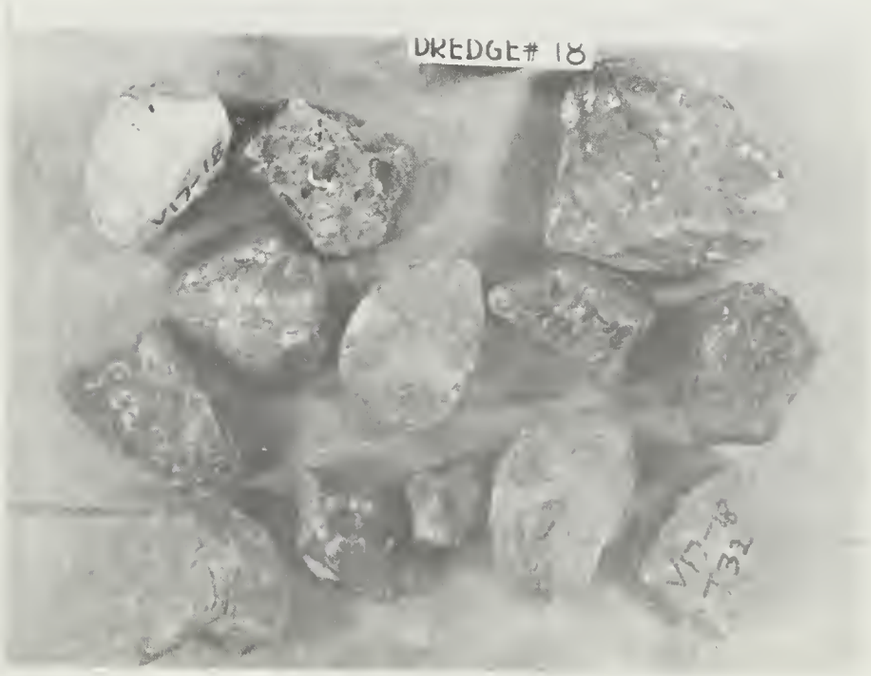



V17 DREDGE 14

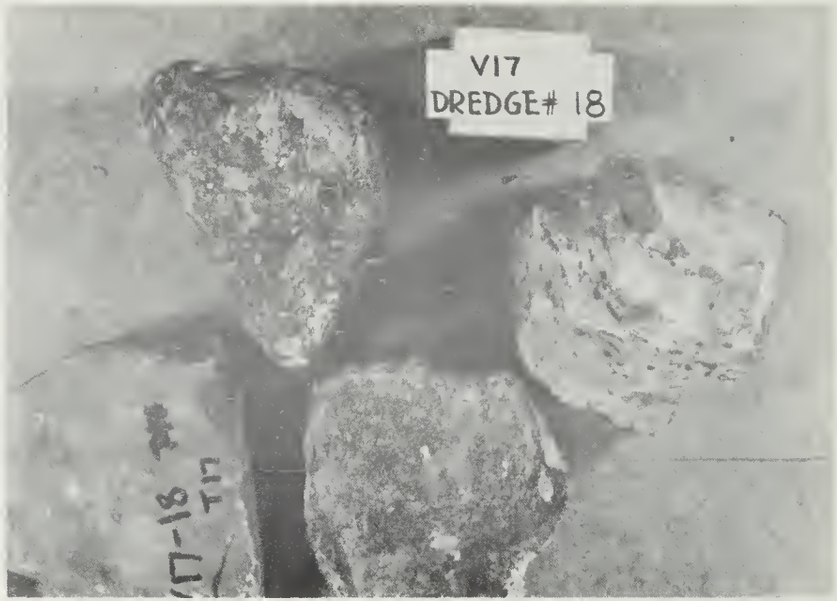

V17 DREDGE 14


V17 DREDGE 14


V17
DREDGE# 18


DREDGE# 18

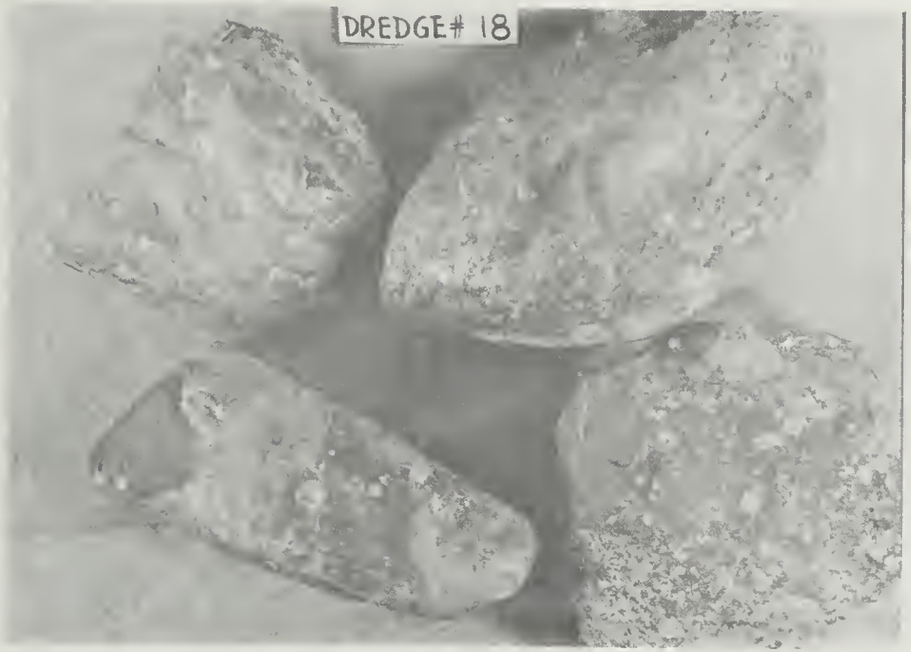

V17
DREDGE# 18

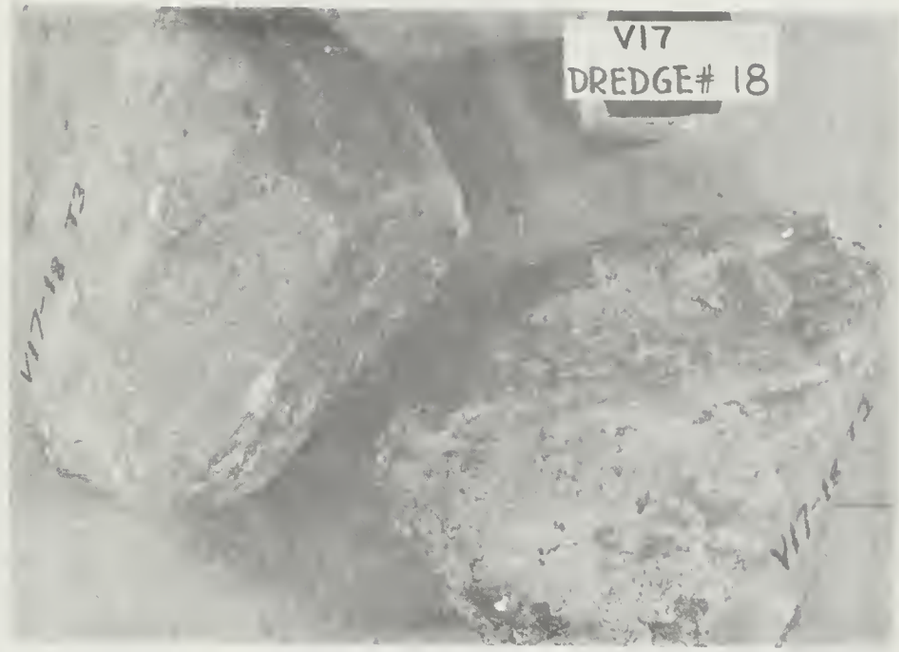

V17
DREDGE# 18

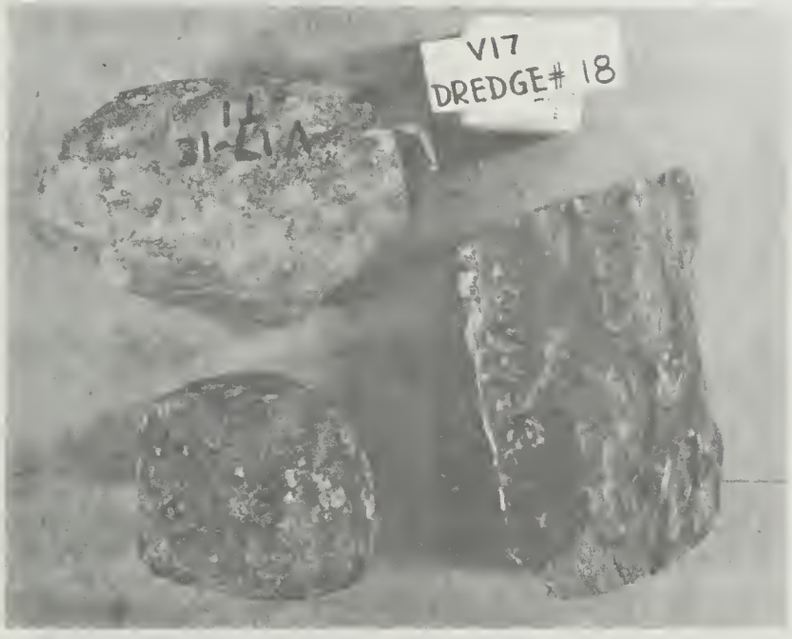

V17
DREDGE# 18


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DREDGE# 18




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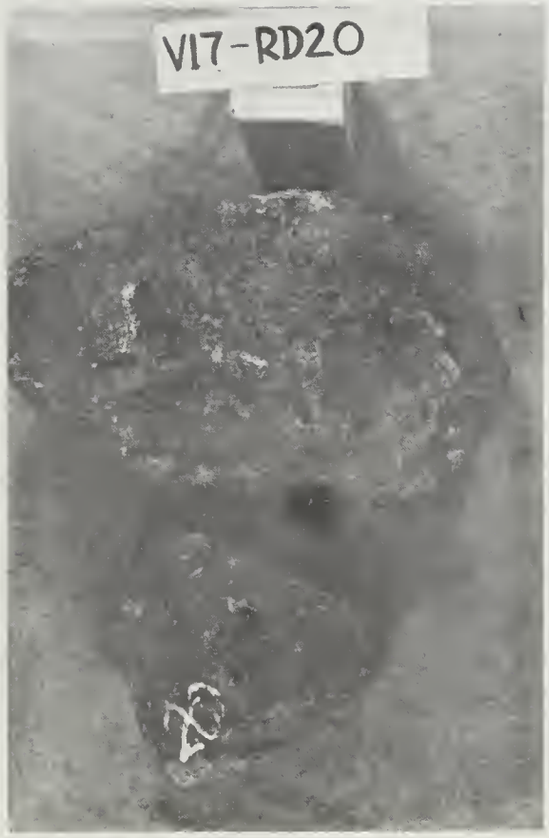

V17
DREDGE# 18


V17-RD20


VI7-RD20

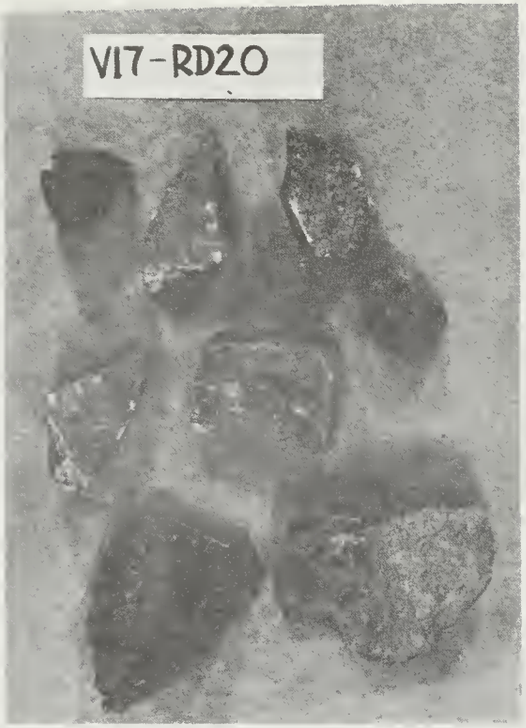

VI7-RD20




VI7-RD20


VI7-RD20


VI7-RD20


VI7-RD20


VI7-RD20


VI7-RD20

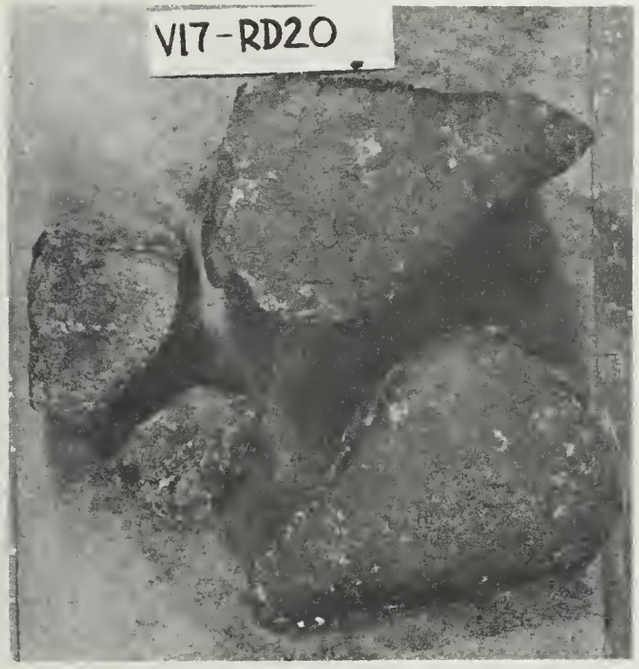

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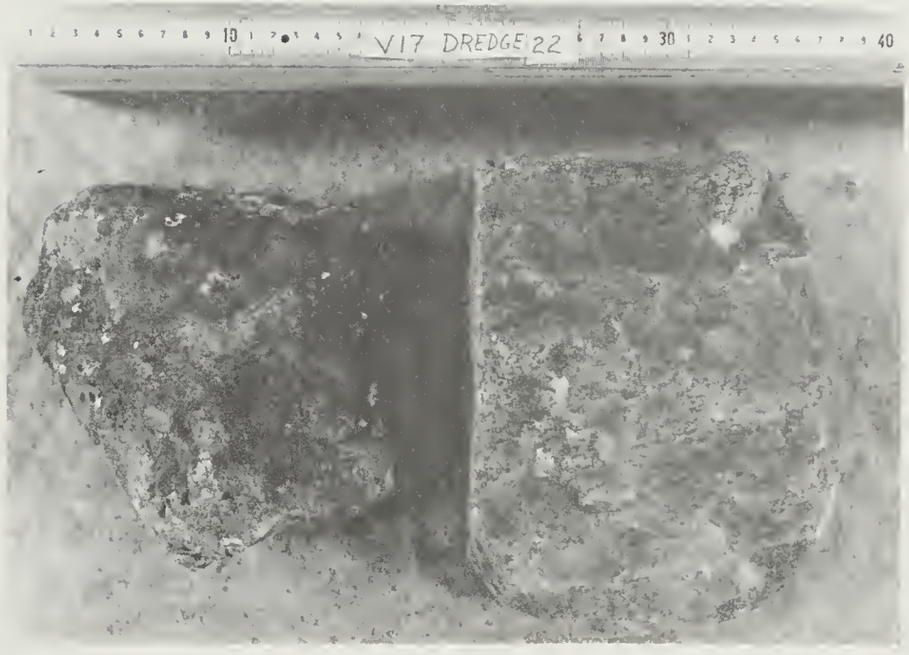


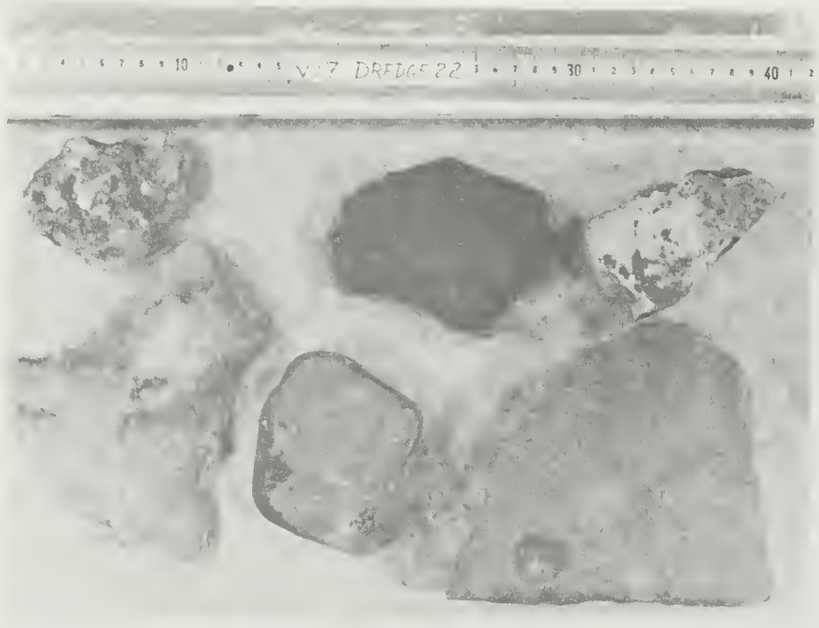

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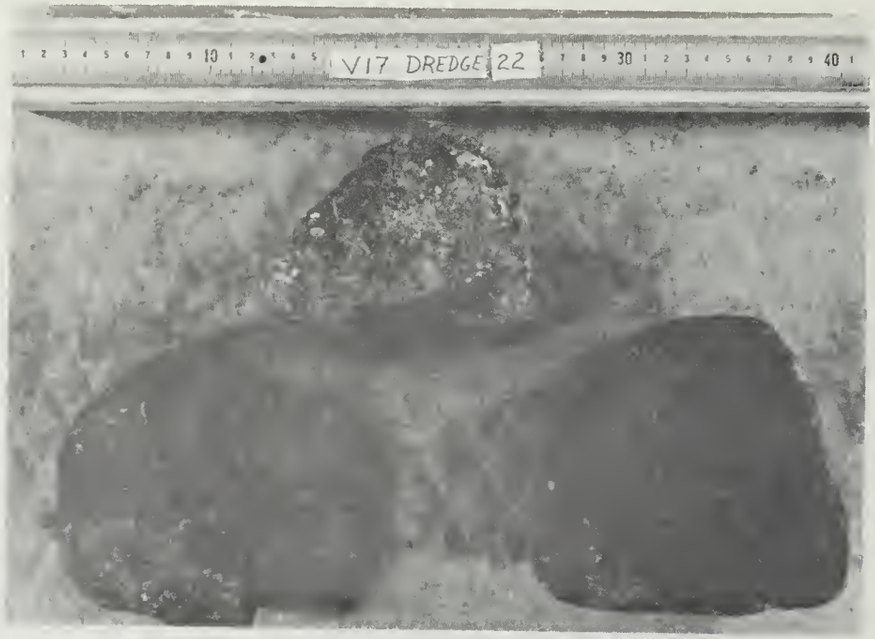

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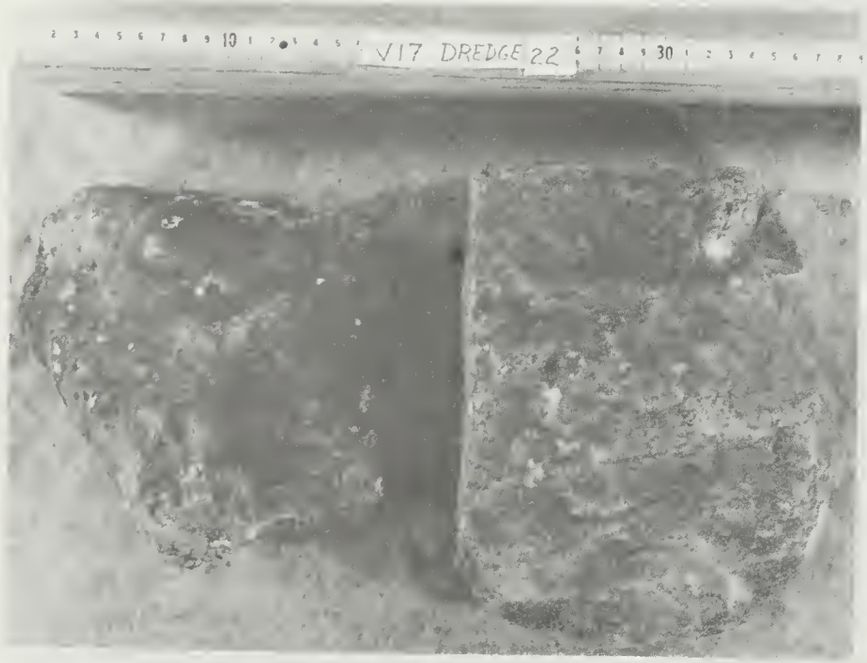

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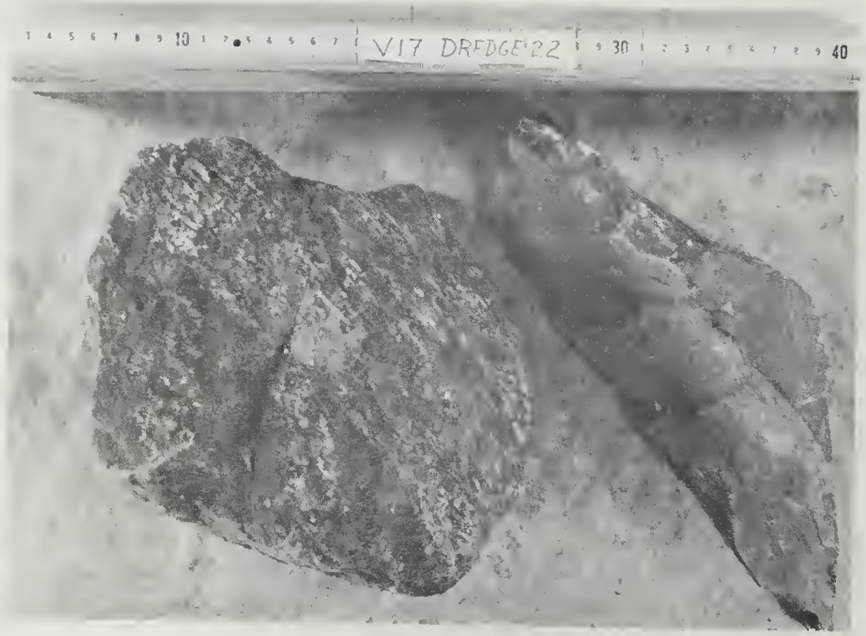

V17-RD20


V17 DREDGE 22


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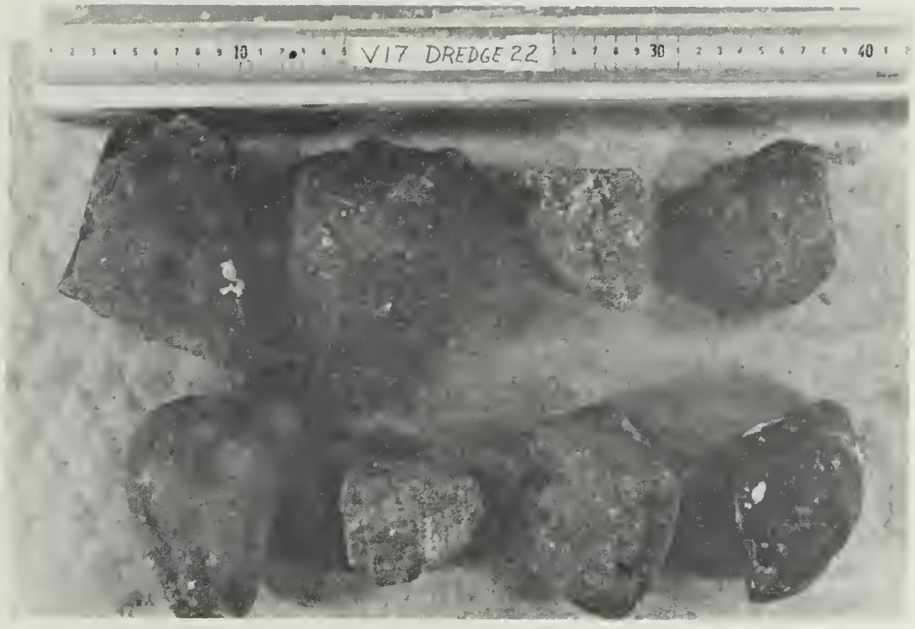

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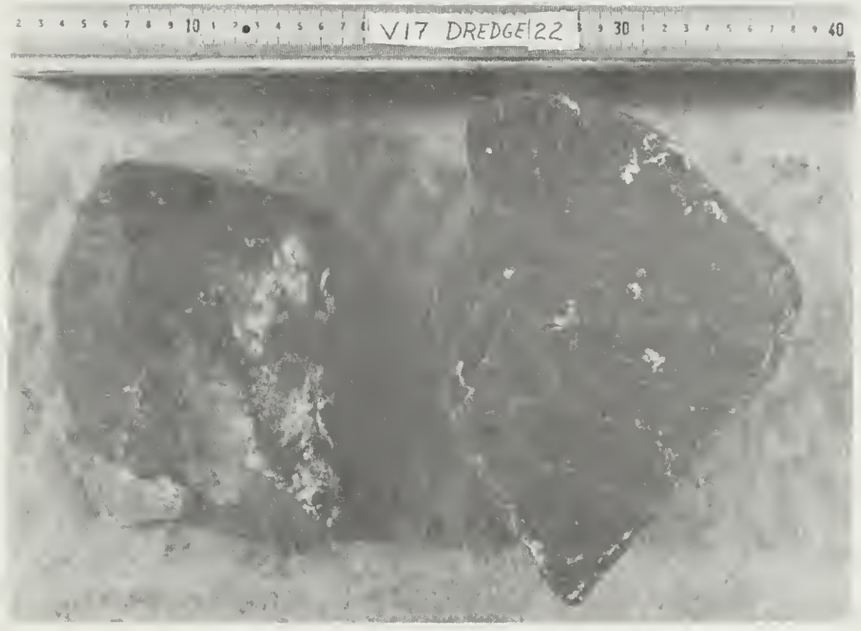

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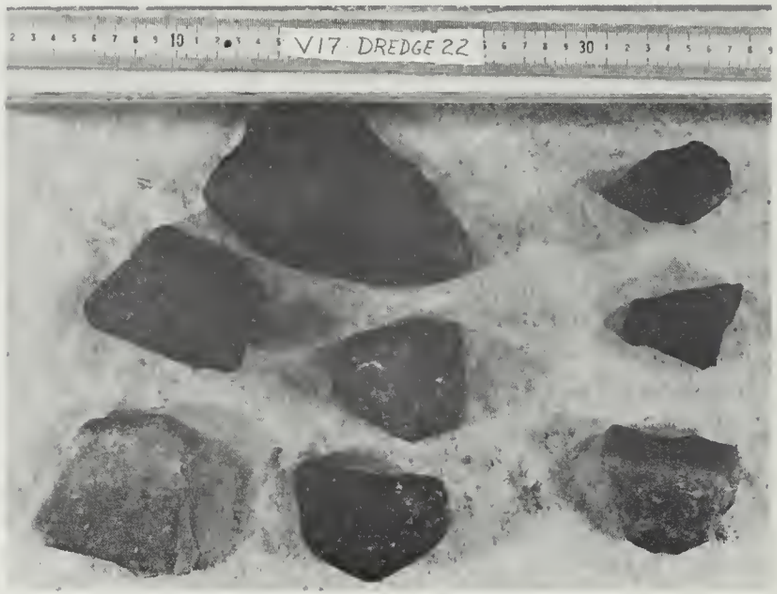

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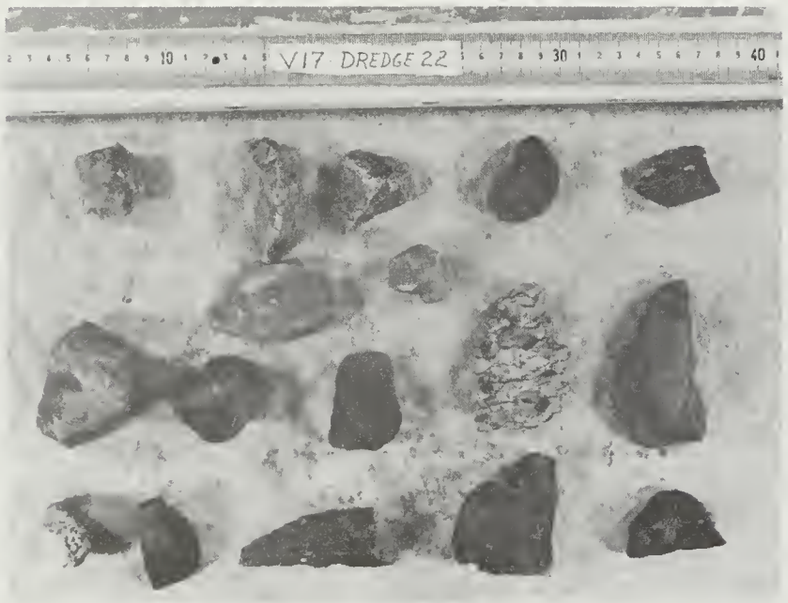

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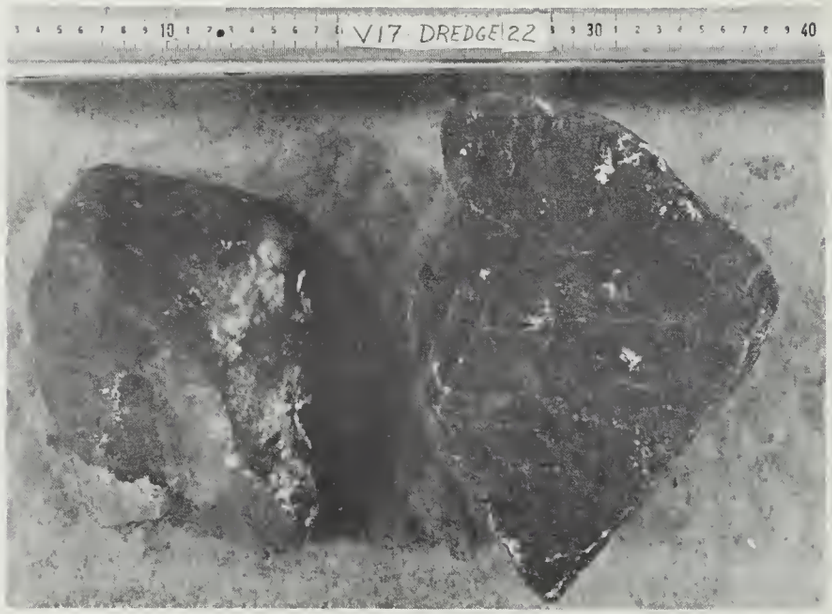

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V17 DREDGE 22

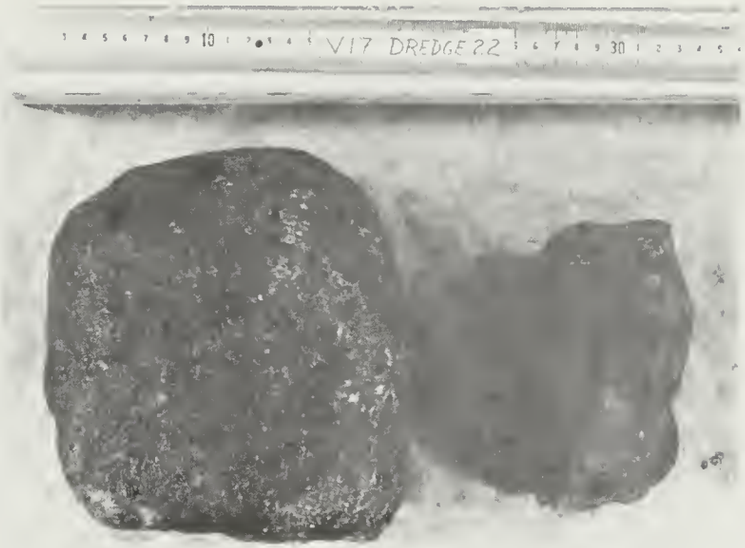

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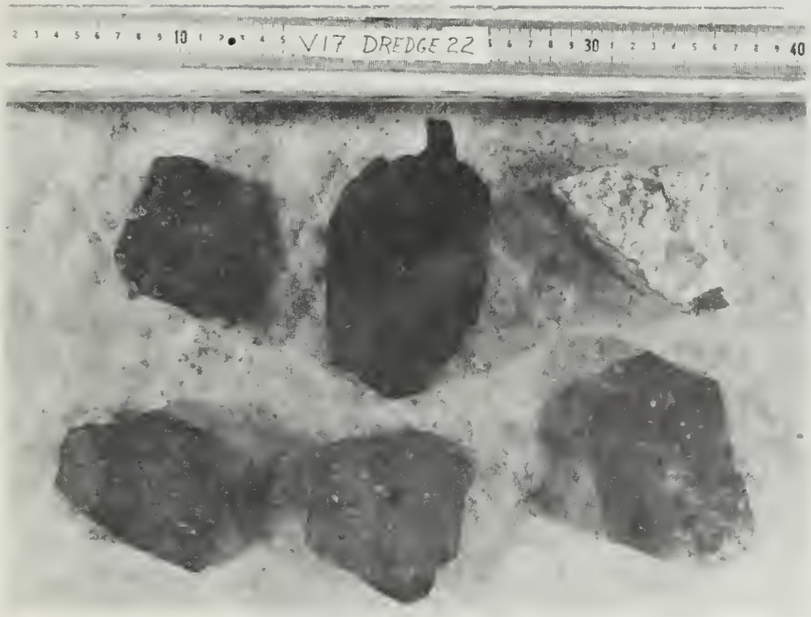

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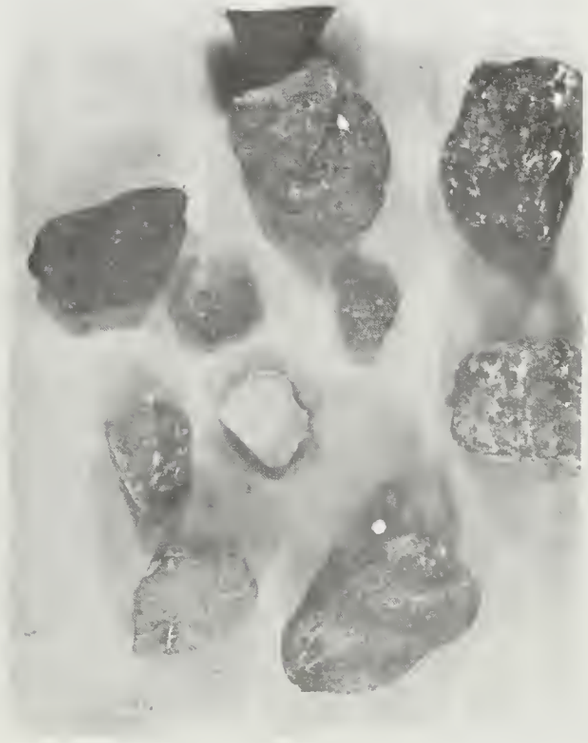

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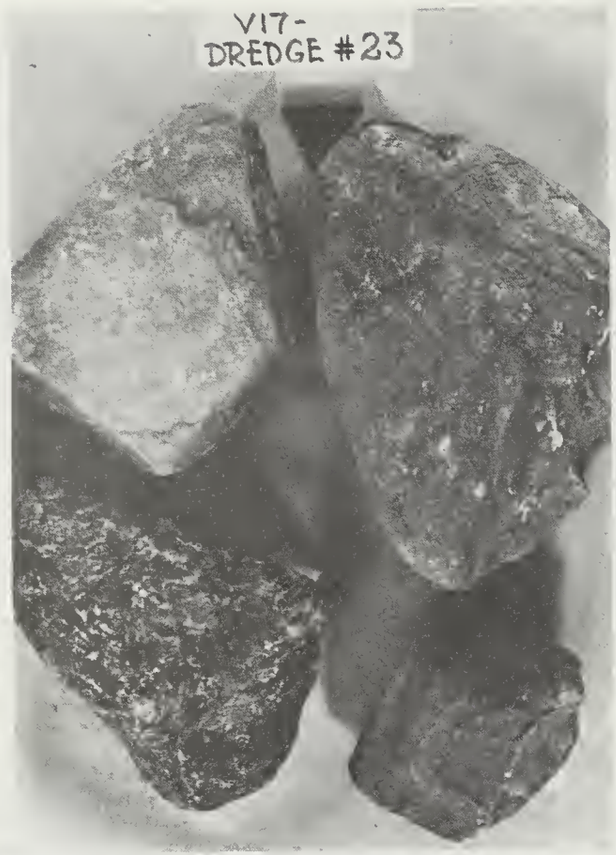

V17 DREDGE 22


V17 DREDGE 22


V17 DREDGE 22

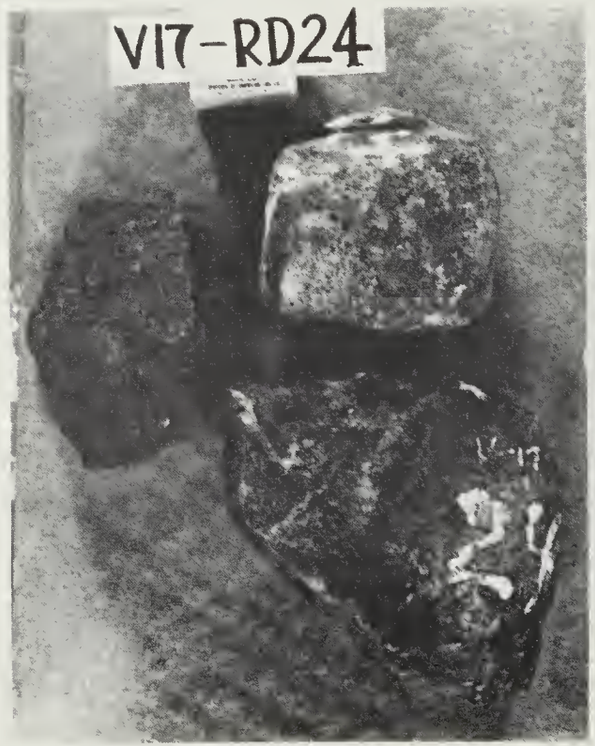

V17 DREDGE 22




V17-
DREDGE #23

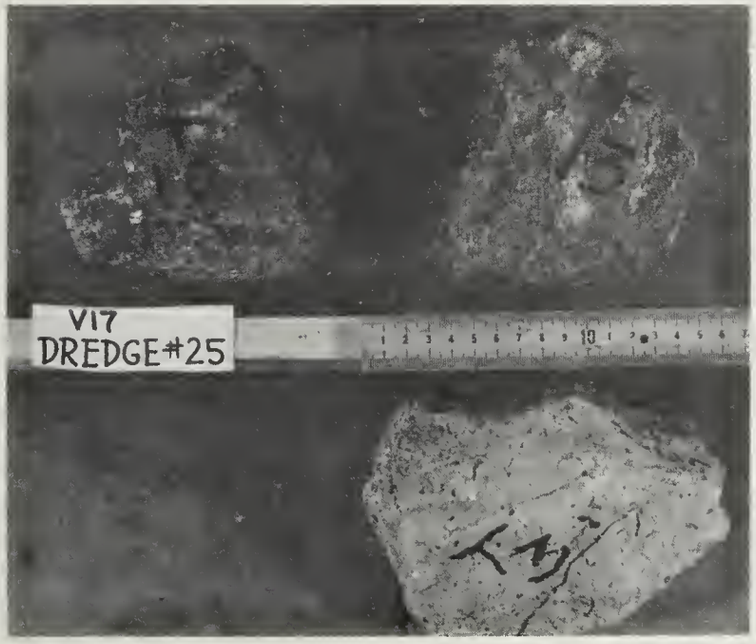

V17-


V17-24
T1
V17-
DREDGE #24


V17-RD24

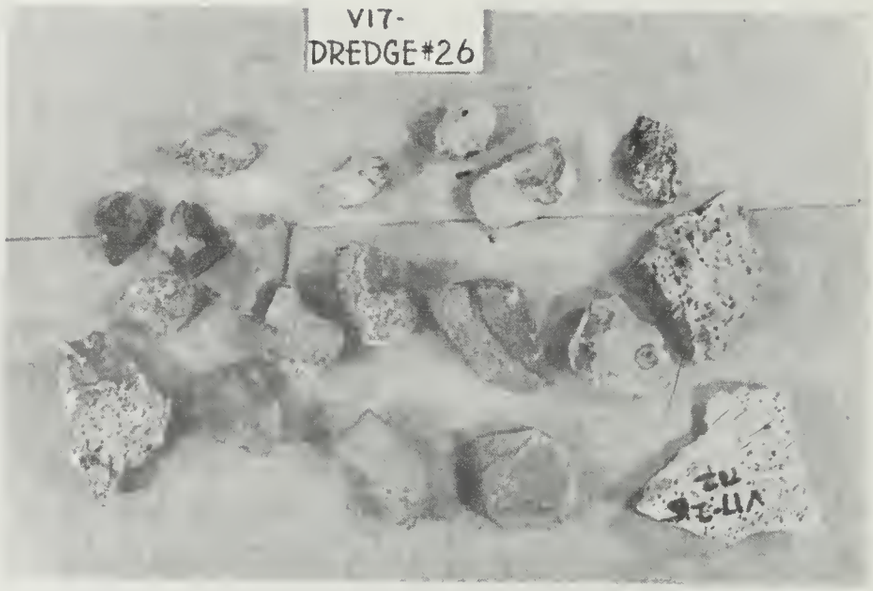

V17-
DREDGE#24
V17-24
T5
V17-24
T6


V17
DREDGE#25
V17-25
T1
V17-25
T4


V17
DREDGE#25


V17
DREDGE#25


V17-
DREDGE#26


V17-
DREDGE#26


V17
DREDGE#25


V17
DREDGE#25


V17-
DREDGE#26


V17 DREDGE 27


V17 DREDGE 27


V17 DREDGE 27


V17 DREDGE 27

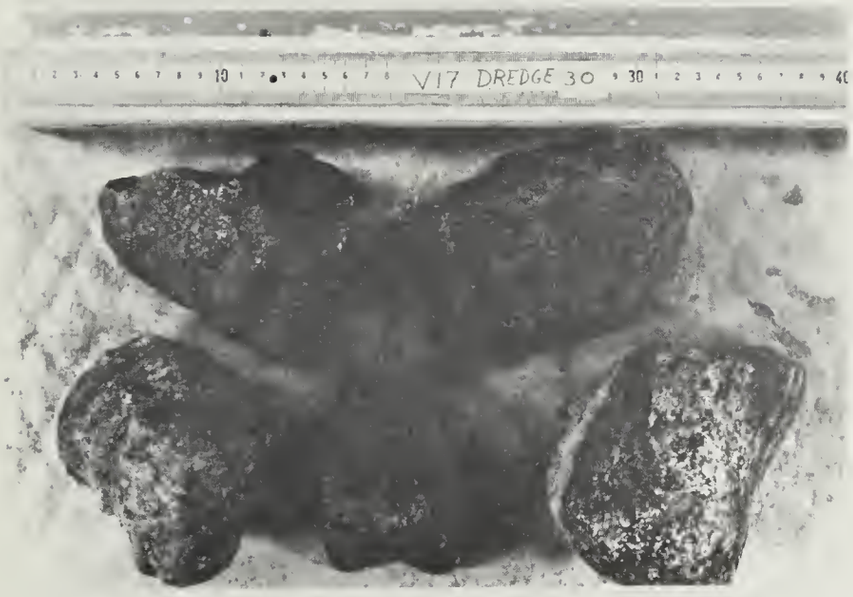

V17 DREDGE 29


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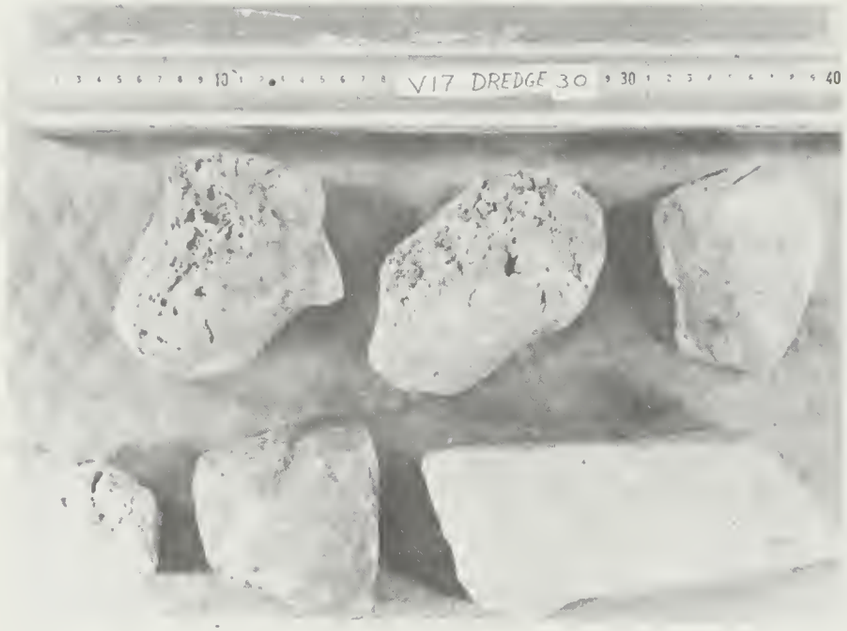

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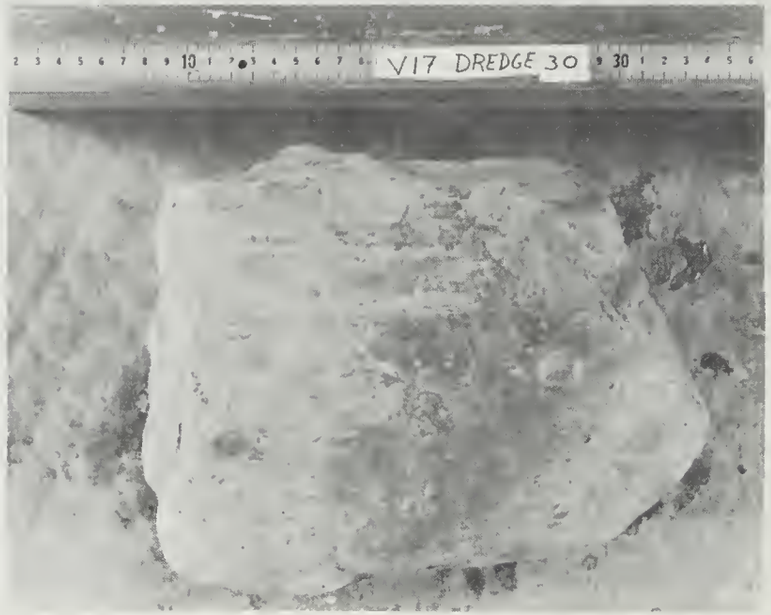

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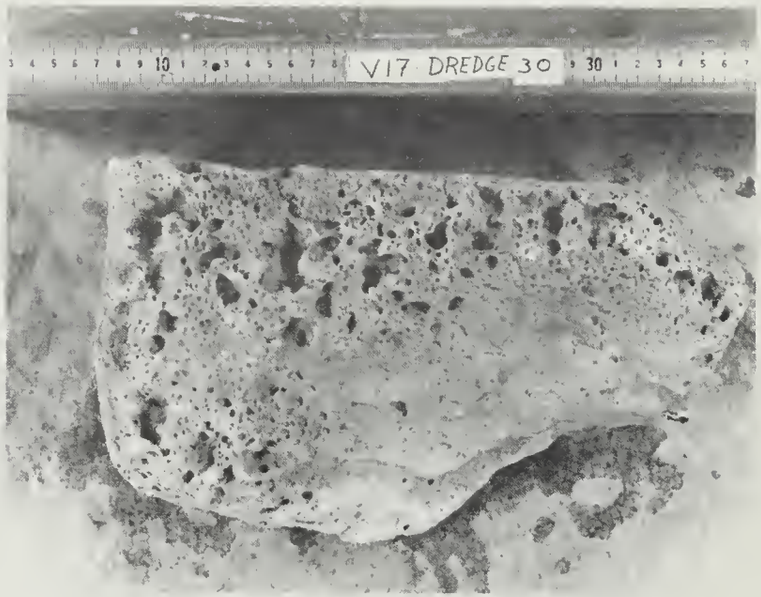

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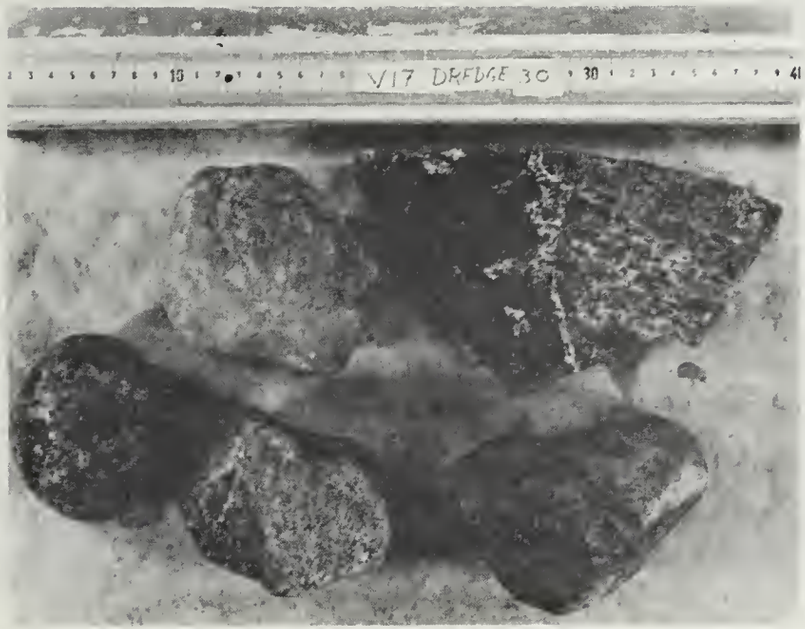

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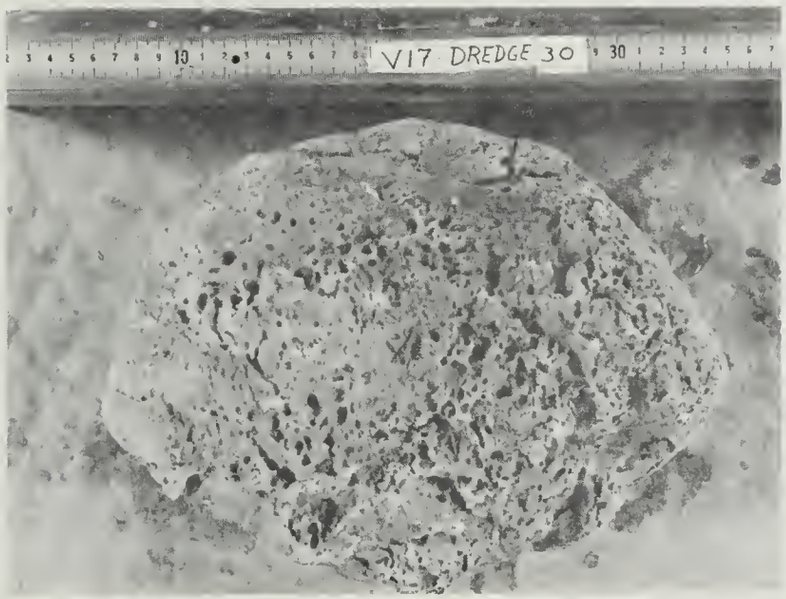

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V17 DREDGE 30


V17 DREDGE 30

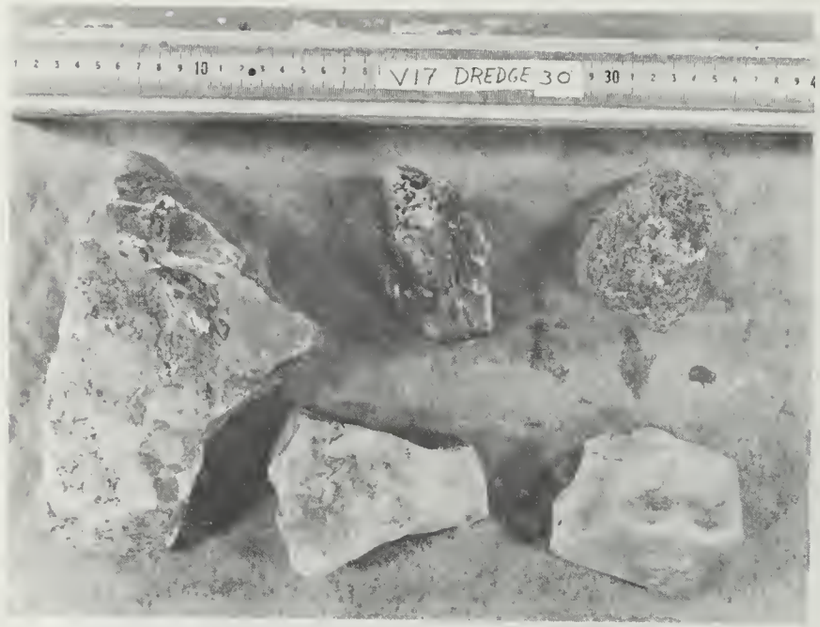

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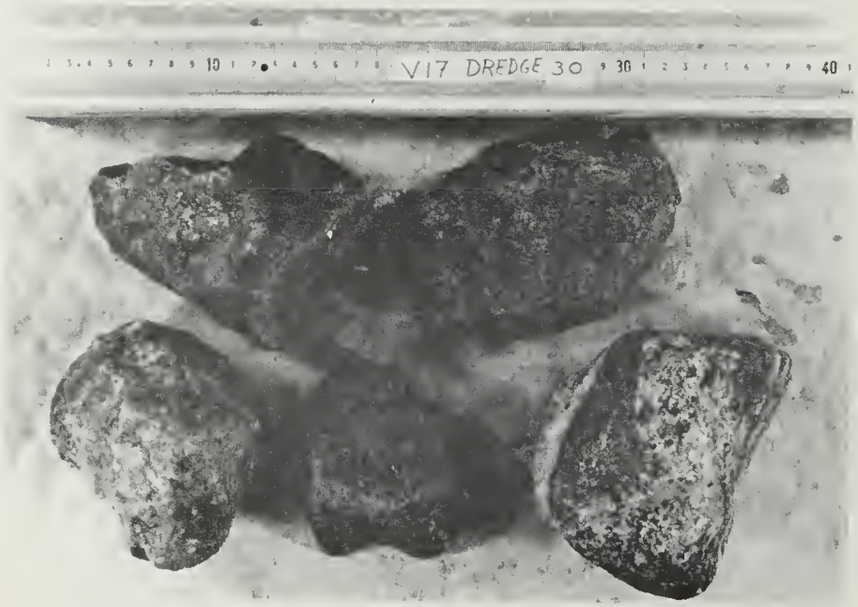

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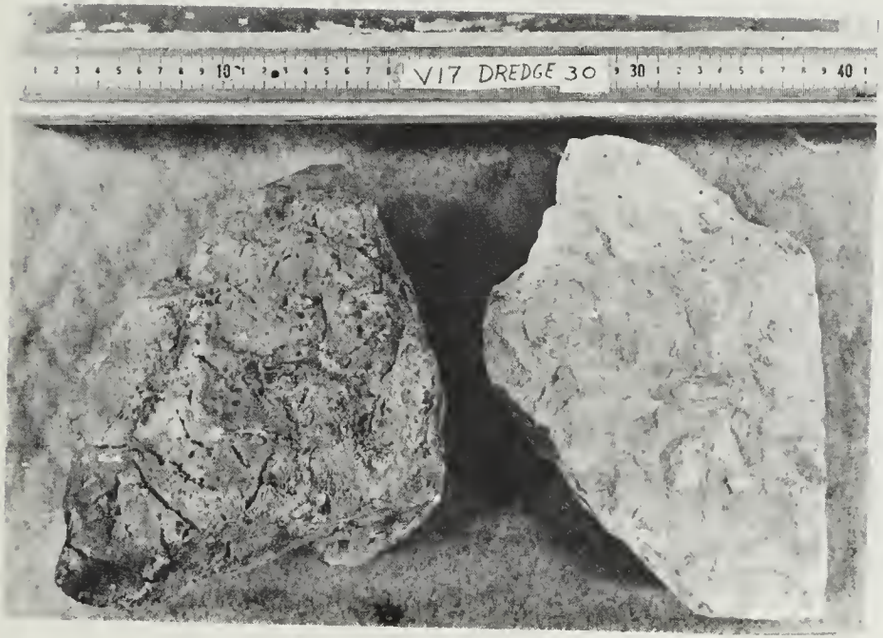

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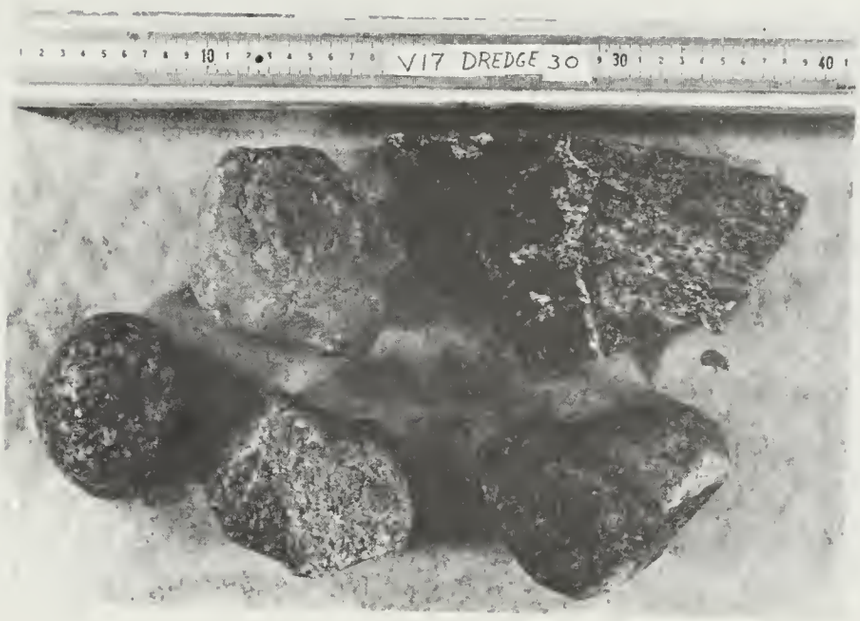

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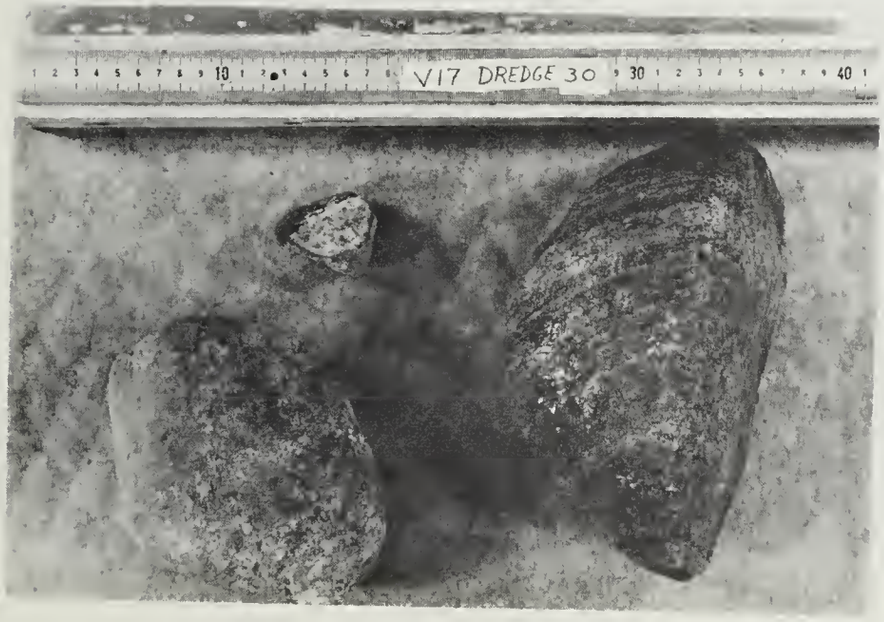

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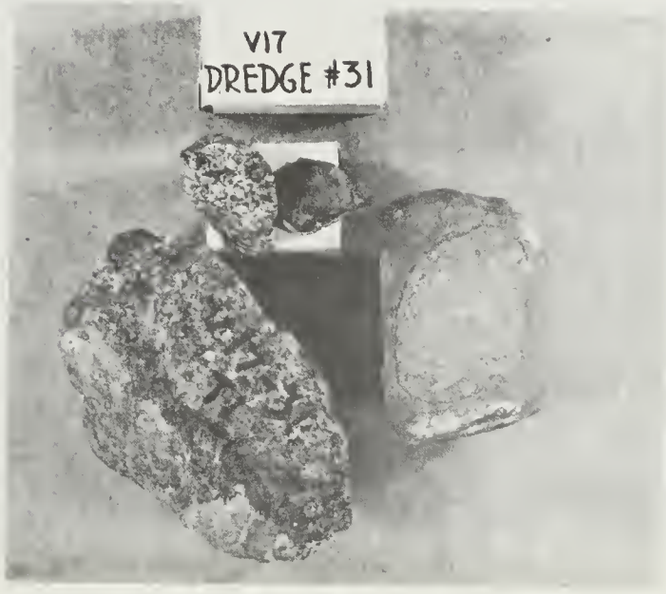

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V17 DREDGE 30

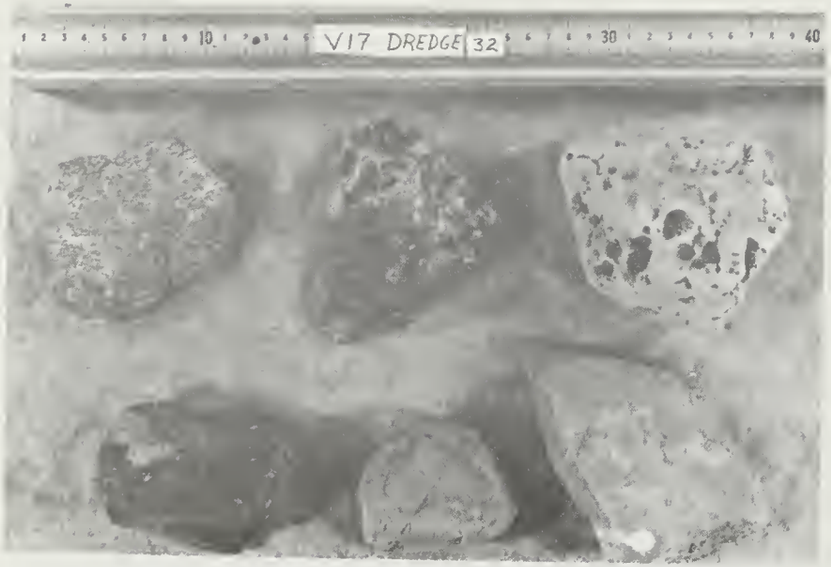

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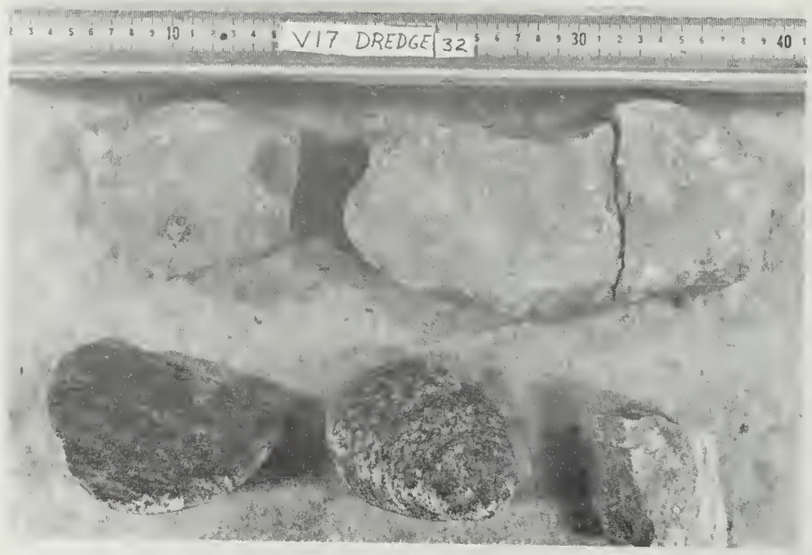

V17 DREDGE 30


V17
DREDGE #31


V17
DREDGE #31


V17 DREDGE 32

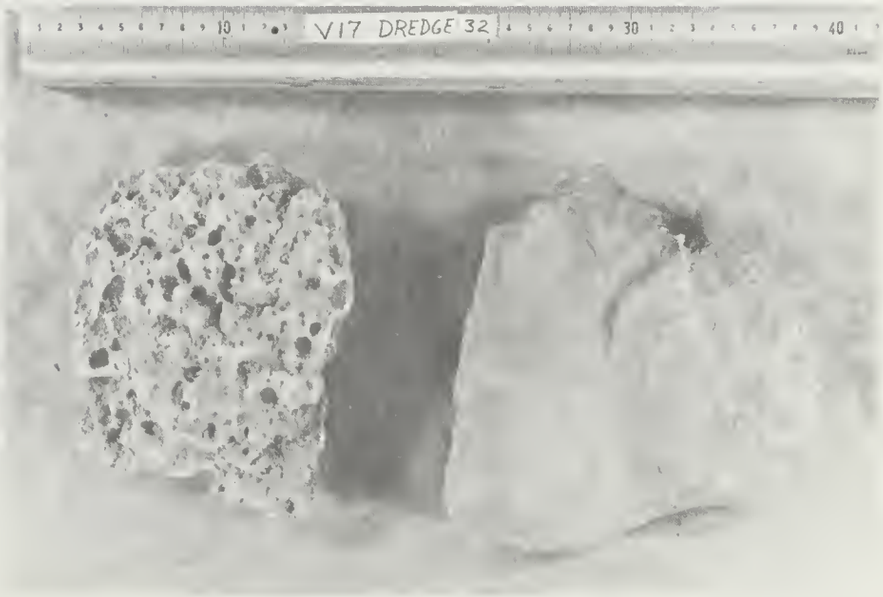

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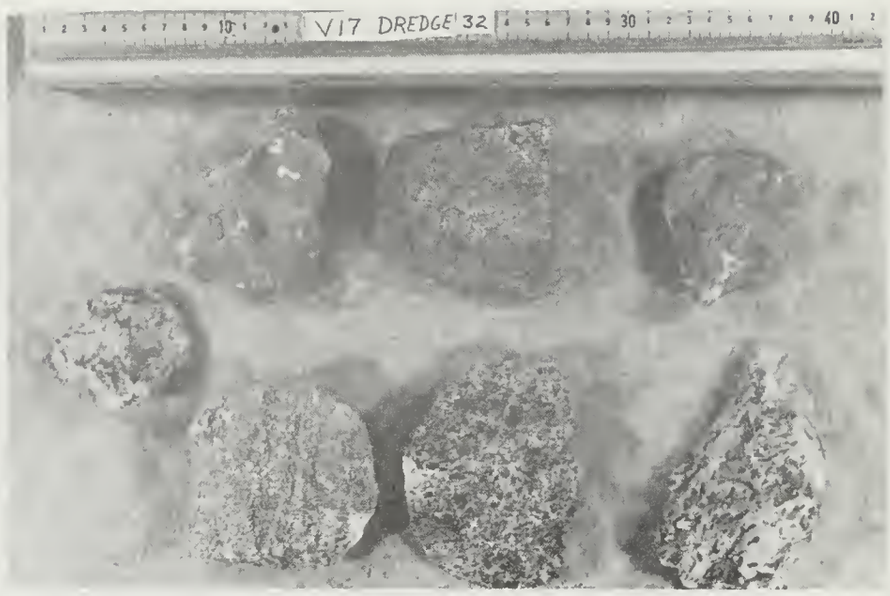

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V17 DREDGE 32


V17 DREDGE 32

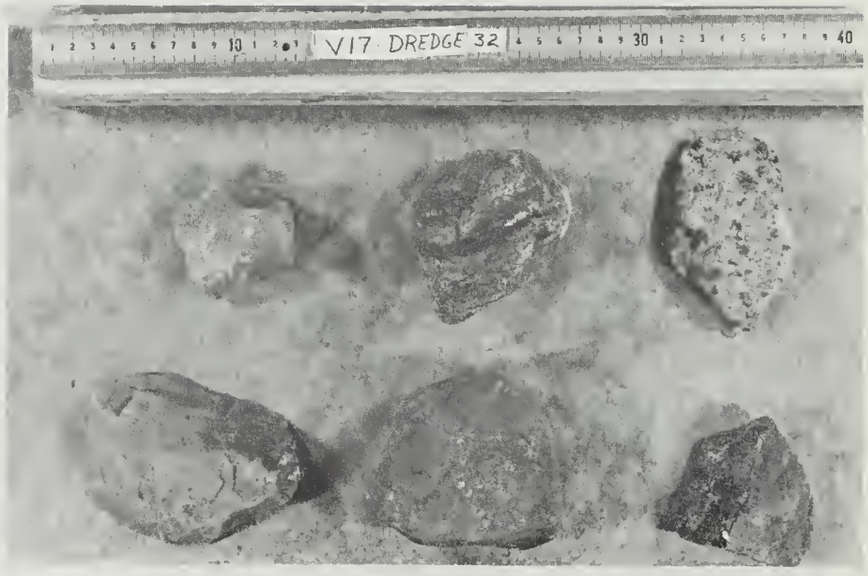

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V17 DREDGE 32


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V17 DREDGE 32


V17 DREDGE 32

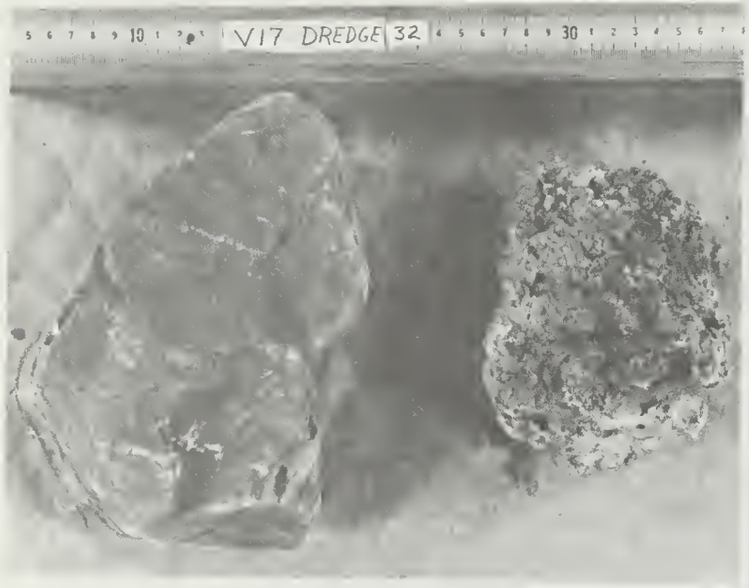

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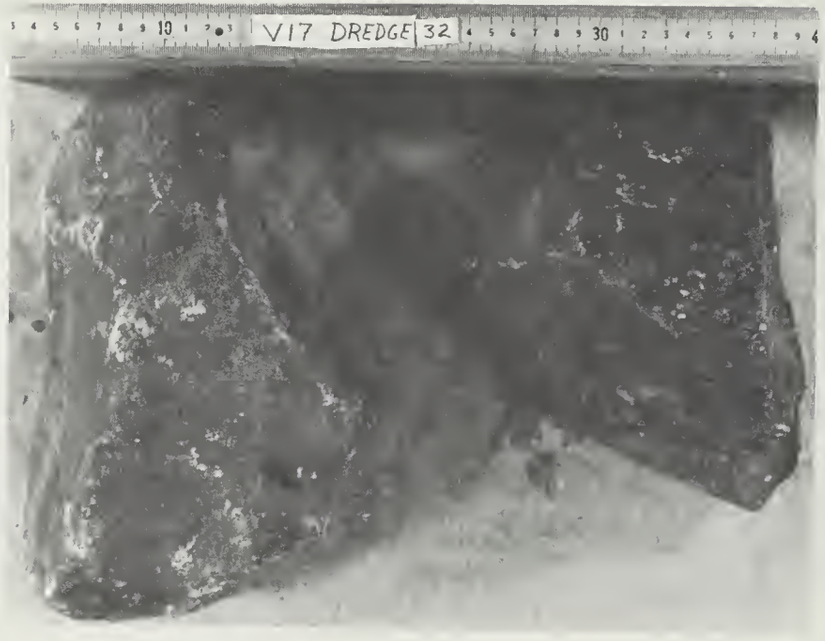

V17 DREDGE 32


V17 DREDGE 32


V17 DREDGE 32

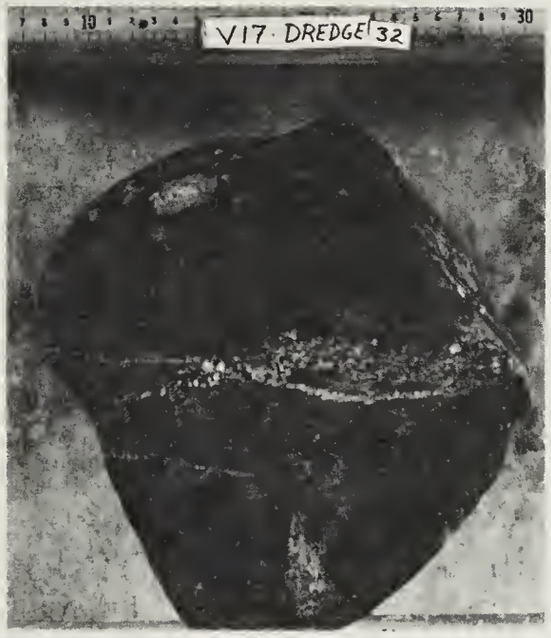

V17 DREDGE 32


V17 DREDGE 32


V17 DREDGE 32


V17 DREDGE 32


V17 DREDGE 32


V17 DREDGE 32

VEMA - 17 WATER BARRELS

Barrel #	Ship Stn.	Date 1961	Position Lat. North	Position Long. West	Msdn Sq.	PDR Depth* Fms.	PDR Depth* C.M.**	Sample Depth Fms.	Sample Depth C.M.**	L-DGO #
1	17	13 Jan	27°44'	94°18.5'	082	385	720	surface		654A
2	17.2	16 Jan	25°37'	91°46'	082	1728	3237	surface		654B
3	18	16 Jan	24°33'	91°09'	082	2016	3687	492	919	654C
4	20	18 Jan	23°02'	90°42'	082	1375	2578	219	414	654D
5	21	19 Jan	23°33'	92°25'	082	1954	3671	2122	3634	654E
6	23	26 Jan	24°02'	91°25'	082	1984	3715	492	880	654F
7	24.1	31 Jan	20°18'	83°17'	081	2140	4032	surface		654G
8	28	3 Feb	20°01'	84°22'	081	2412	4557	328	622	654H
9	31	4 Feb	19°02'	85°14'	045	2415	4563	437	824	654K
10	32	5 Feb	18°23'	86°21'	045	2305	4351	2290	4324	654L
11	36	7 Feb	17°33'	84°24'	045	2745	5205	547	1038	654M
12	36	7 Feb	17°33'	84°24'	045	2733	5183	439	826	654N
13	36	7 Feb	17°33'	84°24'	045	2740	5255	328	621	654P
14	36	7 Feb	17°33'	84°24'	045	2730	5178	219	416	654Q
15	43	10 Feb	18°37'	81°59'	045	2330	4400	2330	4399	654R
16	43	10 Feb	18°37'	81°59'	045	2330	4400	surface		654S
17	45	13 Feb	11°46'	80°26'	045	1835	3447	1800	3380	654T
18	45	13 Feb	11°46'	80°26'	045	1835	3447	492	922	654U
19	45	13 Feb	11°46'	80°26'	045	1835	3447	273	515	654W
20	45.1	14 Feb	10°05'	80°07'	045	1550	2902	surface		654X
21	46	19 Feb	06°08'	79°54'	008	1651	3080	1641	3063	675A
22	48	22 Feb	03°32'	81°11'	009	974	1812	435	811	675B
23	48	22 Feb	03°32'	81°11'	009	974	1812	219	411	675C
24	48	22 Feb	03°32'	81°11'	009	974	1812	7	13	675D

* Ship Station PDR Start Depths
** Corrected Meters
*** These samples have been contaminated.

VEMA - 17 WATER BARRELS

Barrel #	Ship Stn.	Date 1961	Position Lat. South	Position Long. West	Msdn Sq.	PDR Depth* Fms.	PDR Depth* C.M.**	Sample Depth Fms.	Sample Depth C.M.**	L-DGO #
25	52	2 Mar	16°02'	82°35'	344	2370	4449	716	1334	675E
26	54	6 Mar	28°41'	75°45'	379	2300	4308	219	408	675F
27	54	6 Mar	28°41'	75°45'	379	2300	4308	7	13	675G
28	63	22 Mar	40°32'	75°09'	451	1780	3319	164	303	675H
29	63	22 Mar	40°32'	75°09'	451	1690	3144	5	9	675I
30	74	27 Mar	49°19'	78°44'	451	2075	3871	437	808	675J
31***	74	27 Mar	49°19'	78°44'	451	2035	3799	219	405	None
32	74	27 Mar	49°19'	78°44'	451	2040	3806	5	9	675K
33***	104	15 Apr	57°02'	74°29'	487	2180	4069	2348	4389	None
34***	104	15 Apr	57°02'	74°29'	487	2210	4125	1914	3564	None
35***	104	15 Apr	57°02'	74°29'	487	2210	4125	5	9	None
36***	104	15 Apr	57°02'	74°29'	487	2220	4145	527	971	None
37	173	28 Jun	33°09'	49°52	412	832	1547	510	952	675L
38	174	1 Jul	26°40'	40°55'	376	1419	2666	1094	2039	675M
39	174	1 Jul	26°40'	40°55'	376	1450	2706	437	820	675N
40	175	3 Jul	21°49'	35°43'	375	2380	4488	2380	4485	675O
41	175	3 Jul	21°49'	35°43'	375	2165	4076	273	514	675P
42	176	4 Jul	19°57'	34°03'	339	2221	3995	109	207	675Q
43	176	4 Jul	19°57'	34°03'	339	2221	3995	5.5	10	675R
44	180	12 Jul	01°34'	19°16'	301	2240	4204	82	155	681A
45	180	12 Jul	01°34'	19°16'	301	2240	4204	27	50	681B
			North	West						
46	183	14 Jul	03°26'	18°31'	002	2654	5002	2700	5092	681C
47	184	16 Jul	09°20'	18°38'	002	2190	4111	109	207	681D
48	184	16 Jul	09°20'	18°38'	002	2190	4111	5.5	10	681E
49	185	17 Jul	12°24'	18°55'	038	2314	4347	437	819	681F
50	185	17 Jul	12°24'	18°55'	038	2310	4340	273	513	681G

* Ship Station PDR Start Depths
** Corrected Meters
*** These samples have been contaminated.

VEMA - 17 WATER BARRELS

Barrel #	Ship Stn.	Date 1961	Position Lat. South	Position Long. West	Msdn Sq.	PDR Depth* Fms.	PDR Depth* C.M.**	Sample Depth Fms.	Sample Depth C.M.**	L-DGO #
51	187	22 Jul	21°22'	24°02'	075	2578	4865	328	616	681H
52	187	22 Jul	21°22'	24°02'	075	2578	4865	3.3	6	681I
53	189	24 Jul	24°58'	28°58'	162	2980	5650	273	516	681J
54	189	24 Jul	24°58'	28°58'	162	2986	5662	109	206	681K
55	190	26 Jul	27°58'	34°08'	076	2400	4533	547	1030	681L
56	191	26 Jul	28°29'	35°02'	076	2380	4359	1367	2530	681M
57	191	26 Jul	28°29'	35°02'	076	2380	4359	3.3	6	681N
58	195	1 Aug	37°30'	50°05'	114	2870	5444	547	1031	681O
59	195	1 Aug	37°30'	50°05'	114	2870	5444	273	518	681P
60	196	2 Aug	38°48'	52°42'	114	2818	5337	711	1335	681Q
61	197	3 Aug	40°39'	55°59'	150	2730	5167	1367	2564	681R
62	197	3 Aug	40°39'	55°59'	150	2728	5163	109	205	681S
63	197	3 Aug	40°39'	55°59'	150	2728	5163	3.3	6	681T
64	229	6 Sep	60°44'	57°50'	222	1530	2839	1540	2857	681U
65	229	6 Sep	60°44'	57°50'	222	1460	2708	1094	2022	681W
66	229	6 Sep	60°44'	57°50'	222	1475	2738	547	1006	681X
67	229.1	7 Sep	60°42'	51°52'	222	1741	3238	164	301	681Y
68	229.1	7 Sep	60°42'	51°52'	222	1740	3236	3	5.5	681Z
69	231.2	10 Sep	54°27'	54°08'	186	120	221	120	221	682A
70	231.2	10 Sep	54°27'	54°08'	186	120	221	41	75	682B
71	231.2	10 Sep	54°27'	54°08'	186	120	221	3	5.5	682C
72	243	24 Sep	40°24'	63°10'	151	2446	4621	273	505	682D
73	243	24 Sep	40°24'	63°10'	151	2446	4621	3	5.5	682E
74	244	25 Sep	39°15'	63°09'	115	2648	5009	273	505	682F
75	244	25 Sep	39°15'	63°09'	115	2648	5009	3	5.5	682G
76	245	26 Sep	37°04'	62°55'	115	2669	5051	273	512	682H
77	245	26 Sep	37°04'	62°55'	115	2669	5051	3	5.5	682I

* Ship Station PDR Start Depths
** Corrected Meters
*** These samples have been contaminated.

VEMA - 17 GEOCHEMISTRY STRONTIUM 90

Sample	Ship Stn.	Date	Position Lat.N	Position Long. W	Msdn Sq.	PDR Fms.	Depth* C.M.**	Sample Depth Fms.	Sample Depth C.M.**	Vol. Ltrs.
1 A	26	2-3 Feb	20°47'	83°27'	081	2381	4499	109	200	143
B	27	3 Feb	20°31'	84°04'	081	2405	4546	328	600	145
C	28	3 Feb	20°01'	84°22'	081	2412	4558	1640	3000	138
D	28	3 Feb	20°01'	84°22'	081	2412	4558	328	600	142
E	28	3 Feb	20°01'	84°22'	081	2412	4558	6	11	148
F	28	3 Feb	20°01'	84°22'	081	2412	4558	6	11	139
G	36	7 Feb	17°33'	84°24'	045	2725	5169	547	900	145
H	36	7 Feb	17°33'	84°24'	045	2725	5169	439	800	146
I	36	7 Feb	17°33'	84°24'	045	2725	5169	711	1350	145
J	36	7 Feb	17°33'	84°24'	045	2725	5169	328	600	148
K	36	7 Feb	17°33'	84°24'	045	2725	5169	219	400	149
L	39	9 Feb	17°13'	82°50'	045	1079	2017	111	200	147
M	39	9 Feb	17°13'	82°50'	045	1079	2017	1640	3000	75
N	43	10 Feb	18°37'	81°59'	045	2610	4942	surface	3	72
1 O	43	10 Feb	18°37'	81°59'	045	2610	4942	surface	3	84
11 A	48	21 Feb	03°32'	81°11'	009	980	1825	440	800	140
B	48	21 Feb	03°32'	81°11'	009	980	1825	328	600	142
C	48	21 Feb	03°32'	81°11'	009	980	1825	219	400	142
D	48	21 Feb	03°32'	81°11'	009	980	1825	109	200	143
E	48	21 Feb	03°32'	81°11'	009	980	1825	7	13	142
F	52	2 Mar	16°02'S	82°35'	344	2540	4775	857	1567	136
G	52	2 Mar	16°02'	82°35'	344	2540	4775	723	1320	140
H	52	2 Mar	16°02'	82°35'	344	2540	4775	547	1000	142
I	54	6 Mar	28°41'	75°45'	379	2315	4336	220	400	149
11 J	54	6 Mar	28°41'	75°45'	379	2315	4336	7	13	149
111 A	63	22 Mar	40°32'	75°09'	451	2000	3732	7	13	135
B	73	26 Mar	49°25'	78°46'	451	2070	3866	713	1300	135
C	73	26 Mar	49°25'	78°46'	451	2070	3866	549	1000	131

* Ship Station PDR Start Depths
** Corrected Meters

VEMA - 17 GEOCHEMISTRY STRONTIUM 90

Sample	Ship Stn.	Date	Position Lat.S	Long. W	Msdn Sq.	PDR Fms.	Depth* C.M.**	Sample Depth Fms.	C.M.**	Vol. Ltrs.
D	74	27 Mar	49°19'	78°44'	451	2078	3881	439	800	119
E	74	27 Mar	49°19'	78°44'	451	2078	3881	331	600	140
F	74	27 Mar	49°19'	78°44'	451	2078	3881	221	400	146
G	74	27 Mar	49°19'	78°44'	451	2078	3881	111	200	142
111 H	74	27 Mar	49°19'	78°44'	451	2078	3881	7	13	146
V11 A	173	28 June	33°09'	49°52'	412	810	1509	510	950	58
B	175	3 July	21°49'	35°43'	375	2362	4441	437	800	147
C	175	3 July	21°49'	35°43'	375	2362	4441	109	200	143
D	175	3 July	21°49'	35°43'	375	2362	4441	55	100	146
E	175	3 July	21°49'	35°43'	375	2362	4441	5.5	10	147
F	176	4 July	19°57'	34°03'	339	2222	4174	2332	4265	151
G	176	4 July	19°57'	34°03'	339	2222	4174	1096	2000	86
H	176	4 July	19°57'	34°03'	339	2222	4174	273	500	67
I	176	4 July	19°57'	34°03'	339	2222	4174	164	330	147
J	180	12 July	01°34'	19°16'	301	2355	4426	100	180	
K	180	12 July	01°34'	19°16'	301	2355	4426	27	50	
L	184	16 July	09°20'N	18°38'	002	2230	4189	437	800	
M	184	16 July	09°20'	18°38'	002	2230	4189	273	500	
N	185	17 July	12°24'	18°55'	038	2320	4361	109	200	
V11 O	185	17 July	12°24'	18°55'	038	2320	4361	5.5	10	
V111 A	187	22 July	21°22'	24°02'	075	2573	4864	328	600	
B	187	22 July	21°22'	24°02'	075	2573	4864	43	80	
C	188	23 July	23°15'	26°43'	075	2862	5425	273	500	
D	190	26 July	27°58'	34°08'	076	2715	5140	164	300	
E	190	26 July	27°58'	34°08'	076	2715	5140	109	200	
F	190	26 July	27°58'	34°08'	076	2715	5140	54.7	100	
G	190	26 July	27°58'	34°08'	076	2715	5140	3.3	6	

* Ship Station PDR Start Depths

** Corrected Meters

VEMA - 17 GEOCHEMISTRY STRONTIUM 90

Sample	Ship Stn.	Date	Position Lat.N	Position Long. W	Msdn Sq.	PDR Depth* Fms.	PDR Depth* C.M.**	Sample Depth Fms.	Sample Depth C.M.**	Vol. Ltrs.
H	191	26 July	28°29'	35°02'	076	2452	4633	1367	2500	153
I	191	26 July	28°29'	35°02'	076	2452	4633	711	1300	
J	191	26 July	28°29'	35°02'	076	2452	4633	547	1000	
K	191	26 July	28°29'	35°02'	076	2452	4633	383	700	
L	195	1 Aug	37°30'	50°05'	114	2868	5434	711	1300	
M	195	1 Aug	37°30'	50°05'	114	2868	5434	547	1000	
N	195	1 Aug	37°30'	50°05'	114	2868	5434	273	500	
O	196	2 Aug	38°48'	52°42'	114	2818	5335	385	700	
P	196	2 Aug	38°48'	52°42'	114	2818	5335	166	300	
Q	196	2 Aug	38°48'	52°42'	114	2818	5335	111	185	
R	197	3 Aug	40°39'	55°59'	150	2730	5167	1367	2500	
S	197	3 Aug	40°39'	55°59'	150	2730	5167	54.7	100	
V111 T	197	3 Aug	40°39'	55°59'	150	2730	5167	3.3	6	145
1X A	229	6 Aug	60°44'	57°50'	222	1507	2796	1540	2820	
B	229	6 Aug	60°44'	57°50'	222	1507	2796	1094	2000	
C	229	6 Aug	60°44'	57°50'	222	1507	2796	711	1300	
D	229	6 Aug	60°44'	57°50'	222	1507	2796	547	1000	
E	229	6 Aug	60°44'	57°50'	222	1507	2796	303	550	
F	229.1	7 Aug	60°42'	51°52'	222	1739	3235	273	500	
G	229.1	7 Aug	60°42'	51°52'	222	1739	3235	164	300	
H	229.1	7 Aug	60°42'	51°52'	222	1739	3235	109	200	
I	229.1	7 Aug	60°42'	51°52'	222	1739	3235	55	100	
IX J	229.1	7 Aug	60°42'	51°52'	222	1739	3235	3	5	
X A	243	24 Aug	40°24'	63°10'	151	2454	4623	273	500	
B	243	24 Aug	40°24'	63°10'	151	2454	4623	3	5	
C	244	25 Aug	39°15'	63°09'	115	2648	5008	273	500	
D	244	25 Aug	39°15'	63°09'	115	2648	5008	3	3	
E	245	26 Aug	37°04'	62°55'	115	2651	5015	273	500	
X F	245	26 Aug	37°04'	62°55'	115	2651	5015	3	5	

* Ship Station PDR Start Depths

** Corrected Meters

VEMA - 17 HYDROGRAPHIC STATIONS

Hydro Cast	Ship Stn.	Date	Local Time	Time Zone	Position Lat.	Position Long.	Msdn Sq.	PDR Depth Fms.	PDR Depth C.M.	Air Temp.	Wind Vel.	Wind Dir.	Sea State
		1960	North		North	West							
1	6	22 Dec	0100	+4	20°26'	73°20'	080	1850	3480	26.1	3	E	2
2	7	22 Dec	0730		19°57'	73°49'	044	1985	3737	26.1	3	E	2
		1961											
3	25	2 Feb	0955	+5	21°14'	83°00'	081	2315	4371	25.6	4	SEXE	3
4	26	2 Feb	2004		20°47'	83°27'	081	2386	4508	26.1	3	SE	3
5	27	3 Feb	0550		20°31'	84°03'	081	2405	4545	25.6	3	SEXE	2
6	28	3 Feb	1750		20°01'	84°22'	081	2407	4549	26.1	4	SSE	3
7	29	4 Feb	0137		19°40'	84°52'	045	2416	4567	26.1	3	S	2
8	30	4 Feb	0918		19°25'	85°13'	045	2415	4565	27.8	3	SXE	2
9	31	4 Feb	2354		19°02'	85°41'	045	2415	4563	26.7	1	-	2
10	32	5 Feb	1000		18°23'	86°21'	045	2300	4342	27.8	2	E	1
11	33	5 Feb	1926		17°51'	86°58'	045	2104	3963	26.7	4	SEXE	3
12	34	6 Feb	1035		18°14'	85°46'	045	2140	4033	27.8	4	EXS	2
13	35	7 Feb	0855		17°01'	84°44'	045	1195	2240	26.7	4	SEXS	3
14	36	7 Feb	1755		17°33'	84°24'	045	2680	5078	27.8	4	SEXS	3
15	37	8 Feb	0205		18°01'	84°10'	045	2768	5137	26.7	2	SE	1
16	38	8 Feb	1022		18°22'	84°00'	045	1910	3593	28.3	1	-	1
17	39	9 Feb	0158		17°13'	82°50'	045	1080	2022	26.7	0	-	1
18	40	9 Feb	0835		17°49'	82°55'	045	2780	5274	28.7	1	-	1
19	41	9 Feb	2020		17°58'	82°53'	045	2800	5312	26.1	1	-	1
20	42	10 Feb	0500		18°21'	82°19'	045	2137	4029	25.0	4	NE	2
21	43	10 Feb	1355		18°37'	81°59'	045	2540	4807	26.7	4	NE	3
22	44	11 Feb	1012		18°32'	81°31'	045	2460	4653	26.7	5	ENE	4
					South	West							
23	109	20 Apr	0140	+4	61°36'	68°27'	522	2230	4151	3.9	3	NXW	3
24	110	20 Apr	0708		61°43'	68°23'	522	2085	3874	3.3	5	NE	3
25	111	20 Apr	0955		61°52'	68°20'	522	1984	3685	2.8	6	NNE	5
26	112	20 Apr	1602	62	62°02'	68°15'	522	2120	3940	2.2	6	NNE	5
27	113	20 Apr	1838		62°09'	68°11'	522	2060	3828	3.3	6	NNE	5

VEMA - 17 HYDROGRAPHIC STATIONS

Hydro Cast	Ship Stn.	Date 1961	Local Time	Time Zone	Position Lat. South	Position Long. West	Msdn Sq.	PDR Depth Fms.	Depth C.M.	Air Temp.	Wind Vel.	Wind Dir.	Sea State
28	146	3 Jun	0322	+3	49°16'	35°56'	447	2634	4922	3.3	3	WNW	4
29	147	3 Jun	0650		49°07'	36°06'	447	2930	5497	2.8	4	NWXN	4
					North	West							
30	186	20 Jul	1719	0	16°59'	20°03'	039	1828	3429	26.7	5	NE	5
31	201.2	14 Aug	0355		42°03'	61°25'	151	1578	2884	20.6	4	NW	4
32	202	14 Aug	1300		42°51'	61°44'	151	575	1060	21.1	3	NW	3
33	203.2	14 Aug	2237		43°07'	62°08'	151	55	102	17.2	5	NW	5
34	204.1	18 Aug	1340		44°24'	63°28'	151	49	91	16.7	3	SW	2
35	204.2	18 Aug	1517		44°17'	63°18'	151	80	148	17.8	3	SW	2
36	205.1	18 Aug	1950		43°55'	62°53'	151	141	261	16.7	3	SW	2
37	205.2	18 Aug	2335		43°32'	62°25'	151	41	76	17.8	4	WXS	4
38	211	21 Aug	1255		43°23'	54°52'	150	2145	3968	20.6	3	WXN	3
39	212.1	22 Aug	2315		46°11'	57°50'	150	255	472	17.8	4	SXW	4
40	212.2	23 Aug	0440		46°35'	58°27'	150	225	472	18.3	6	W	5
41	214.2	24 Aug	1900		46°10'	56°12'	150	37	68	19.4	3	WXN	3
42	214.3	25 Aug	0247		46°53'	54°47'	150	130	240	15.6	3	WXN	3
43	214.4	26 Aug	0400		46°27'	57°03'	150	60	111	14.4	3	SSW	3
44	214.5	26 Aug	0825	+3	45°54'	52°45'	150	54	100	15.6	3	WXS	3
45	215	26 Aug	1135		45°29'	52°32'	150	53	98	17.2	5	NW	4
46	216	26 Aug	1510		44°57'	52°15'	150	34	63	17.8	4	NW	4
47	216.1	26 Aug	1835		44°28'	52°01'	150	41	76	16.7	4	NNE	4
48	217	27 Aug	1305		46°42'	50°47'	150	58	107	13.3	5	NXE	5
49	218	27 Aug	1631		46°41'	51°30'	150	45	83	13.3	4	NNE	5
50	219	27 Aug	2000		46°40'	52°12'	150	49	91	13.3	3	NNE	5
51	219.1	27 Aug	2325		46°42'	52°50'	150	18	33	13.3	2	ENE	3
52	221	29 Aug	1118		50°30'	52°19'	186	121	224	11.1	6	NEXE	5

VEMA - 17 HYDROGRAPHIC STATIONS

Hydro Cast	Ship Stn.	Date 1961	Local Time	Time Zone	Position Lat. North	Position Long. West	Msdn Sq.	PDR Depth Fms.	PDR Depth C.M.	Air Temp.	Wind Vel.	Wind Dir.	Sea State
53	222	29 Aug	1942		50°57'	51°24'	186	145	268	11.1	4	NE	5
54	223	30 Aug	1440		51°20'	50°36'	186	139	257	10.6	1	N	2
55	226	3 Sep	1428		60°44'	45°45'	221	228	422	12.2	0	-	0
56	228	3 Sep	1652		60°42'	46°01'	221	162	300	10.0	3	WXS	1
57	231	9 Sep	1250		55°49'	52°27'	186	1790	3311	8.9	6	WXW	5
58	231.2	10 Sep	1357		54°27'	54°08'	186	118	218	5.6	4	NNW	3
59	232	10 Sep	2156		53°42'	55°36'	186	79	146	5.6	2	W	2
60	233	11 Sep	2030		51°08'	58°01'	186	123	227	12.2	4	E	4
61	233.1	11 Sep	2222		50°59'	57°52'	186	70	129	12.2	4	E	4
62	233.2	11 Sep	2356		50°51'	57°43'	186	40	74	12.2	4	E	4
63	233.3	12 Sep	0129		50°43'	57°35'	186	111	205	12.2	3	ESE	2
64	233.4	12 Sep	1740		50°00'	61°50'	187	47	87	13.9	3	WSW	3
65	234	12 Sep	2003		49°49'	61°46'	151	113	209	11.7	3	WSW	3
66	235	12 Sep	2155		49°37'	61°49'	151	140	259	12.8	3	WSW	3
67	235.1	12 Sep	2353		49°26'	61°51'	151	57	105	12.8	3	WSW	3
68	237.1	13 Sep	2035		48°39'	60°20'	151	176	326	13.3	4	NW	3
69	238	14 Sep	1012		47°58'	61°58'	151	27	54	13.3	3	SSW	3
70	239	14 Sep	1930		47°36'	63°00'	151	28	52	13.3	4	SSE	3
71	239.2	15 Sep	0609		47°14'	64°00'	151	17	31	16.7	4	S	4
72	240.1	15 Sep	1658		48°03'	64°00'	151	35	65	17.8	8	WXS	6
73	240.3	15 Sep	2215		47°40'	63°12'	151	32	59	16.7	2	SXW	3
74	241	16 Sep	1150		46°58'	62°05'	151	27	50	17.2	2	WXN	3
75	242	16 Sep	1953		46°27'	61°12'	151	18	33	17.8	3	NNW	2

VEMA 17 PLANKTON SAMPLES EXAMINED FOR PLANKTONIC FORAMINIFERA AS OF AUGUST 1971

SERIAL NO.	SHIP	CR	STATION	SAMPLE	LAT.	LONG.	DEPTH (M) FROM	TO	DATE DA	MT	YR	TIME	DUR MIN	TEMP. UPPER	DEEPER	DEV	TYPE TOW	MESH	VWF	MARSDEN SQUARE	OCEAN
345	1	17	3	1	1950N	6724W	0	10	18	12	60	1340	65	27.00	27.00	3	1	202	894	43497	1
346	1	17	4	2	1953N	68 8W	0	10	20	12	60	1406	90	27.00	27.00	3	1	202	1332	43498	1
347	1	17	22	1	1833N	8129W	0	10	11	2	61	1105	145	27.00	0.00	1	1	202	755	45381	1
348	1	17	72	5	2650N	32 9W	0	10	25	7	61	1735	60	24.20	0.00	1	1	202	467	76362	1
349	1	17	73	1	2758N	34 9W	0	10	26	7	61	850	45	24.30	24.30	1	1	202	157	76374	1
350	1	17	74	1	2829N	35 2W	0	10	26	7	61	1937	36	24.10	24.10	1	1	202	144	76485	1
351	1	17	75	2	2937N	3655W	0	10	27	7	61	1155	60	24.50	24.50	1	1	202	198	76496	1
352	1	17	76	1	2959N	3731W	0	10	27	7	61	1810	65	24.80	24.80	1	1	202	504	76497	1
353	1	17	77	2	3245N	4154W	0	10	29	7	61	556	84	25.90	0.00	1	1	202	205	113121	1
354	1	17	78	5	3316N	4242W	0	10	29	7	61	1656	69	26.10	0.00	1	1	202	205	77122	1
355	1	17	80	1	3545N	47 5W	0	10	31	7	61	1423	67	26.00	26.00	1	1	202	500	77457	1
356	1	17	81	1	3730N	50 5W	0	10	1	8	61	1300	145	25.70	0.00	1	1	202	521	114370	1
357	1	17	82	1	3848N	5242W	0	10	2	8	61	1125	55	24.80	24.80	1	1	202	396	114382	1
358	1	17	84	1	4039N	5558W	0	10	3	8	61	1013	60	23.60	23.60	1	1	202	354	1502 5	1
359	1	17	85	1	4118N	5712W	0	10	3	8	61	2010	90	22.70	22.70	1	1	202	747	150217	1
360	1	17	86	1	4230N	59 6W	0	10	4	8	61	1014	60	22.70	22.70	1	1	202	219	150229	1
361	1	17	87	1	43 1N	5951W	0	10	4	8	61	1950	115	18.40	0.00	1	1	202	893	150239	1
362	1	17	88	1	4338N	6127W	0	10	5	8	61	1020	40	17.00	0.00	1	1	202	123	151131	1
363	1	17	74	2	2829N	35 2W	0	300	26	7	61	1820	60	24.10	16.10	1	2	202	204	76485	1
364	1	17	75	1	2937N	3655W	0	300	27	7	61	1313	43	24.50	16.70	1	2	202	139	76496	1
365	1	17	77	1	3245N	4154W	0	300	29	7	61	740	23	25.90	0.00	1	2	202	229	113121	1
366	1	17	82	2	3848N	5242W	0	300	2	8	61	1229	31	24.80	17.50	1	2	202	228	114382	1
367	1	17	84	2	4039N	5558W	0	300	3	8	61	1225	44	23.60	12.20	1	2	202	0	1502 5	1
368	1	17	81	3	3730N	50 5W	0	100	1	8	61	1607	13	25.70	17.20	4	3	202	66	114370	1
369	1	17	81	4	3730N	50 5W	100	300	1	8	61	1620	20	17.20	16.30	4	3	202	103	114370	1
370	1	17	81	5	3730N	50 5W	300	500	1	8	61	1640	60	16.30	0.00	4	3	202	300	114370	1
371	1	17	81	6	3730N	50 5W	500	1000	1	8	61	1607	93	0.00	0.00	9	3	202	3693	114370	1
372	1	17	85	2	4118N	5712W	0	100	3	8	61	2003	20	22.70	14.20	4	3	202	317	150217	1
373	1	17	85	3	4118N	5712W	100	300	3	8	61	2023	35	14.20	11.10	4	3	202	548	150217	1
374	1	17	85	4	4118N	5712W	300	500	3	8	61	2058	22	11.10	0.00	4	3	202	353	150217	1
375	1	17	85	5	4118N	5712W	500	1000	3	8	61	2003	77	0.00	0.00	9	3	202	7021	150217	1
376	1	17	86	2	4230N	59 6W	0	100	4	8	61	1244	18	22.70	15.40	4	2	202	108	150229	1
377	1	17	86	3	4230N	59 6W	100	300	4	8	61	1302	34	15.40	10.50	4	2	202	205	150229	1
378	1	17	86	4	4230N	59 6W	300	200	4	8	61	1336	38	10.50	0.00	4	2	202	226	150229	1
379	1	17	86	5	4230N	59 6W	500	1000	4	8	61	1242	97	0.00	0.00	9	2	202	4587	150229	1
380	1	17	87	2	43 1N	5951W	0	100	4	8	61	1952	20	18.40	6.50	4	3	202	170	150239	1
381	1	17	1	1	3429N	6728W	0	150	11	12	60	1335	25	22.20	20.00	1	3	202	69	115247	1
382	1	17	1	2	3429N	6728W	0	50	11	12	60	1406	8	22.20	22.20	4	2	202	0	115247	1
383	1	17	1	3	3429N	6728W	50	100	11	12	60	1414	8	22.20	21.80	4	2	202	0	115247	1
384	1	17	4	1	1953N	68 8W	0	300	20	12	60	1416	44	27.00	0.00	1	2	202	258	43498	1
385	1	17	23	1	1146N	8026W	500	1000	13	2	61	1936	69	0.00	0.00	9	3	202	1319	42110	1
386	1	17	23	2	1146N	8026W	0	400	13	2	61	2007	63	26.70	0.00	1	3	202	402	45110	1
387	1	17	72	1	2650N	32 9W	0	100	25	7	61	1646	16	23.70	20.80	4	3	202	96	76362	1
388	1	17	72	2	2650N	32 9W	100	300	25	7	61	1702	45	20.80	16.10	4	3	202	260	76362	1
389	1	17	72	3	2650N	32 9W	300	500	25	7	61	1747	30	16.10	0.00	4	3	202	175	76362	1
390	1	17	72	4	2650N	32 9W	0	1000	25	7	61	1646	121	23.70	0.00	9	3	202	0	76362	1
391	1	17	76	3	2959N	3731W	0	500	27	7	61	1821	104	24.80	0.00	4	3	202	631	76497	1
392	1	17	76	4	2959N	3731W	500	1000	27	7	61	1803	93	0.00	0.00	9	3	202	954	76497	1
393	1	17	78	4	3316N	4242W	500	1000	29	7	61	1658	77	0.00	0.00	9	3	202	2845	113132	1
394	1	17	79	2	3456N	4521W	0	100	30	7	61	1802	18	25.20	17.00	4	3	202	0	113245	1

EACH SPECIES EXPRESSED IN PERCENT OF TOTAL FORAMINIFERA POPULATION

SERIAL	PUM	EX	DA	MT	YR	SP	PACHL	P/E-L	PACHR	P/E-R	UVULA	HUMIL	BULL	FALCN	INFLT	QUNQL	QUNQR	HIRST	TRUNL	TRUNR	SCITL
345	114	3	23	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.48	0.70	0.00
346	114	3	24	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
347	111	3	25	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.52	0.00
348	114	3	17	11	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
349	114	0	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
350	114	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
351	114	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00
352	114	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
353	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
354	111	6	9	11	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	114	3	11	12	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
356	117	2	3	12	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.36	0.00	0.00	0.00
357	114	2	0	0	0	5	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	2.20	0.00	0.00	0.00	0.10	0.00	0.00
358	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
359	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.02	0.00	0.00	0.00	0.19	0.00	0.00
360	117	2	0	0	0	5	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.33
361	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	11.63	0.00	0.00	0.00	25.58	0.00	0.00	0.00	0.00
362	111	2	0	0	0	5	0.00	1.75	0.00	3.51	0.00	0.00	7.02	0.00	0.00	36.84	42.11	0.00	0.00	0.00	0.00
363	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.56	0.00	0.00
364	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.71	0.71	0.00
365	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00
366	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.63	0.54	0.54	0.00	0.00	0.00	0.00
367	114	2	0	0	0	5	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	60.85	0.00	0.00	0.00	0.25	0.00	0.00
368	114	2	0	0	0	5	0.00	0.00	0.10	0.00	0.00	0.00	0.54	0.00	11.85	0.00	0.00	0.00	0.74	0.05	0.00
369	111	2	0	0	0	5	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	28.43	0.49	0.00	0.00	3.43	0.98	0.00
370	111	2	0	0	0	5	0.00	0.00	0.00	5.00	0.00	0.00	5.00	0.00	25.00	5.00	0.00	0.00	5.00	0.00	0.00
371	111	2	0	0	0	5	0.42	0.00	1.69	0.00	0.00	0.00	0.42	0.00	15.19	0.00	0.00	32.07	0.84	1.69	0.00
372	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.43	0.00	0.00	0.00	0.00	0.00	0.00
373	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	84.62	0.00	0.00	0.00	0.00	0.00	0.00
374	111	2	0	0	0	4	5.88	0.00	0.00	0.00	0.00	0.00	5.88	0.00	47.06	0.00	0.00	0.00	0.00	0.00	0.00
375	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.16	0.00	0.00	0.00	2.15	0.00	0.00
376	114	2	5	2	62	5	0.00	0.71	0.00	13.72	0.00	0.00	3.50	0.00	47.68	0.00	0.00	0.00	0.05	0.05	0.00
377	111	2	6	2	62	5	0.00	0.00	12.93	14.97	0.00	0.00	2.72	0.00	39.46	0.00	0.00	0.00	0.00	0.00	0.68
378	111	2	0	0	0	5	0.00	0.00	52.38	1.59	0.00	0.00	3.17	0.00	7.94	0.00	0.00	0.00	0.00	0.00	1.59
379	114	2	13	1	62	5	0.00	0.00	2.74	18.36	0.00	0.00	0.55	0.00	15.62	0.00	0.00	0.00	0.00	3.01	0.00
380	111	2	0	0	0	5	0.00	0.00	0.00	16.46	0.00	0.00	43.04	0.00	21.52	0.00	0.00	0.00	0.00	0.00	0.00
381	114	3	20	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	3.21	0.00	0.00	0.00	0.00	0.00	42.67	3.13	0.00
382	111	3	20	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.00	0.00	0.00	0.00	0.00	50.37	2.22	0.00
383	111	3	21	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	3.77	0.00	0.00	0.00	0.00	0.00	47.28	6.28	0.00
384	111	3	23	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.26	0.00
385	111	3	26	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.70	0.00
386	114	3	27	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00
387	111	3	0	0	0	4	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00
388	111	3	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.48	0.00	0.00
389	111	3	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390	114	3	10	11	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.00	0.14
391	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06	1.06	0.00
392	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
393	111	2	0	0	0	4	1.07	0.00	7.14	0.00	0.00	0.00	0.00	0.00	57.50	0.00	0.00	6.43	2.86	0.36	2.14
394	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.61	0.00	0.00	0.00	0.00	0.00	0.00

SERIAL	PUMIL	CRASS	HEXAG	DUTRR	DUTRL	CNGLM	GLUTN	OBLIQ	SPIUN	SPHUN	RUBES	TENEL	RUBRP	RUBRW	G.DIG	ADAMS	AEQSY	AEQAS
345	0.00	0.00	0.00	0.70	0.00	0.00	1.48	0.00	0.00	0.70	0.00	0.00	12.54	5.00	0.00	0.00	2.11	32.32
346	0.00	0.00	0.00	0.41	0.00	0.00	2.03	0.20	0.00	1.01	0.00	0.00	19.27	1.42	0.00	0.00	11.76	12.17
347	0.00	0.00	0.00	1.41	0.00	0.00	0.70	0.00	2.11	4.93	0.00	0.00	32.39	4.23	0.00	0.00	5.63	16.90
348	0.00	0.00	0.00	0.00	0.00	0.00	1.45	0.00	0.71	1.45	0.00	0.00	17.18	52.35	0.00	0.00	0.00	0.43
349	0.00	0.00	0.00	0.00	0.00	0.00	3.83	0.00	3.83	4.60	0.00	0.00	10.28	70.24	0.00	0.00	0.00	0.88
350	0.00	0.00	0.00	0.00	0.00	0.00	1.41	0.00	2.73	0.24	0.00	0.00	9.13	83.99	0.00	0.00	0.00	1.27
351	0.00	0.00	0.00	0.00	0.00	0.00	5.29	0.00	2.48	1.35	0.00	0.00	8.00	79.28	0.00	0.00	0.00	0.11
352	0.00	0.00	0.00	0.00	0.00	0.00	2.91	0.00	0.09	0.09	0.00	0.00	22.21	74.60	0.00	0.00	0.00	0.00
353	0.00	0.00	0.00	0.00	0.00	0.00	1.69	0.00	0.00	0.85	0.00	0.00	16.10	79.66	0.00	0.00	0.00	0.85
354	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.85	3.70	0.00	0.00	67.90	17.90	0.00	0.00	0.00	0.00
355	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	4.06	0.00	0.00	0.00	51.07	40.10	0.00	0.00	0.00	0.08
356	0.00	0.00	0.00	0.17	0.17	0.00	5.02	0.00	2.69	2.33	0.00	0.00	41.30	44.89	0.00	0.00	0.00	0.36
357	0.00	0.00	0.00	0.30	0.00	0.00	1.90	0.00	2.61	0.50	0.00	0.00	21.34	15.13	0.00	0.00	1.10	47.29
358	0.00	0.00	0.00	0.14	0.00	0.00	0.41	0.00	2.45	1.23	0.00	0.00	70.71	15.26	0.00	0.00	0.00	4.50
359	0.00	0.58	0.00	0.39	0.00	0.00	0.00	0.00	6.99	1.75	0.00	0.00	45.05	8.35	0.00	0.00	1.17	13.59
360	0.00	0.02	0.00	0.16	0.00	0.00	0.05	0.05	3.26	3.38	0.00	0.00	45.24	5.49	0.00	0.00	0.02	36.16
361	0.00	0.00	0.00	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.16	2.33	0.00	0.00	0.00	3.49
362	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.26	0.00	0.00	0.00	0.00	0.00
363	0.00	0.00	0.00	0.00	0.00	0.00	2.25	0.00	1.13	6.20	0.00	0.00	6.48	70.14	0.00	0.00	0.56	3.66
364	0.00	0.00	0.00	0.00	0.00	0.00	4.29	0.00	0.00	14.29	0.00	0.00	5.00	57.86	0.00	0.00	0.00	5.71
365	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	8.00	0.00	0.00	2.00	75.33	0.00	0.00	0.00	2.67
366	0.00	0.00	0.00	1.09	0.00	0.00	2.17	0.00	0.54	6.52	0.00	0.00	3.80	10.87	0.00	0.00	1.09	25.54
367	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.12	6.61	0.00	0.00	8.60	6.98	0.00	0.00	0.00	12.97
368	0.00	0.00	0.00	3.36	0.05	0.00	2.27	0.49	0.00	16.54	0.00	0.00	2.27	39.01	0.00	0.00	5.93	11.65
369	0.00	0.98	0.00	1.96	0.00	0.00	0.49	0.49	0.00	7.35	0.00	0.00	0.00	51.47	0.00	0.00	1.47	0.49
370	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	5.00	20.00	0.00	0.00	0.00	20.00
371	0.00	8.02	0.00	2.11	0.42	0.00	0.84	0.00	0.00	4.64	0.00	0.00	0.42	2.11	0.00	0.00	0.00	1.69
372	0.00	0.32	0.00	0.96	0.00	0.00	1.27	0.00	0.00	9.24	0.00	0.00	14.01	17.52	0.00	0.00	6.05	17.52
373	0.00	9.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54
374	0.00	11.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	5.88	0.00	0.00	0.00	5.88
375	0.00	2.15	0.00	0.00	0.00	0.00	2.15	1.08	0.00	0.00	0.00	0.00	17.20	13.98	0.00	0.00	0.00	4.30
376	0.00	0.00	0.00	1.66	0.00	0.00	0.05	1.04	0.00	4.54	0.00	0.00	4.35	8.47	0.00	0.00	2.03	9.74
377	0.00	17.01	0.00	2.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	1.36	0.00	0.00	0.00	6.12
378	0.00	20.63	0.00	1.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.35
379	0.00	14.79	0.00	7.95	0.00	0.00	0.00	0.00	0.00	3.29	0.00	0.00	0.00	0.00	0.00	0.00	2.74	8.49
380	0.00	1.27	0.00	5.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.59	1.27	0.00	0.00	0.00	1.27
381	0.00	0.00	0.00	0.76	0.00	0.00	0.00	21.37	0.00	1.37	0.00	0.00	0.08	4.27	0.00	0.00	0.00	21.37
382	0.00	0.00	0.00	0.74	0.00	0.00	0.00	25.19	0.00	0.00	0.00	0.00	0.00	7.41	0.00	0.00	0.00	8.89
383	0.00	0.00	0.00	0.42	0.00	0.00	0.00	18.83	0.00	0.84	0.00	0.00	0.00	11.72	0.00	0.00	0.00	8.79
384	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	2.78	0.00	0.00	16.67	3.70	0.00	0.00	8.33	13.89
385	0.00	2.48	0.00	0.41	0.00	0.00	0.41	2.07	0.00	3.31	0.00	0.00	10.74	6.20	0.00	0.00	13.64	28.10
386	0.00	6.74	0.00	0.98	0.00	0.00	0.00	1.09	0.00	1.52	0.00	0.00	6.30	3.48	0.00	0.00	34.13	22.39
387	0.00	0.00	0.00	0.00	0.00	0.00	4.14	0.00	0.00	0.34	0.00	0.00	12.76	50.34	0.00	0.00	0.00	1.03
388	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45	85.02	0.00	0.00	0.48	4.83
389	0.00	0.00	0.00	0.00	0.00	0.00	3.45	0.00	0.00	0.00	0.00	0.00	6.90	62.07	0.00	0.00	0.00	6.90
390	0.00	0.14	0.00	0.00	0.00	0.00	0.41	0.00	0.00	7.84	0.00	0.00	6.19	60.39	0.14	0.00	0.41	2.75
391	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.13	9.57	0.00	0.00	0.00	75.53	0.00	0.00	0.00	3.19
392	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	9.37	50.00	0.00	0.00	3.12	4.69
393	0.00	1.79	0.00	0.71	0.00	0.00	0.00	0.36	0.36	0.00	0.00	0.00	0.36	5.36	0.00	0.00	0.71	1.07
394	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.25	75.90	0.00	0.00	0.00	0.00

SERIAL	AEQBU	CALDA	PELAG	H.DIG	MENAR	TUMID	SACWO	SACCW	DEHIS	CONGL	NITID	IOTA	CAVRN	FLEXU	CRASU	JUV.	TOTAL
345	0.00	0.00	6.62	0.00	0.00	0.00	24.72	0.00	0.00	10.92	0.70	0.00	0.00	0.00	0.00	0	1420.
346	0.00	0.00	12.78	0.00	2.64	0.20	26.77	0.00	0.00	8.52	0.81	0.00	0.00	0.00	0.00	4	493.
347	0.00	0.00	0.70	0.00	2.82	0.00	20.42	0.00	0.00	4.23	0.00	0.00	0.00	0.00	0.00	0	142.
348	0.00	0.00	0.00	0.00	0.00	0.00	26.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	168	3515.
349	0.00	0.00	0.11	0.00	0.22	0.00	6.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	122	914.
350	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	2124.
351	0.00	0.00	0.00	0.00	0.00	0.00	3.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	888.
352	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	1067.
353	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	118.
354	0.00	0.00	4.32	0.00	0.00	0.00	3.09	0.00	0.00	1.23	0.00	0.00	0.00	0.00	0.00	1	162.
355	0.00	0.00	4.22	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17	1257.
356	0.00	0.00	0.00	0.00	0.00	0.00	2.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	4121.
357	0.00	0.00	1.80	0.00	0.10	0.00	3.41	0.00	0.00	2.10	0.00	0.00	0.00	0.00	0.00	0	998.
358	0.00	0.00	0.41	0.00	0.41	0.00	4.09	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0	734.
359	0.00	0.00	0.00	0.00	0.00	0.00	15.73	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0	515.
360	0.00	0.00	0.75	0.00	0.00	0.00	3.59	0.02	0.00	1.28	0.02	0.00	0.00	0.00	0.00	0	4295.
361	0.00	0.00	0.00	0.00	0.00	0.00	2.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	86.
362	0.00	0.00	0.00	0.00	1.75	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	57.
363	0.00	0.00	6.20	0.00	0.00	0.00	2.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	355.
364	0.00	0.00	6.43	0.00	0.71	0.00	3.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	140.
365	0.00	0.00	8.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	150.
366	0.00	0.00	41.85	0.00	1.63	0.00	1.09	0.00	0.00	1.09	0.00	0.00	0.00	0.00	0.00	0	184.
367	0.00	0.00	1.25	0.00	0.00	0.00	0.25	1.37	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0	802.
368	0.10	0.00	1.68	0.00	0.05	0.00	1.68	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	2025.
369	0.00	0.00	1.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	204.
370	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	20.
371	0.00	0.00	27.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	237.
372	0.00	0.00	0.00	0.00	0.64	0.00	11.78	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	314.
373	0.00	0.00	1.54	0.00	1.54	0.00	1.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	65.
374	0.00	0.00	5.88	0.00	5.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	17.
375	0.00	0.00	3.23	0.00	3.23	0.00	5.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	93.
376	0.00	0.00	0.00	0.00	0.09	0.00	1.80	0.47	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0	2114.
377	0.00	0.00	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	147.
378	0.00	0.00	4.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	63.
379	0.00	0.00	16.71	0.00	3.01	0.00	2.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	365.
380	0.00	0.00	0.00	0.00	0.00	0.00	2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	79.
381	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0	1310.
382	0.00	0.00	0.00	0.00	0.74	0.00	2.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	135.
383	0.00	0.00	0.00	0.00	0.00	0.00	1.67	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0	239.
384	0.00	0.00	10.19	0.00	2.78	0.00	22.22	0.00	0.00	8.33	0.93	0.00	0.00	0.00	0.00	4	108.
385	0.00	0.00	2.07	1.24	3.72	0.00	7.02	0.83	0.00	2.07	0.00	0.00	0.00	0.00	0.00	0	242.
386	0.00	0.00	11.52	0.00	3.80	0.00	6.30	0.76	0.11	0.76	0.00	0.00	0.00	0.00	0.00	0	920.
387	0.00	0.00	0.00	0.00	1.03	0.00	29.31	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	3	290.
388	0.00	0.00	0.97	0.00	0.00	0.00	5.31	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00	0	207.
389	0.00	0.00	0.00	0.00	3.45	0.00	17.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	29.
390	0.00	0.00	10.18	0.00	0.00	0.00	10.73	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	15	727.
391	0.00	0.00	3.19	0.00	0.00	0.00	3.19	0.00	0.00	1.06	0.00	0.00	0.00	0.00	0.00	0	94.
392	0.00	0.00	15.62	0.00	0.00	0.00	1.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	64.
393	0.00	0.00	10.36	0.00	1.07	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	280.
394	0.00	0.00	0.00	0.00	0.00	0.00	7.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	83.

VEMA 17 PLANKTON SAMPLES EXAMINED FOR PLANKTONIC FORAMINIFERA AS OF AUGUST 1971

SERIAL NO.	SHIP	CR	STATION	SAMPLE	LAT.	LONG.	DEPTH (M) FROM	TO	DATE DA	MT	YR	TIME	DUR MIN	TEMP. UPPER	DEEPER	DEV	TYPE TOW	MESH	VWF	MARSDEN SQUARE	OCEAN
395	1	17	79	5	3456N	4521W	500	1000	30	7	61	1802	84	0.00	0.00	9	3	202	3153	113245	1
396	1	17	80	2	3545N	47 5W	0	100	31	7	61	1429	14	26.00	18.50	4	3	202	191	113457	1
397	1	17	80	5	3545N	47 5W	500	1000	31	7	61	1415	90	0.00	0.00	9	3	202	1764	113457	1
398	1	17	83	1	3921N	5347W	0	100	2	8	61	2015	30	26.50	22.70	4	3	202	185	114393	1
399	1	17	83	4	3921N	5347W	500	1000	2	8	61	2010	85	0.00	0.00	9	3	202	4667	114393	1
400	1	17	90	1	4024N	6310W	0	10	24	9	61	1750	65	22.90	22.90	1	1	202	288	1511 3	1
401	1	17	91	1	3915N	63 9W	0	10	25	9	61	1005	60	26.00	26.00	1	1	202	353	115393	1
402	1	17	92	1	37 4N	6257W	0	10	26	9	61	1102	50	25.80	25.80	1	1	202	197	115372	1
403	1	17	73	2	2758N	34 9W	0	300	26	7	61	1003	52	24.30	16.60	1	2	202	334	76374	1
2032	1	17	68	1	1841N	2138W	0	300	21	7	61	1025	35	24.20	0.00	4	3	202	0	39381	1
2033	1	17	69	1	2120N	24 4W	0	300	22	7	61	1415	40	24.00	0.00	4	3	202	0	75114	1
2401	1	17	67	1	1659N	20 4W	0	850	20	7	61	1425	50	25.00	0.00	4	4	202	0	39360	1
2402	1	17	68	2	1841N	2138W	0	600	21	7	61	1100	57	24.20	0.00	4	4	202	0	39381	1
2403	1	17	69	2	2120N	24 4W	300	600	22	7	61	1455	33	0.00	0.00	4	4	202	0	75114	1
2404	1	17	69	3	2120N	24 4W	600	850	22	7	61	1528	22	0.00	0.00	4	4	202	0	75114	1
2405	1	17	69	4	2120N	24 4W	0	10	22	7	61	1330	145	24.00	0.00	1	1	202	0	75114	1
2406	1	17	70	1	2315N	2644W	0	300	23	7	61	1515	40	0.00	0.00	4	4	202	0	75236	1
2407	1	17	70	3	2315N	2644W	0	850	23	7	61	1620	80	0.00	0.00	4	4	202	0	75236	1
2408	1	17	70	4	2315N	2644W	0	10	23	7	61	1230	185	0.00	0.00	1	1	202	0	75236	1
2409	1	17	71	1	2458N	2859W	0	300	24	7	61	1540	30	23.80	0.00	4	4	202	0	75248	1
2410	1	17	71	2	2458N	2859W	300	600	24	7	61	1610	33	0.00	0.00	4	4	202	0	75248	1
2411	1	17	71	3	2458N	2859W	600	850	24	7	61	1643	34	0.00	0.00	4	4	202	0	75248	1
2483	1	17	70	1	2315N	2644W	0	300	23	7	61	1515	40	0.00	0.00	4	5	202	0	75236	1
3028	1	17	1	2	3429N	6828W	100	150	11	12	60	1406	26	21.00	0.00	4	2	202	0	115248	1
3029	1	17	2	1	2829N	65 3W	500	1000	15	12	60	1024	37	23.30	0.00	1	2	202	257	79485	1
3030	1	17	76	1	2959N	3731W	0	100	27	7	61	2012	3	24.80	0.00	4	3	202	0	76497	1
3031	1	17	78	1	3316N	4242W	300	500	29	7	61	1748	27	26.10	0.00	4	3	202	158	113132	1
3032	1	17	79	1	3456N	4521W	0	10	30	7	61	1640	90	26.30	0.00	1	1	202	450	113245	1
3033	1	17	79	3	3456N	4521W	100	300	30	7	61	1820	35	26.30	0.00	4	3	202	207	113245	1
3034	1	17	79	4	3456N	4521W	300	500	30	7	61	1855	31	26.30	0.00	4	3	202	183	113245	1
3035	1	17	80	3	3545N	47 5W	100	300	31	7	61	1443	15	26.00	0.00	4	3	202	208	113457	1
3036	1	17	80	4	3545N	47 5W	300	500	31	7	61	1458	12	26.00	0.00	4	3	202	163	113457	1
3037	1	17	83	2	3921N	5347W	100	300	2	8	61	2045	18	26.50	0.00	4	3	202	159	114393	1
3038	1	17	83	3	3921N	5347W	300	500	2	8	61	2103	32	26.50	0.00	4	3	202	289	114393	1
3039	1	17	87	3	43 1N	5951W	100	300	4	8	61	2012	33	18.40	0.00	4	3	202	271	150239	1
3040	1	17	87	4	43 1N	5951W	300	500	4	8	61	2045	32	18.40	0.00	4	3	202	271	150239	1
3041	1	17	87	5	43 1N	5951W	500	1000	4	8	61	2117	13	18.40	0.00	4	3	202	5289	150239	1

EACH SPECIES EXPRESSED IN PERCENT OF TOTAL FORAMINIFERA POPULATION

SERIAL	PUM	EX	DA	MT	YR	SP	PACHL	P/E-L	PACHR	P/E-R	UVULA	HUMIL	BULL	FALCN	INFLT	QUNQL	QUNQR	HIRST	TRUNL	TRUNR	SCITL
395	111	2	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	0.00	0.00	4.00	0.00	0.00	0.00
396	111	3	0	0	0	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.32	0.00	0.00	0.00	0.83	0.00	0.41
397	111	3	8	12	61	5	0.00	0.00	2.04	0.68	0.00	0.00	0.00	0.00	7.48	2.04	0.00	7.48	0.00	0.68	2.04
398	114	2	0	0	0	4	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00
399	111	3	16	12	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.24	0.36	1.90	0.24
400	114	10	20	10	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
401	117	10	4	11	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402	117	10	8	11	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
403	111	3	4	12	61	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.64	0.00	0.00
2032	114	13	20	2	67	6	0.00	0.00	0.48	13.51	0.00	0.00	1.49	0.00	6.85	0.00	0.00	0.00	0.00	0.00	0.26
2033	111	12	20	2	67	6	0.00	0.00	0.21	2.97	0.00	0.00	1.48	0.00	3.39	0.00	0.00	0.85	1.27	0.00	0.85
2401	113	14	28	2	67	6	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00
2402	111	12	10	5	67	6	0.00	0.37	1.47	0.73	0.00	0.00	1.10	1.47	8.06	0.00	0.00	8.42	0.73	0.00	8.42
2403	111	14	11	5	67	6	1.32	0.00	2.63	2.63	0.00	0.00	2.63	0.00	2.63	0.00	0.00	2.63	0.00	0.00	1.32
2404	111	13	9	5	67	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2405	114	12	11	5	67	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2406	111	14	9	5	67	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.33
2407	111	12	9	5	67	6	0.00	0.00	0.00	0.00	0.00	0.00	2.01	0.57	0.29	0.00	0.00	0.29	0.29	0.00	2.01
2408	113	12	12	5	67	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2409	111	13	9	5	67	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2410	111	12	9	5	67	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2411	111	12	9	5	67	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2483	111	13	14	6	67	6	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.38	0.00	0.00	2.26
3028	111	3	21	10	61	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.00	0.00
3029	111	3	21	10	61	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3030	111	2	0	0	0	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3031	111	2	0	0	0	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.45	0.00	0.00	9.09	9.09	9.09	0.00
3032	111	2	0	0	0	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3033	111	2	0	0	0	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	25.00	0.00	0.00
3034	111	2	0	0	0	6	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3035	111	3	9	12	61	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	0.00	10.00	0.00	0.00
3036	111	3	8	12	61	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	0.00	0.00	11.76	5.88	0.00	5.88
3037	111	2	2	8	61	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.29	0.00	0.00	0.00	0.00	0.00	0.00
3038	111	2	2	8	61	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.56	0.00	0.00	0.00	0.00	0.00	0.00
3039	111	2	0	0	0	6	0.00	0.00	0.00	40.00	0.00	0.00	20.00	0.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00
3040	111	2	0	0	0	6	0.00	0.00	20.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3041	111	2	0	0	0	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SERIAL	PUMIL	CRASS	HEXAG	DUTRR	DUTRL	CNGLM	GLUTN	OBLIQ	SPIUN	SPHUN	RUBES	TENEL	RUBRP	RUBRW	G.DIG	ADAMS	AEQSY	AEQAS
395	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00	0.00	0.00	32.00
396	0.00	0.41	0.00	0.41	0.00	0.00	1.66	0.00	0.83	15.35	0.00	0.00	10.37	29.88	0.00	0.00	0.41	15.35
397	0.00	15.65	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.68	0.00	0.00	0.00	2.04	0.00	0.00	0.00	3.40
398	0.00	0.07	0.00	0.00	0.00	0.00	1.02	0.00	0.87	2.91	0.00	0.00	24.62	6.85	0.00	0.00	1.02	35.03
399	0.00	5.12	0.00	1.79	0.00	0.00	0.36	0.48	0.24	14.05	0.00	0.00	4.29	10.36	0.00	0.00	2.26	5.36
400	0.00	0.00	0.00	1.58	0.00	0.00	0.00	0.00	1.05	0.16	0.00	0.00	78.13	2.27	0.00	0.00	0.00	2.11
401	0.00	0.00	0.00	3.31	0.00	0.00	1.41	1.26	0.16	0.25	0.00	0.00	66.25	10.95	0.00	0.00	0.00	0.08
402	0.00	0.00	0.00	1.36	0.00	0.00	0.72	0.01	0.88	0.59	0.00	0.00	45.55	17.37	0.00	0.00	0.00	5.59
403	0.00	0.00	0.00	0.00	0.00	0.00	1.91	0.00	3.82	6.69	0.00	0.00	10.19	53.50	0.00	0.00	0.96	10.51
2032	0.00	0.00	0.00	1.56	0.00	0.00	6.40	0.00	0.00	3.72	0.00	0.00	3.69	27.07	0.00	0.00	0.00	4.73
2033	0.00	1.69	0.00	0.64	0.00	0.00	2.75	0.21	0.00	2.54	0.00	0.00	14.83	30.30	0.00	0.00	0.00	2.97
2401	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	5.00	0.00	0.00	15.00
2402	0.00	2.56	0.00	1.47	0.00	0.00	2.56	0.00	0.37	5.49	0.00	0.00	9.52	4.40	2.20	0.00	2.56	8.79
2403	0.00	7.89	0.00	0.00	0.00	2.63	6.58	0.00	0.00	0.00	0.00	0.00	10.53	11.84	0.00	0.00	1.32	1.32
2404	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	20.00	20.00	0.00	0.00	0.00	0.00
2405	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	5.08	4.69	0.00	0.00	33.59	19.92	0.00	0.00	0.00	0.00
2406	0.00	10.00	0.00	0.00	0.00	0.00	6.67	0.00	3.33	0.00	0.00	0.00	10.00	20.00	0.00	0.00	3.33	0.00
2407	0.00	1.72	0.00	0.00	0.00	0.00	2.30	0.00	0.86	2.01	0.00	0.00	22.13	39.94	0.29	0.00	1.44	1.72
2408	0.00	0.00	0.00	0.00	0.00	0.00	3.67	0.00	2.20	2.69	0.00	0.00	26.16	27.63	0.00	0.00	0.00	0.24
2409	0.00	0.00	0.00	0.00	0.00	0.00	6.17	0.00	0.00	0.00	0.00	0.00	4.94	60.49	0.00	0.00	0.00	0.00
2410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.44	0.00
2411	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.22	33.33	0.00	0.00	0.00	0.00
2483	0.00	1.50	0.00	1.50	0.00	0.00	3.76	0.00	0.00	0.00	0.00	0.00	13.16	41.73	0.00	0.00	0.00	0.38
3028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	10.00
3029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3030	0.00	0.00	0.00	0.00	0.00	0.00	13.64	0.00	0.00	0.00	0.00	0.00	22.73	54.55	0.00	0.00	0.00	0.00
3031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	0.00	0.00	0.00	9.09	0.00	0.00	0.00	0.00
3032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.41	13.79	0.00	0.00	0.00	3.45
3033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	25.00
3034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	30.00
3035	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00
3036	0.00	11.76	0.00	0.00	0.00	0.00	0.00	0.00	5.88	0.00	0.00	0.00	5.88	11.76	0.00	0.00	0.00	0.00
3037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.29	14.29	0.00	0.00	0.00	14.29
3038	0.00	55.56	0.00	5.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.56	0.00	0.00	5.56	5.56
3039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SERIAL	AEQBU	CALDA	PELAG	H.DIG	MENAR	TUMID	SACWO	SACCW	DEHIS	CONGL	NITID	IOTA	CAVRN	FLEXU	CRASU	JUV.	TOTAL
395	0.00	0.00	24.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	25.
396	0.41	0.00	15.77	0.00	0.83	0.00	3.32	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	10	241.
397	10.88	0.00	34.69	6.80	1.36	0.00	0.00	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	147.
398	0.00	0.00	3.35	0.00	0.58	0.00	17.48	0.07	0.00	5.10	0.00	0.00	0.00	0.00	0.00	0	1373.
399	0.00	0.00	32.50	0.71	4.05	0.00	2.62	0.00	0.00	12.98	0.00	0.00	0.00	0.00	0.00	14	840.
400	0.00	0.00	0.00	0.00	0.53	0.00	5.58	0.00	0.00	8.59	0.00	0.00	0.00	0.00	0.00	50	1898.
401	0.00	0.00	0.01	0.00	0.99	0.00	13.84	0.00	0.00	1.49	0.00	0.00	0.00	0.00	0.00	0	12169.
402	0.00	0.00	0.00	0.00	8.27	0.00	12.44	0.00	0.00	7.20	0.00	0.00	0.00	0.00	0.00	0	6904.
403	0.64	0.00	2.23	0.00	0.00	0.00	8.28	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	37	314.
2032	12.03	0.00	0.00	0.00	2.53	0.00	15.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	115	2686.
2033	1.48	0.00	0.64	0.00	11.86	0.00	18.64	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	10	472.
2401	0.00	0.00	25.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	200.
2402	7.33	0.00	13.19	1.10	2.93	0.00	4.40	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	273.
2403	13.16	0.00	0.00	2.63	9.21	0.00	15.79	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	76.
2404	0.00	0.00	0.00	0.00	20.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	5.
2405	0.00	0.00	0.00	0.00	5.86	0.00	30.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20	2560.
2406	0.00	0.00	13.33	0.00	3.33	0.00	26.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	30.
2407	0.00	0.00	1.72	0.00	4.02	0.00	15.52	0.29	0.00	0.57	0.00	0.00	0.00	0.00	0.00	9	348.
2408	0.00	0.00	0.00	0.00	11.49	0.00	24.69	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	70	4090.
2409	0.00	0.00	0.00	0.00	4.94	0.00	23.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21	81.
2410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	1.
2411	0.00	0.00	0.00	0.00	48.89	0.00	15.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	45.
2483	0.38	0.00	0.00	0.00	9.77	0.00	23.68	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.00	5	266.
3028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	10.
3029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.
3030	0.00	0.00	0.00	0.00	0.00	0.00	9.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	22.
3031	0.00	0.00	9.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	11.
3032	0.00	0.00	0.00	0.00	0.00	0.00	3.45	0.00	0.00	6.90	0.00	0.00	0.00	0.00	0.00	0	29.
3033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	4.
3034	0.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	10.
3035	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	10.
3036	0.00	0.00	35.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	17.
3037	0.00	0.00	0.00	0.00	0.00	0.00	28.57	0.00	0.00	14.29	0.00	0.00	0.00	0.00	0.00	0	7.
3038	0.00	0.00	0.00	0.00	0.00	0.00	11.11	0.00	0.00	5.56	0.00	0.00	0.00	0.00	0.00	0	18.
3039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	5.
3040	0.00	0.00	60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	5.
3041	0.00	0.00	99.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	1.

VEMA CRUISE 17 PLANKTON SAMPLE FIELD DATA

SERIAL NO.	STATION	SAMPLE	POSITION LATITUDE	POSITION LONGITUDE	DEPTH (M) UPPER	DEPTH (M) LOWER	DATE DA	DATE MO	DATE YR	TIME ST	TIME END	TEMP. (C) UPPER	TEMP. (C) LOWER	MESH	VWF	MARSDEN SQUARE	OCEAN
381	1	1	3429 N	6728 W	0	150	11	12	60	1335	1400	22.20	20.00	202	69	115247	1
382	1	2	3429 N	6728 W	0	50	11	12	60	1406	1414	22.20	22.20	202		115247	1
3028	1	2	3429 N	6828 W	100	150	11	12	60	1406	1432	21.00		202		115248	1
383	1	3	3429 N	6728 W	50	100	11	12	60	1414	1422	22.20	21.80	202		115247	1
3029	2	1	2829 N	65 3 W	500	1000	15	12	60	1024	1211	23.30		202	257	79485	1
4516	2	2	2829 N	65 3 W	0	300	15	12	60	1105	1200	23.30		202	172	79485	1
345	3	1	1950 N	6724 W	0	10	18	12	60	1340	1445	27.00	27.00	202	894	43497	1
384	4	1	1953 N	68 8 W	0	300	20	12	60	1416	1500	27.00		202	258	43498	1
346	4	2	1953 N	68 8 W	0	10	20	12	60	1406	1536	27.00	27.00	202	1332	43498	1
4517	5	1	2550 N	83 6 W	0	10	31	12	60	1040	1205	22.00		202	458	81353	1
4518	5	2	26 0 N	83 5 W	0	10	31	12	60	1955	2110	22.50		202	231	81363	1
4519	6	1	2539 N	84 9 W	0	10	1	1	61	1325	1430	23.00		202	464	81354	1
4520	7	1	2520 N	8431 W	0	10	3	1	61	1529	1630	23.50		202	674	81354	1
4521	8	1	23 4 N	9046 W	0	10	5	1	61	1505	1615	23.00		202	465	82130	1
4522	9	1	2422 N	9134 W	0	300	6	1	61	916	951	23.10		202	210	82141	1
4523	10	1	2551 N	9233 W	0	300	7	1	61	954	1031	23.70		202	223	82352	1
4524	10	2	2551 N	9230 W	0	10	7	1	61	1250	1447	24.00		202	130	82352	1
4525	11	1	2736 N	9411 W	0	10	13	1	61	2045	2220	20.50		202	840	82374	1
4526	12	1	2432 N	91 9 W	0	1000	16	1	61	1420	1605	22.20		202	1904	82141	1
4527	12	2	2432 N	91 9 W	0	300	16	1	61	1505	1540	22.70		202	160	82141	1
4528	12	3	2432 N	91 9 W	0	10	16	1	61	1400	1620	22.20		202	1520	82141	1
4529	13	1	2327 N	9016 W	0	300	17	1	61	1108	1145	22.80		202	230	82130	1
4530	13	2	2327 N	9016 W	500	1000	17	1	61	1041	1127	22.80		202	635	82130	1
4532	14	1	23 2 N	9041 W	500	1000	18	1	61	833	1031	23.00		202	2244	82130	1
4533	14	2	23 2 N	9041 W	0	325	18	1	61	921	1011	23.00		202	154	82130	1
4534	14	3	23 2 N	9041 W	0	50	18	1	61	936	1002	23.00		202		82130	1
4535	14	4	23 2 N	9041 W	50	100	18	1	61	936	1002	23.00		202		82130	1
4536	14	5	23 2 N	9041 W	100	150	18	1	61	936	1002	23.00		202		82130	1
4537	14	6	23 2 N	9041 W	0	10	18	1	61	830	1131	23.00		202	1633	82130	1
4538	15	1	24 0 N	9128 W	0	10	26	1	61	235	425	22.20		202	554	82141	1
4539	15	2	24 0 N	9128 W	0	319	26	1	61	302	340	22.20		202	145	82141	1
4540	15	3	24 0 N	9128 W	500	1000	26	1	61	230	402	22.20		202	214	82141	1
4541	16	1	2045 N	8417 W	500	1000	30	1	61	1855	1946	26.90		202	1349	811 4	1
4542	16	2	2045 N	8417 W	0	300	30	1	61	1919	2018	26.90		202	189	811 4	1
4531	16	3	2327 N	9016 W	0	10	17	1	61	1000	1230	22.80		202	1738	82130	1
4543	16	3	2045 N	8417 W	0	10	30	1	61	1830	2035	26.90		202	1569	811 4	1
4544	17	1	2047 N	8327 W	0	10	2	2	61	1930	2201	28.30		202	1552	811 3	1
4545	18	1	1924 N	8513 W	0	10	4	2	61	930	1730	27.00		202	1211	45495	1
4546	19	1	1816 N	8548 W	0	10	6	2	61	1100	1400	26.80		202	1595	45485	1
4547	20	1	1822 N	84 0 W	0	10	8	2	61	1030	1300	27.20		202	533	45384	1
4548	21	1	1836 N	81 0 W	0	10	10	2	61	1445	1800	27.10		202	807	45381	1
347	22	1	1833 N	8129 W	0	10	11	2	61	1105	1330	27.00		202	755	45381	1
385	23	1	1146 N	8026 W	500	1000	13	2	61	1936	2045	0.00		202	1319	42110	1
386	23	2	1146 N	8026 W	0	400	13	2	61	2007	2110	26.70		202	402	45110	1
4549	23	3	1145 N	8025 W	0	10	13	2	61	1920	2200	26.70		202	763	45110	1
4550	24	1	6 9 N	7953 W	0	10	19	2	61	1944	3	21.30		202	135	8469	3
4551	24	2	6 7 N	7955 W	500	1000	19	2	61	2138	2357	21.61		202	2745	8469	3
4552	24	3	6 7 N	7986 W	0	100	19	2	61	2204	2212	21.61		202		8469	3
4620	24	4	6 7 N	7976 W	100	250	19	2	61	2212	2222	21.61		202		8469	3
4621	24	5	6 7 N	7976 W	250	500	19	2	61	2222	2232	21.61		202		8469	3

VEMA CRUISE 17 PLANKTON SAMPLE FIELD DATA

SERIAL NO.	STATION	SAMPLE	POSITION LATITUDE	POSITION LONGITUDE	DEPTH (M) UPPER	DEPTH (M) LOWER	DATE DA	DATE MO	DATE YR	TIME ST	TIME END	TEMP. (C) UPPER	TEMP. (C) LOWER	MESH	VWF	MARSDEN SQUARE	OCEAN
4553	25	1	559 N	7914 W	0	10	20	2	61	1336	1505	21.00		202	962	8459	3
4554	25	2	559 N	7914 W	0	10	20	2	61	1340	1457	21.00		202	3644	8459	3
4555	26	1	332 N	8111 W	0	10	21	2	61	2333	44	23.50		202	120	9131	3
4556	27	1	152 N	8237 W	0	10	23	2	61	342	510	25.00		202	151	9112	3
4557	27	2	152 N	8237 W	0	100	23	2	61	519	528	25.00		202		9112	3
4622	27	3	152 N	8237 W	100	250	23	2	61	528	535	25.00		202		9112	3
4623	27	4	152 N	8237 W	250	500	23	2	61	535	553	25.00		202		9112	3
4558	28	1	334 S	85 7 W	0	10	25	2	61	934	1055	28.20		202	133	308235	4
4559	28	2	334 S	85 7 W	0	10	25	2	61	939	1052	28.20		202	320	308235	4
3199	29	1	710 S	8550 W	0	40	26	2	61	1932	2053	27.40		202		308475	4
4560	29	1	710 S	8550 W	0	10	26	2	61	1938	2058	27.20		202	398	308475	4
4561	30	1	16 2 S	8234 W	0	10	2	3	61	20	208	24.20		202	182	344362	4
4562	30	2	16 2 S	8234 W	0	10	2	3	61	28	156	24.20		202	467	344362	4
4563	31	1	2221 S	7857 W	0	10	4	3	61	940	1057	21.80		202	555	379228	4
4564	31	2	2221 S	7857 W	0	100	4	3	61	1304	1317	21.75		202		379228	4
4565	31	3	2221 S	7857 W	100	250	4	3	61	1304	1337	21.75		202		379228	4
4566	31	4	2221 S	7857 W	0	500	4	3	61	1337	1422	21.75		202		379228	4
4567	32	1	2843 S	7545 W	0	10	6	3	61	1524	1651	19.90		202	639	379485	4
4568	33	1	3332 S	7259 W	0	10	12	3	61	1427	1633	16.30		202	459	415132	4
4569	33	2	3332 S	7259 W	0	10	12	3	61	1424	1637	16.30		202	402	415132	4
4570	34	1	3429 S	7421 W	0	10	13	3	61	1238	1520	16.80		202	1129	415144	4
4571	35	1	3615 S	7651 W	0	10	14	3	61	1802	2038	17.80		202	1020	415466	4
4572	36	1	3713 S	7744 W	0	10	15	3	61	1447	2015	18.10		202	1648	415477	4
2113	37	1	3757 S	75 8 W	0	10	16	3	61	1410	1837	16.50		202	729	415475	4
4573	38	1	3758 S	7510 W	0	10	21	3	61	1127	1413	16.50		202	1092	415475	4
4574	38	2	3758 S	7510 W	0	10	21	3	61	1010	1408	16.50		202	525	415475	4
4575	39	1	4033 S	75 9 W	0	10	22	3	61	1125	1500	14.90		202	334	4512 5	4
4576	40	1	47 0 S	7556 W	0	10	24	3	61	1805	2125	0.00		202	298	451475	4
4577	41	1	4924 S	7845 W	0	10	25	3	61	2116	55	0.00		202	480	451498	4
4578	42	1	57 2 S	7429 W	0	10	15	4	61	1305	1408	6.20		202	1134	487374	4
4579	43	1	60 8 S	7456 W	0	10	16	4	61	2133	2245	4.10		202	299	5231 4	4
4580	44	1	6135 S	6827 W	0	10	20	4	61	212	340	3.30		202	267	522218	2
4581	45	1	6059 S	6027 W	0	10	26	4	61	1935	2039	0.00		202	360	5221 0	2
4582	46	1	5634 S	6234 W	0	10	6	5	61	1744	2032	5.00		202	480	486362	2
4583	47	1	4358 S	52 9 W	0	10	26	5	61	1300	1347	10.60		202	267	449132	2
4584	48	1	4433 S	4919 W	0	10	27	5	61	1412	1500	10.80		202	240	448249	2
4585	49	1	4522 S	4658 W	0	10	28	5	61	1052	1201	10.10		202	306	448456	2
4586	50	1	4834 S	36 4 W	0	10	31	5	61	1207	1302	6.10		202	328	447486	2
4587	51	1	5015 S	3553 W	0	10	1	6	61	916	1051	3.10		202	358	4832 5	2
4588	52	1	4735 S	4321 W	0	10	6	6	61	1309	1415	7.40		202	267	448373	2
4589	53	1	48 3 S	45 6 W	0	10	7	6	61	1024	1215	7.40		202	390	448485	2
4590	54	1	4410 S	5432 W	0	10	15	6	61	2310	2352	9.10		202	204	449144	2
4591	55	1	2149 S	3543 W	0	10	3	7	61	1432	1532	24.40		202	155	375215	2
4592	56	1	1957 S	34 3 W	0	10	4	7	61	1251	1405	24.90		202	270	339394	2
4593	57	1	18 9 S	3244 W	0	10	5	7	61	1125	1239	25.00		202	197	339382	2
4594	58	1	523 S	2126 W	0	10	10	7	61	1312	1533	26.30		202	279	302351	2
4595	59	1	3 9 S	1923 W	0	10	11	7	61	1920	2030	24.60		202	308	301239	2
4596	60	1	134 S	1916 W	0	10	12	7	61	1835	2023	23.20		202	195	301219	2
4597	61	1	023 N	1758 W	0	10	13	7	61	1904	2018	22.80		202	241	22 7	1
4598	62	1	328 N	1831 W	0	10	14	7	61	1902	2013	27.20		202	152	2238	1

VEMA CRUISE 17 PLANKTON SAMPLE FIELD DATA

SERIAL NO.	STATION	SAMPLE	POSITION LATITUDE	POSITION LONGITUDE	DEPTH (M) UPPER	DEPTH (M) LOWER	DATE DA	DATE MO	DATE YR	TIME ST	TIME END	TEMP. (C) UPPER	TEMP. (C) LOWER	MESH	VWF	MARSDEN SQUARE	OCEAN
4599	63	1	922 N	1839 W	0	10	16	7	61	1210	1405	27.00		202	270	2498	1
4600	64	1	1224 N	1855 W	0	10	17	7	61	1213	1424	26.10		202	174	38228	1
4601	65	1	1517 N	1826 W	0	500	19	7	61	1855	1925	26.60		202		38458	1
4602	66	1	17 0 N	20 2 W	0	300	20	7	61	1105	1138	25.00		202		39370	1
4603	66	2	17 0 N	20 2 W	600	850	20	7	61	1205	1228	25.00		202		39370	1
2401	67	1	1659 N	20 4 W	0	850	20	7	61	1425	1515	25.00		202		39360	1
2032	68	1	1841 N	2138 W	0	300	21	7	61	1025	1100	24.20		202		39381	1
2402	68	2	1841 N	2138 W	0	600	21	7	61	1100	1157	24.20		202		39381	1
2033	69	1	2120 N	24 4 W	0	300	22	7	61	1415	1455	24.00		202		75114	1
2403	69	2	2120 N	24 4 W	300	600	22	7	61	1455	1528	0.00		202		75114	1
2404	69	3	2120 N	24 4 W	600	850	22	7	61	1528	1550	0.00		202		75114	1
2405	69	4	2120 N	24 4 W	0	10	22	7	61	1330	1555	24.00		202		75114	1
2406	70	1	2315 N	2644 W	0	300	23	7	61	1515	1555	0.00		202		75236	1
2483	70	1	2315 N	2644 W	0	300	23	7	61	1515	1555	0.00		202		75236	1
2407	70	3	2315 N	2644 W	0	850	23	7	61	1620	1740	0.00		202		75236	1
2408	70	4	2315 N	2644 W	0	10	23	7	61	1230	1535	0.00		202		75236	1
2409	71	1	2458 N	2859 W	0	300	24	7	61	1540	1610	23.80		202		75248	1
2410	71	2	2458 N	2859 W	300	600	24	7	61	1610	1643	0.00		202		75248	1
2411	71	3	2458 N	2859 W	600	850	24	7	61	1643	1717	0.00		202		75248	1
4604	71	4	2458 N	2859 W	0	10	24	7	61	1300	1551	23.80		202	1403	75248	1
387	72	1	2650 N	32 9 W	0	100	25	7	61	1646	1702	23.70	20.80	202	96	76362	1
388	72	2	2650 N	32 9 W	100	300	25	7	61	1702	1747	20.80	16.10	202	260	76362	1
389	72	3	2650 N	32 9 W	300	500	25	7	61	1747	1817	16.10		202	175	76362	1
390	72	4	2650 N	32 9 W	0	1000	25	7	61	1646	1847	23.70		202		76362	1
348	72	5	2650 N	32 9 W	0	10	25	7	61	1735	1835	24.20		202	467	76362	1
349	73	1	2758 N	34 9 W	0	10	26	7	61	850	935	24.30	24.30	202	157	76374	1
403	73	2	2758 N	34 9 W	0	300	26	7	61	1003	1055	24.30	16.60	202	334	76374	1
350	74	1	2829 N	35 2 W	0	10	26	7	61	1937	2013	24.10	24.10	202	144	76485	1
363	74	2	2829 N	35 2 W	0	300	26	7	61	1820	1920	24.10	16.10	202	204	76485	1
364	75	1	2937 N	3655 W	0	300	27	7	61	1313	1356	24.50	16.70	202	139	76496	1
351	75	2	2937 N	3655 W	0	10	27	7	61	1155	1255	24.50	24.50	202	198	76496	1
3030	76	1	2959 N	3731 W	0	100	27	7	61	2012	2015	24.80		202		76497	1
352	76	1	2959 N	3731 W	0	10	27	7	61	1810	1915	24.80	24.80	202	504	76497	1
391	76	3	2959 N	3731 W	0	500	27	7	61	1821	2005	24.80		202	631	76497	1
392	76	4	2959 N	3731 W	500	1000	27	7	61	1803	1936	0.00		202	954	76497	1
365	77	1	3245 N	4154 W	0	300	29	7	61	740	803	25.90		202	229	113121	1
353	77	2	3245 N	4154 W	0	10	29	7	61	556	720	25.90		202	205	113121	1
3031	78	1	3316 N	4242 W	300	500	29	7	61	1748	1815	26.10		202	158	113132	1
393	78	4	3316 N	4242 W	500	1000	29	7	61	1658	1815	0.00		202	2845	113132	1
354	78	5	3316 N	4242 W	0	10	29	7	61	1656	1805	26.10		202	205	77122	1
3032	79	1	3456 N	4521 W	0	10	30	7	61	1640	1810	26.30		202	450	113245	1
394	79	2	3456 N	4521 W	0	100	30	7	61	1802	1820	25.20		202		113245	1
3033	79	3	3456 N	4521 W	100	300	30	7	61	1820	1855	26.30		202	207	113245	1
3034	79	4	3456 N	4521 W	300	500	30	7	61	1855	1926	26.30		202	183	113245	1
395	79	5	3456 N	4521 W	500	1000	30	7	61	1802	1926	0.00		202	3153	113245	1
355	80	1	3545 N	47 5 W	0	10	31	7	61	1423	1530	26.00	26.00	202	500	77457	1
396	80	2	3545 N	47 5 W	0	100	31	7	61	1429	1443	26.00	18.50	202	191	113457	1
3035	80	3	3545 N	47 5 W	100	300	31	7	61	1443	1458	26.00		202	208	113457	1
3036	80	4	3545 N	47 5 W	300	500	31	7	61	1458	1510	26.00		202	163	113457	1
397	80	5	3545 N	47 5 W	500	1000	31	7	61	1415	1545	0.00		202	1764	113457	1

VEMA CRUISE 17 PLANKTON SAMPLE FIELD DATA

SERIAL NO.	STATION	SAMPLE	POSITION LATITUDE	POSITION LONGITUDE	DEPTH (M) UPPER	DEPTH (M) LOWER	DATE DA	DATE MO	DATE YR	TIME ST	TIME END	TEMP. (C) UPPER	TEMP. (C) LOWER	MESH	VWF	MARSDEN SQUARE	OCEAN
356	81	1	3730 N	50 5 W	0	10	1	8	61	1300	1525	25.70		202	521	114370	1
368	81	3	3730 N	50 5 W	0	100	1	8	61	1607	1620	25.70	17.20	202	66	114370	1
369	81	4	3730 N	50 5 W	100	300	1	8	61	1620	1640	17.20	16.30	202	103	114370	1
370	81	5	3730 N	50 5 W	300	500	1	8	61	1640	1740	16.30		202	300	114370	1
371	81	6	3730 N	50 5 W	500	1000	1	8	61	1607	1740	0.00		202	3693	114370	1
357	82	1	3848 N	5242 W	0	10	2	8	61	1125	1220	24.80	24.80	202	396	114382	1
366	82	2	3848 N	5242 W	0	300	2	8	61	1229	1300	24.80	17.50	202	228	114382	1
398	83	1	3921 N	5347 W	0	100	2	8	61	2015	2045	26.50	22.70	202	185	114393	1
3037	83	2	3921 N	5347 W	100	300	2	8	61	2045	2103	26.50		202	159	114393	1
3038	83	3	3921 N	5347 W	300	500	2	8	61	2103	2135	26.50		202	289	114393	1
399	83	4	3921 N	5347 W	500	1000	2	8	61	2010	2135	0.00		202	4667	114393	1
358	84	1	4039 N	5558 W	0	10	3	8	61	1013	1113	23.60	23.60	202	354	1502 5	1
367	84	2	4039 N	5558 W	0	300	3	8	61	1225	1309	23.60	12.20	202		1502 5	1
359	85	1	4118 N	5712 W	0	10	3	8	61	2010	2140	22.70	22.70	202	747	150217	1
372	85	2	4118 N	5712 W	0	100	3	8	61	2003	2023	22.70	14.20	202	317	150217	1
373	85	3	4118 N	5712 W	100	300	3	8	61	2023	2058	14.20	11.10	202	548	150217	1
374	85	4	4118 N	5712 W	300	500	3	8	61	2058	2120	11.10		202	353	150217	1
375	85	5	4118 N	5712 W	500	1000	3	8	61	2003	2110	0.00		202	7021	150217	1
360	86	1	4230 N	59 6 W	0	10	4	8	61	1014	1114	22.70	22.70	202	219	150229	1
376	86	2	4230 N	59 6 W	0	100	4	8	61	1244	1302	22.70	15.40	202	108	150229	1
377	86	3	4230 N	59 6 W	100	300	4	8	61	1302	1336	15.40	10.50	202	205	150229	1
378	86	4	4230 N	59 6 W	300	200	4	8	61	1336	1414	10.50		202	226	150229	1
379	86	5	4230 N	59 6 W	500	1000	4	8	61	1242	1419	0.00		202	4587	150229	1
361	87	1	43 1 N	5951 W	0	10	4	8	61	1950	2145	18.40		202	893	150239	1
380	87	2	43 1 N	5951 W	0	100	4	8	61	1952	2012	18.40	6.50	202	170	150239	1
3039	87	3	43 1 N	5951 W	100	300	4	8	61	2012	2045	18.40		202	271	150239	1
3040	87	4	43 1 N	5951 W	300	500	4	8	61	2045	2117	18.40		202	271	150239	1
3041	87	5	43 1 N	5951 W	500	1000	4	8	61	2117	2130	18.40		202	5289	150239	1
362	88	1	4338 N	6127 W	0	10	5	8	61	1020	1100	17.00		202	123	151131	1
4605	89	1	5514 N	4850 W	0	10	31	8	61	1733	1950	8.40		202	446	185458	1
400	90	1	4024 N	6310 W	0	10	24	9	61	1750	1855	22.90	22.90	202	288	1511 3	1
401	91	1	3915 N	63 9 W	0	10	25	9	61	1005	1105	26.00	26.00	202	353	115393	1
402	92	1	37 4 N	6257 W	0	10	26	9	61	1102	1152	25.80	25.80	202	197	115372	1

VEMA - 17 TRAWL DATA

# of Trawl	Ship Stn.	Date 1961	Position Lat. South	Long. West	Msdn Sq.	TIME Over	Hit	Free	Surface	PDR Depth Fms. Over	Hit	Free	Surface	Data*
1	51	26 Feb	07°10'	85°50'	308	2228	-	-	2328	2193	-	-	2200	C45
2	58	13 Mar	34°30'	74°19'	415	1140	1250	1350	1515	2220	2150	2200	2200	C50
3	59	14 Mar	36°15'	76°51'	415	1818	1903	1933	2035	2150	2155	2155	2155	C51
4	60	15 Mar	37°13'	77°44'	415	1710	1815	1900	2010	-2180	-2180	-2180	2185	C52
5	61	16 Mar	38°15'	76°00'	415	1546	1641	1726	1830	2062	2046	2005	1984	C53
6	62	21 Mar	37°57'	75°09'	415	1205	1257	1357	1510	2301	2297	2308	2343	C54
7	63	22 Mar	40°32'	75°09'	451	1230	1315	1400	1455	1840	1745	1690	1643	C55
8	64	23 Mar	43°14'	75°27'	451	0815	0859	0944	1035	1731	1730	1730	1695	
9	65	23 Mar	43°20'	75°20'	451	1218	1227	1257	1315	792	797	840	890	C56
10	66	23 Mar	43°24'	75°08'	451	1422	1432	1450	1500	300	280	290	270	
11	67	23 Mar	43°25'	75°05'	451	1519	1522	1529	1532	83	82	81	80	
12	68	23 Mar	43°30'	74°55'	451	1730	1732	1752	1754	80	80	89	89	
13	69	24 Mar	47°00'	75°56'	451	1945	2020	2050	2129	1495	1440	1350	1155	C57
14	70	24 Mar	47°01'	75°44'	451	2206	2226	2246	2300	697	680	621	605	
15	71	24 Mar	47°02'	75°36'	451	2345	2356	0006	0014	363	350	340	330	
16	72	25 Mar	47°03'	75°32'	451	0046	0050	0058	0101	97	97	88	86	
17	75	28 Mar	53°34'	72°29'	487	1505	1513	1515	1517	184	172	164	157	C59
18	76	28 Mar	53°48'	71°45'	487	1747	1751	1755	1759	139	142	143	144	C60
19	78	29 Mar	52°59'	70°31'	487	0405	0407	0411	0413	48	49	49	50	C62
20	79	29 Mar	53°21'	70°36'	487	0631	0636	0639	0642	135	135	135	136	C63
21	80	29 Mar	53°23'	70°55'	487	0817	0820	0826	0828	81	81	82	82	C64
22	81	29 Mar	53°38'	70°50'	487	1017	1020	1044	1049	135	138	180	150	C65
23	82	29 Mar	53°47'	70°17'	487	1527	1530	1549	1553	155	155	150	155	C66
24	83	29 Mar	53°38'	69°55'	486	1738	1739	1741	1742	23	23	23	23	C67

* Correlated Data

VEMA - 17 TRAWL DATA

# of Trawl	Ship Stn.	Date 1961	Position Lat. South	Long. West	Msdn Sq.	TIME Over	Hit	Free	Surface	PDR Depth Fms. Over	Hit	Free	Surface	Data*
25	84	29 Mar	53°28'	69°33'	486	1913	1914	1921	1922	25	25	25	25	C68
26	85	29 Mar	53°27'	69°57'	486	2043	2044	2045	2046	23	23	23	23	C69
27	86	29 Mar	53°34'	70°17'	487	2223	2226	2229	2232	144	143	143	143	C70
28	87	1 Apr	52°40'	70°05'	487	1545	1546	1546	1547	17	17	17	16	C71
29	88	1 Apr	52°44'	69°54'	486	1718	1718	1719	1719	12	13	13	13	C72
30	89	1 Apr	52°40'	69°52'	486	1812	1812	1813	1813	12	13	13	13	C73
31	90	1 Apr	52°35'	69°48'	486	1913	1913	1914	1914	7	7	8	8	C74
32	91	1 Apr	52°42'	69°45'	486	2016	2017	2025	2028	24	24	29	22	C75
33	92	2 Apr	52°49'	67°35'	486	1305	1306	1307	1308	36	36	36	36	C76
34	93	2 Apr	52°30'	68°56'	486	1952	1953	1954	1955	24	24	24	24	C77
35	94	2 Apr	52°19'	68°07'	486	2120	2121	2122	2122	22	22	22	22	C78
36	95	2 Apr	52°22'	69°20'	486	2252	2253	2254	2254	22	23	23	23	C79
37	96	3 Apr	52°39'	69°49'	486	0103	0104	0104	0105	16	16	16	16	C80
38	97	3 Apr	53°35'	70°23'	487	0951	0953	0956	0958	71	72	72	72	C81
39	98	3 Apr	53°47'	70°18'	487	1133	1137	1142	1145	146	146	146	146	C82
40	106	17 Apr	60°08'	74°56'	523	2115	2209	2239	0015	2191	2191	2196	2237	C90
41	109	20 Apr	61°36'	68°27'	522	0206	0254	0332	0421	2230	2230	2230	2230	
42	111	20 Apr	61°52'	68°20'	522	1021	1105	1150	1237	1984	1984	1984	1984	
43	114	21 Apr	62°48'	62°06'	522	1835	1844	1915	1922	359	360	378	377	C94
44	115	22 Apr	62°57'	60°37'	522	0924	0926	0930	0932	89	89	89	89	C95
45	116	23 Apr	62°33'	59°26'	521	1513	1522	1533	1540	320	325	352	358	C96
46	117	4 May	54°53'	67°57'	486	1334	1338	1342	1345	123	123	123	123	C98
47	118	4 May	55°07'	66°30'	486	1831	1833	1835	1836	39	39	39	39	C99
48	118.1	4 May	55°10'	66°23'	486	1920	1921	1922	1923	23	23	23	23	
49	119	4 May	55°12'	66°15'	486	1952	1953	1954	1955	33	34	35	36	C100

* Correlated Data

VEMA - 17 TRAWL DATA

# of Trawl	Ship Stn.	Date 1961	Position Lat. South	Long. West	Msdn Sq.	T I M E Over	Hit	Free	Surface	PDR Depth Fms. Over	Hit	Free	Surface	Data*
50	120	4 May	55°14'	66°07'	486	2045	2047	2049	2051	55	56	56	57	C101
51	121	4 May	55°17'	66°00'	486	2135	2139	2141	2144	110	111	114	119	
52	122	4 May	55°20'	65°52'	486	2214	2227	2230	2241	470	510	519	550	C102
53	122	4 May	55°20'	65°52'	486	2300	2315	2322	2336	600	650	680	780	C102
54	122	5 May	55°20'	65°52'	486	0006	0027	0034	0055	848	700	745	750	C102
55	123	5 May	55°28'	66°17'	486	1041	1043	1048	1049	53	53	53	53	C103
56	124	6 May	56°34'	62°41'	486	1715	1816	2016	2105	2155	2155	2154	2154	C104
57	124.1	8 May	54°57'	63°04'	486	0652	0722	0734	0759	1012	1033	1027	1058	
58	124.2	10 May	54°56'	60°32'	486	0215	0305	0311	0323	190	438	436	428	
59	124.3	10May	54°53'	60°27'	486	0444	0451	0453	0458	244	236	232	228	
60	124.4	10 May	54°51'	60°22'	486	0532	0537	0542	0547	160	159	157	157	
61	126	11 May	54°44'	55°39'	485	2213	2236	2330	2355	941	985	1025	1081	C106
62	126.1	12 May	54°41'	55°35'	485	0049	0106	0113	0128	692	657	639	588	
63	126.2	12 May	54°23'	55°00'	485	0816	0845	0857	0929	1136	1167	1164	1136	
64	127	13 May	51°08'	55°22'	485	2012	2033	2045	2105	820	823	828	832	C107, K15
65	128	14 May	50°18'	54°11'	485	0708	0725	0745	0805	810	812	817	819	C108
66	128.1	15 May	50°18'	54°14'	485	1118	1135	1155	1214	3070	3095	3120	3130	
67	129	18 May	41°39'	59°53'	449	0849	0850	0857	0858	40	40	40	40	C109, K16
68	130	18 May	41°16'	60°03'	450	1208	1209	1215	1216	38	38	38	38	C110, K17
69	131	18 May	40°56'	60°10'	450	1503	1504	1507	1508	38	38	38	38	C111, K18
70	132	18 May	40°32'	60°19'	450	1803	1804	1807	1808	30	30	30	30	C112, K19
71	133	18 May	40°11'	60°27'	450	2105	2106	2109	2110	24	24	24	24	C113, K20
72	134	19 May	39°20'	61°08'	419	0540	0543	0545	0548	7	8	8	8	C114
73	135	23 May	39°47'	61°08'	419	0029	0030	0033	0034	13	13	13	13	C115
74	136	23 May	41°27'	59°33'	449	1302	1303	1307	1308	40	40	40	40	C116, K21

* Correlated Data

VEMA - 17 TRAWL DATA

# of Trawl	Ship Stn.	Date 1961	Position Lat. South	Long. West	Msdn Sq.	TIME Over	TIME Hit	TIME Free	TIME Surface	PDR Depth Fms. Over	PDR Depth Fms. Hit	PDR Depth Fms. Free	PDR Depth Fms. Surface	Data*
75	137	23 May	41°41'	59°19'	449	1636	1637	1642	1643	44	44	44	44	C117, K22
76	138	23 May	41°57'	59°03'	449	2032	2033	2036	2037	42	42	42	42	C118
77	139	24 May	42°15'	58°45'	449	0002	0010	0015	0017	48	48	48	48	C119
78	140	24 May	42°28'	58°31'	449	0323	0327	0331	0334	122	123	124	125	C120
79	140	24 May	42°28'	58°31'	449	0347	0351	0403	0406	135	136	142	143	C120
80	141	26 May	43°58'	52°09'	449	1047	1145	1256	1430	3082	3079	3078	3074	C121
81	142	27 May	44°33'	49°19'	448	1209	1308	1408	1529	2843	2843	2840	2838	C122
82	143	28 May	45°22'	46°58'	448	0905	1000	1045	1205	2807	2810	2817	2800	C123
83	144	31 May	48°34'	36°04'	447	1015	1123	1158	1330	2810	2775	2808	2844	C124
84	145	1 Jun	50°15'	35°53'	483	0846	0933	1003	1104	2504	2517	2512	2526	C125
85	148	6 Jun	47°35'	43°21'	448	1055	1203	1303	1419	2935	2927	2923	2924	C126
86	151	11 Jun	45°29'	60°06'	450	0907	0910	0914	0917	121	123	124	123	C129
87	152	11 Jun	45°21'	60°27'	450	1122	1123	1135	1137	59	59	60	60	C130
88	153	11 Jun	45°11'	60°55'	450	1401	1403	1413	1415	60	60	60	60	C131
89	154	11 Jun	45°02'	60°18'	450	1626	1628	1639	1641	57	57	57	57	C132
90	155	11Jun	44°53'	61°43'	450	1900	1901	1916	1918	56	56	56	56	C133
91	156	11 Jun	44°45'	62°11'	450	2148	2150	2152	2154	54	54	54	54	C134
92	157	12 Jun	44°37'	62°40'	450	0036	0037	0052	0053	53	53	53	53	C135
93	158	12 Jun	44°35'	63°07'	450	0323	0325	0339	0341	53	53	53	53	C136
94	159	12 Jun	44°33'	63°33'	450	0614	0616	0623	0624	50	50	50	50	C137
95	160	12 Jun	44°30'	63°59'	450	0903	0905	0906	0907	47	47	47	47	C138
96	161	12 Jun	44°28'	64°25'	450	1118	1120	1122	1123	44	44	43	43	C139
97	162	13 Jun	44°29'	60°59'	450	0807	0809	0825	0827	56	56	56	56	C140
98	163	13 Jun	44°28'	60°45'	450	1001	1003	1005	1007	58	58	58	58	C141
99	164	13 Jun	44°25'	59°54'	449	1534	1536	1545	1547	80	82	83	83	C142

* Correlated Data

VEMA - 17 TRAWL DATA

# of Trawl	Ship Stn.	Date 1961	Position Lat. South	Long. West	Msdn Sq.	T I M E Over	Hit	Free	Surface	PDR Depth Fms. Over	Hit	Free	Surface	Data*
100	165	13 Jun	44°23'	59°53'	449	1630	1632	1643	1646	93	93	98	99	C143, D12
101	170	19 Jun	38°13'	55°19'	413	2104	2109	2124	2131	246	245	242	242	D16-17
102	171	27 Jun	39°25'	52°19'	413	2259	-	-	2302	40	-	-	40	C145
103	172	28 Jun	34°21'	51°07'	413	0040	-	-	0043	40	-	-	40	C146
104	NUMBER SKIPPED				-	-	-	-	-	-	-	-	-	-
			North	West										
105	186	20 Jul	16°59'	20°03'	039	1905	-	-	1930	1830	-	-	1830	C159
106	194.1	30 Jul	35°06'	45°56'	113	0132	-	-	0212	2072	-	-	2135	
107	198.2	5 Aug	43°38'	61°27'	151	1755	-	-	1756	26	-	-	26	
108	198.3	12 Aug	44°22'	59°05'	150	1415	-	-	1416	52	-	-	51	
109	201	13 Aug	43°34'	60°04'	151	1501	-	-	1507	80	-	-	81	C170
110	207	19 Aug	44°50'	60°37'	151	1247	-	-	1301	154	-	-	157	C175
111	208	19 Aug	44°50'	60°15'	151	1617	-	-	1619	158	-	-	159	C176
112	209	20 Aug	44°30'	57°07'	150	0918	0924	0927	0931	190	190	190	190	C177
113	212	22 Aug	46°31'	58°04'	150	1927	1927	1930	1930	247	247	247	247	C179
114	213	23 Aug	46°39'	58°40'	150	1346	-	-	1356	224	-	-	220	
115	216	26 Aug	44°57'	52°15'	150	1513	-	-	1515	35	-	-	35	C183
116	225	1 Sep	58°23'	47°46'	185	2303	2337	2357	0039	-	-	-	-	C192
117	226	3 Sep	60°44'	45°45'	221	1329	-	-	1351	228	-	-	228	C193
118	230	8 Sep	57°51'	54°06'	186	2102	-	-	2117	1820	-	-	1820	C197
119	231.2	10 Sep	55°11'	53°12'	186	1412	-	-	1418	119	-	-	119	D31
120	233	11 Sep	51°08'	58°01'	186	1940	-	-	1941	109	-	-	109	C200

*Correlated Data

VEMA - 17 SEISMIC REFRACTION

Refraction Profile #	Ship Stn.	Date 1960	Position Lat. North	Position Long. West	Msdn Sq.	Time Start	Time End	Steaming Course	Vema Shooting or Receiving
1VR*	7.1	30 Dec	26°05'	81°49'	081	1700	2345		Receiving
1VS	7.2	31 Dec	25°58'	82°25'	081	0021	0420	255°	Shooting
2VS	7.2	31 Dec	25°58'	82°25'	081	0420	0956	255°	Shooting
2VR	8.0	31 Dec	25°50'	83°06'	081	1117	1644		Receiving
3VR	8.1	31 Dec	26°00'	83°05'	081	1644	1955		Receiving
3VS	8.2	31 Dec	25°47'	83°48'	081	2257	0402	255°	Shooting
		1961							
4VS	8.2	1 Jan	25°47'	83°48'	081	0402	0811	255°	Shooting
4VR	9.1	1 Jan	25°37'	84°07'	081	0919	1434		Receiving
5VR	9.1	1 Jan	25°37'	84°07'	081	1434	2323		Receiving
5VS	9.2	2 Jan	24°55'	85°22'	081	0102	1430	255°	Shooting
6VS	9.2	2 Jan	24°55'	85°22'	081	1556	0032	255°	Shooting
7VS	16.1	12 Jan	29°11'	94°50'	082	0213	0537	180°	Shooting
7VR	16.2	12 Jan	28°43'	94°56'	082	1440	2007		Receiving
8VR	16.2	12 Jan	28°40'	94°56'	082	2009	0426		Receiving
8VS	16.3	13 Jan	28°01'	94°31'	082	0718	1146	140°	Shooting
9VS	16.3	13 Jan	28°01'	94°31'	082	1146	1832	145°	Shooting
10VS	21.2	22 Jan	24°19'	91°01'	082	1027	1353	050°	Shooting
11VS	21.2	22 Jan	24°19'	91°01'	082	1405	1851	153°	Shooting
11VR	22	22 Jan	23°49'	90°44'	082	2021	0131		Receiving
12VR	22.0	23 Jan	23°49'	90°44"	082	0134	0549		Receiving
12VS	22.1	23 Jan	23°28'	90°31'	082	0827	1358	149°	Shooting
13VR	22.2	23 Jan	23°00'	90°13'	082	1741	1833		Receiving
14VR	22.2	23 Jan	23°00'	90°13'	082	1836	2304		Receiving
14VS	22.3	24 Jan	22°36'	90°03'	082	0039	0407	150°	Shooting
15VS	22.3	24 Jan	22°36'	90°03'	082	0411	0930	157°	Shooting

*Times given for refraction profiles 1VR to 20 VR are exact times of first and last shot explosions respectively.

VEMA - 17 SEISMIC REFRACTION

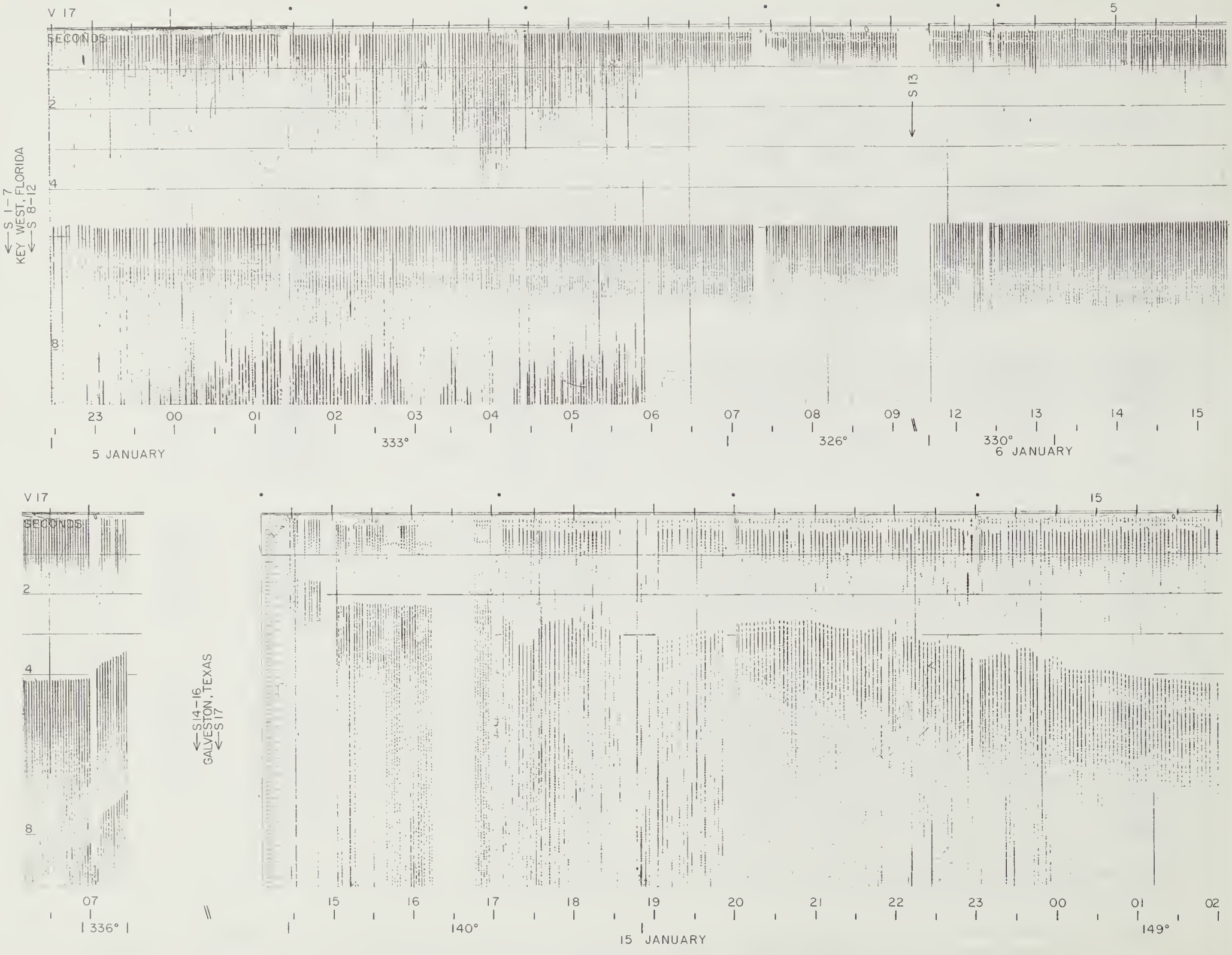
Refraction Profile #	Ship Stn.	Date	Position Lat.	Position Long.	Msdn Sq.	Time Start	Time End	Steaming Course	Vema Shooting or Receiving
		1961	North	West					
15VR	22.4	24 Jan	21°49'	89°48'	081	1053	1602		Receiving
16VR	22.4	24 Jan	21°49'	89°48'	081	1604	1918		Receiving
16VS	22.5	24 Jan	21°21'	89°40'	081	2040	2348	157°	Shooting
17VR	22.6	25 Jan	22°21'	89°42'	081	0554	0723		Receiving
17VS	22.7	25 Jan	22°22'	89°54'	081	0747	0908	270°	Shooting
18VS	22.7	25 Jan	22°22'	89°54'	081	0928	1057	circling	Shooting
18VR	22.8	25 Jan	22°34'	89°54'	081	1139	1309		Receiving
19VR	23.1	26 Jan	24°00'	91°27'	082	1705	0418		Receiving over OBS #1
20VR	23.1	28 Jan	24°00'	91°27'	082	0423	1800		Receiving over OBS #1
100VR*	213.1	23 Aug	46°36'	58°24'	150	1843	2103		Receiving
100VS	213.2	23 Aug	46°12'	57°56'	150	2312	0133	140°	Shooting
101VS	213.2	24 Aug	46°12'	57°56'	150	0135	0303	140°	Shooting
101VR	214.00	24 Aug	45°53'	57°30'	150	0434	0635		Receiving
102VR	214.00	24 Aug	45°53'	57°30'	150	0638	0825		Receiving
102VS	214.1	24 Aug	45°45'	57°20'	150	1110	1231	208°	Shooting
103VR	220.0	28 Aug	49°53'	53°02'	150	1945	2153		Receiving
103VS	220.1	28 Aug	50°11'	42°41'	186	2326	0208	053°	Shooting
104VS	220.1	29 Aug	50°11'	52°41'	186	0211	0452	053°	Shooting
104VR	221.0	29 Aug	50°30'	52°19'	186	0610	0837		Receiving
105VR	221.0	29 Aug	50°30'	52°19'	186	0841	1040		Receiving
105VS	221.1	29 Aug	50°43'	51°52'	186	1246	1601	053°	Shooting
106VS	221.1	29 Aug	50°43'	51°52'	186	1604	1756	053°	Shooting
106VR	222.0	29 Aug	50°57'	51°24'	186	2007	2225		Receiving
107VR	222.0	29 Aug	50°57'	51°24'	186	2225	0012		Receiving

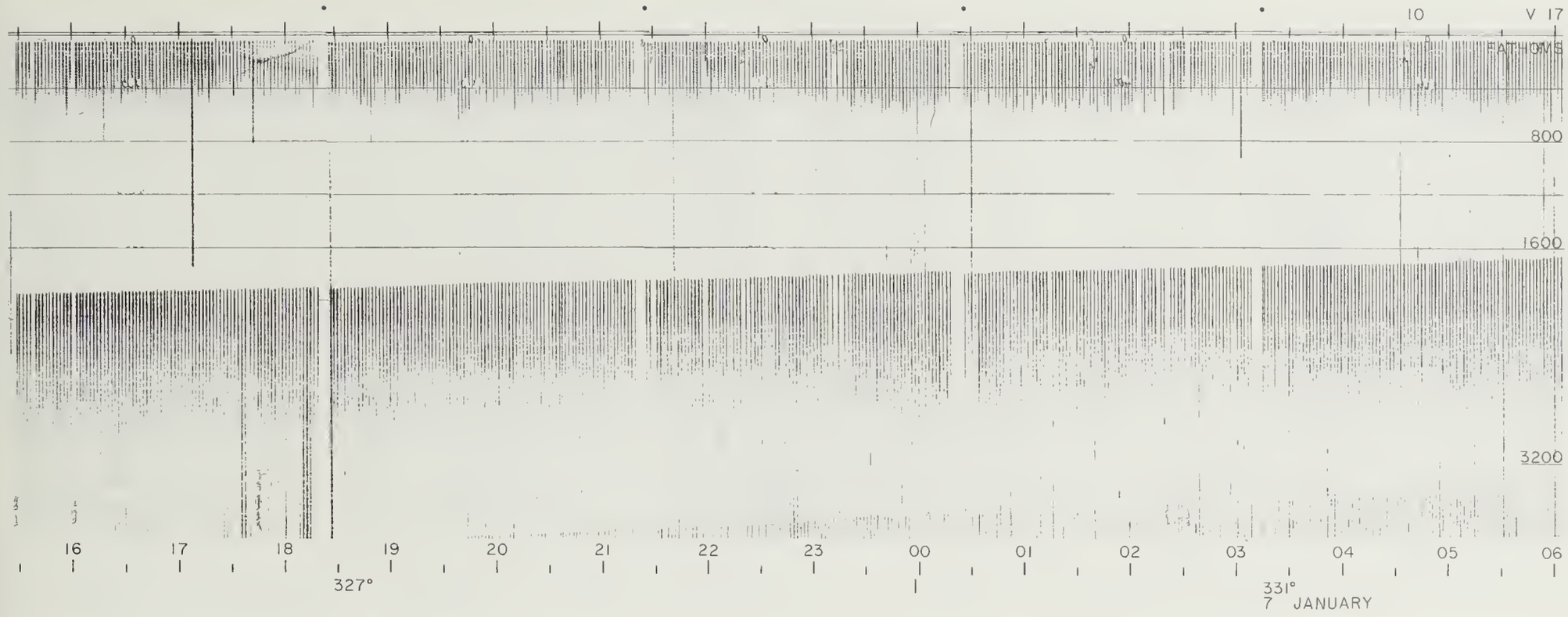
VEMA - 17 SEISMIC REFRACTION

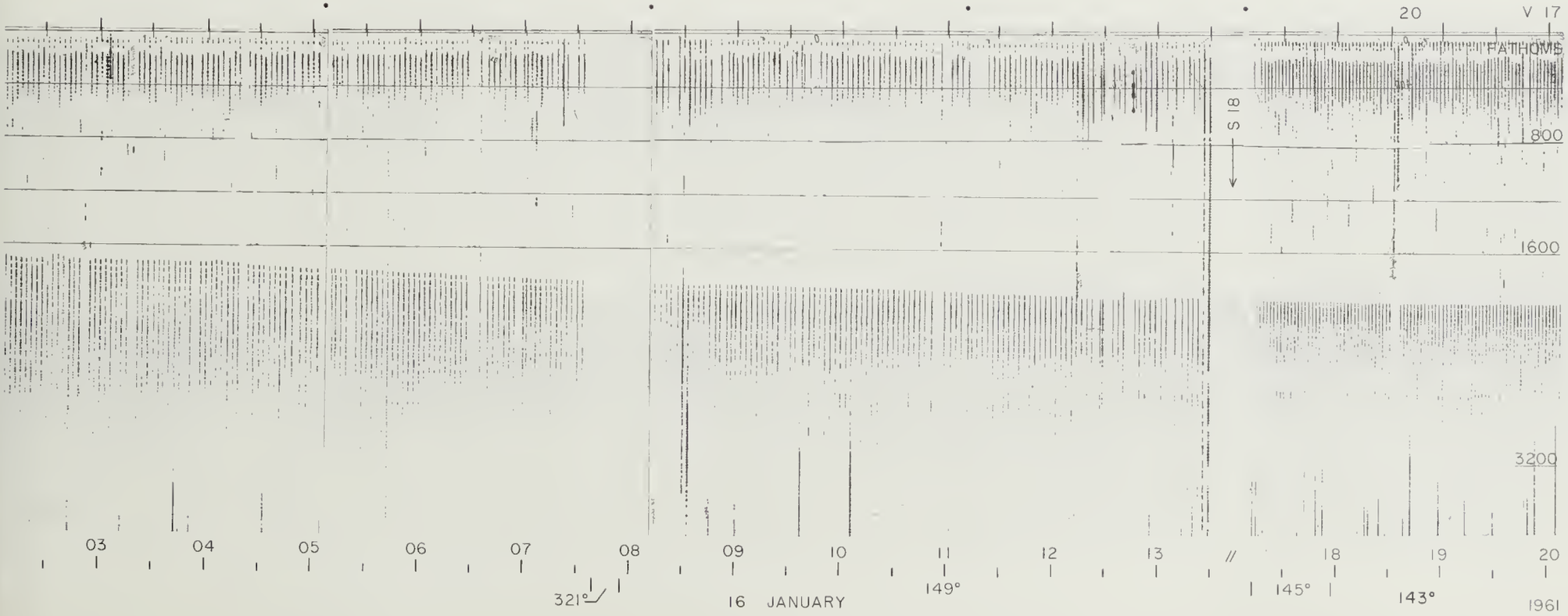
Refraction Profile #	Ship Stn.	Date 1961	Position Lat. North	Position Long. West	Msdn Sq.	Time Start	Time End	Steaming Course	Vema Shooting or Receiving
107VS	222.1	30 Aug	51°05'	51°06'	186	0128	0440	053°	Shooting
108VS	222.1	30 Aug	51°05'	51°06'	186	0443	0701	053°	Shooting
108VR	223.0	30 Aug	51°20'	50°36'	186	0844	1117		Receiving
109VR	223.0	30 Aug	51°20'	50°36'	186	1217	1405		Receiving
109VS	223.1	30 Aug	51°21'	50°32'	186	1503	1752	053°	Shooting
110VR	231.0	9 Sep	55°49'	52°27'	186	1534	1847		Receiving
110VS	231.1	9 Sep	55°29'	52°49'	186	1958	2243	225°	Shooting
111VS	231.1	9 Sep	55°29'	52°49'	186	2251	0108	225°	Shooting
111VR	231.2	10 Sep	55°11'	53°12'	186	0220	0513		Receiving
112VR	237.1	13 Sep	48°39'	60°20'	151	2217	0001		Receiving
112VS	237.2	14 Sep	48°36'	60°22'	151	0114	0404	240°	Shooting
113VR	238.0	14 Sep	47°58'	61°58'	151	1049	1254		Receiving
113VS	238.1	14 Sep	47°58'	61°57'	151	1426	1632	240°	Shooting
114VS	239.1	14 Sep	47°37'	63°00'	151	2210	0031	240°	Shooting
115VR	239.2	15 Sep	47°14'	64°00'	151	0405	0537		Receiving
115VS	239.2	15 Sep	47°14'	64°00'	151	0655	0856	240°	Shooting
116VR	240.0	15 Sep	48°01'	64°01'	151	1426	1625		Receiving
116VS	240.2	15 Sep	47°45'	63°22'	151	1735	2056	130°	Shooting
117VS	240.2	15 Sep	47°45'	63°22'	151	2059	2141	120°	Shooting
117VR	240.3	15 Sep	47°40'	63°12'	151	2248	0044		Receiving
118VS	240.5	16 Sep	47°16'	62°37'	151	0435	0639	136°	Shooting
118VR	240.6]	16 Sep	46°59'	62°07'	151	0803	0929		Receiving
119VR	240.6	16 Sep	46°58'	62°06'	151	0931	1121		Receiving
119VS	241.1	16 Sep	46°42'	61°37'	151	1238	1440	130°	Shooting
120VS	241.1	16 Sep	46°42'	61°37'	151	1443	1642	130°	Shooting
120VR	242.0	16 Sep	46°27'	61°12'	151	1727	1911		Receiving

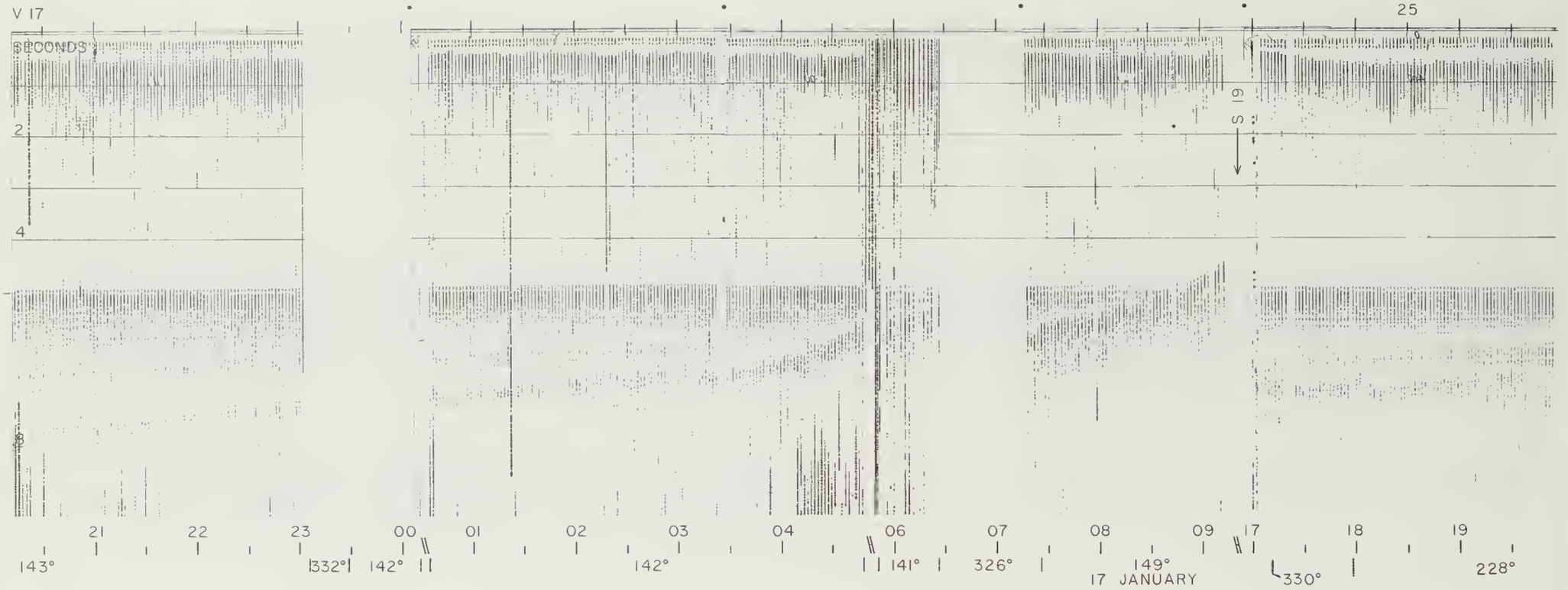
* Times given for refraction profiles 100VR to 120VR are approximate times of first and last shot explosions respectively.

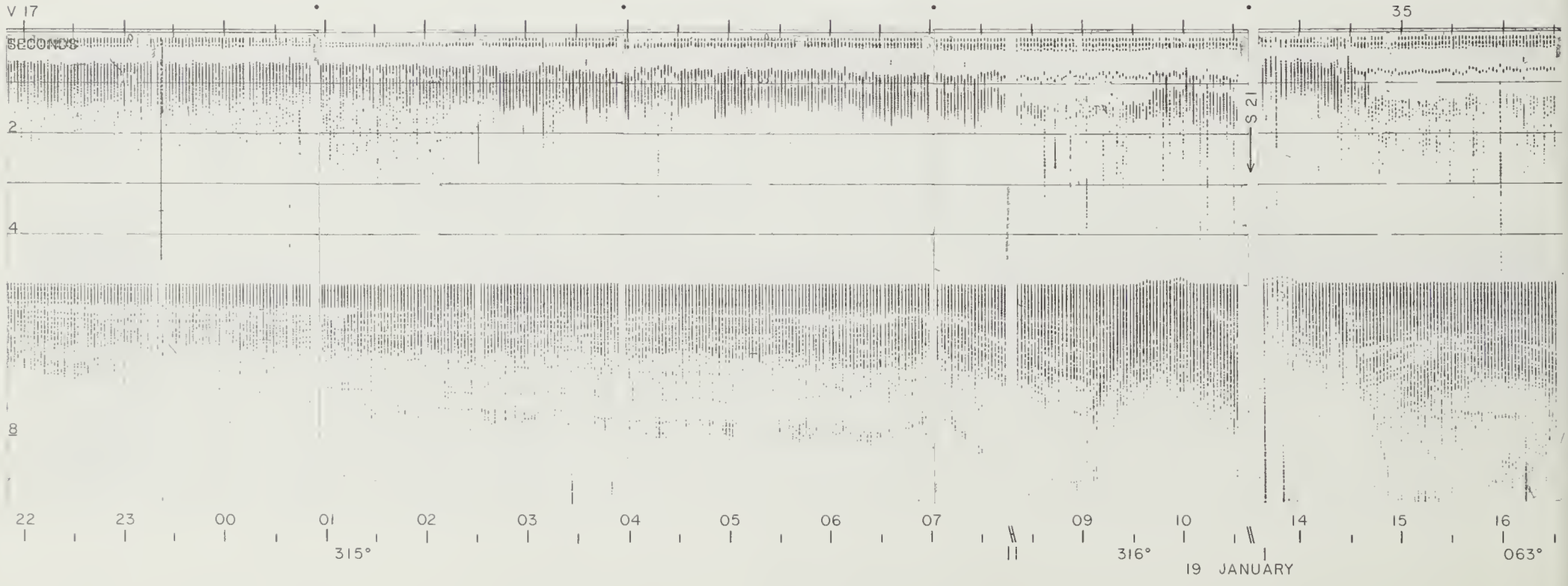
NOTE: In cases where VEMA is the shooting ship, positions given are positions where it passed the receiving ship. In cases where VEMA is the receiving ship, positions given are VEMA's position.

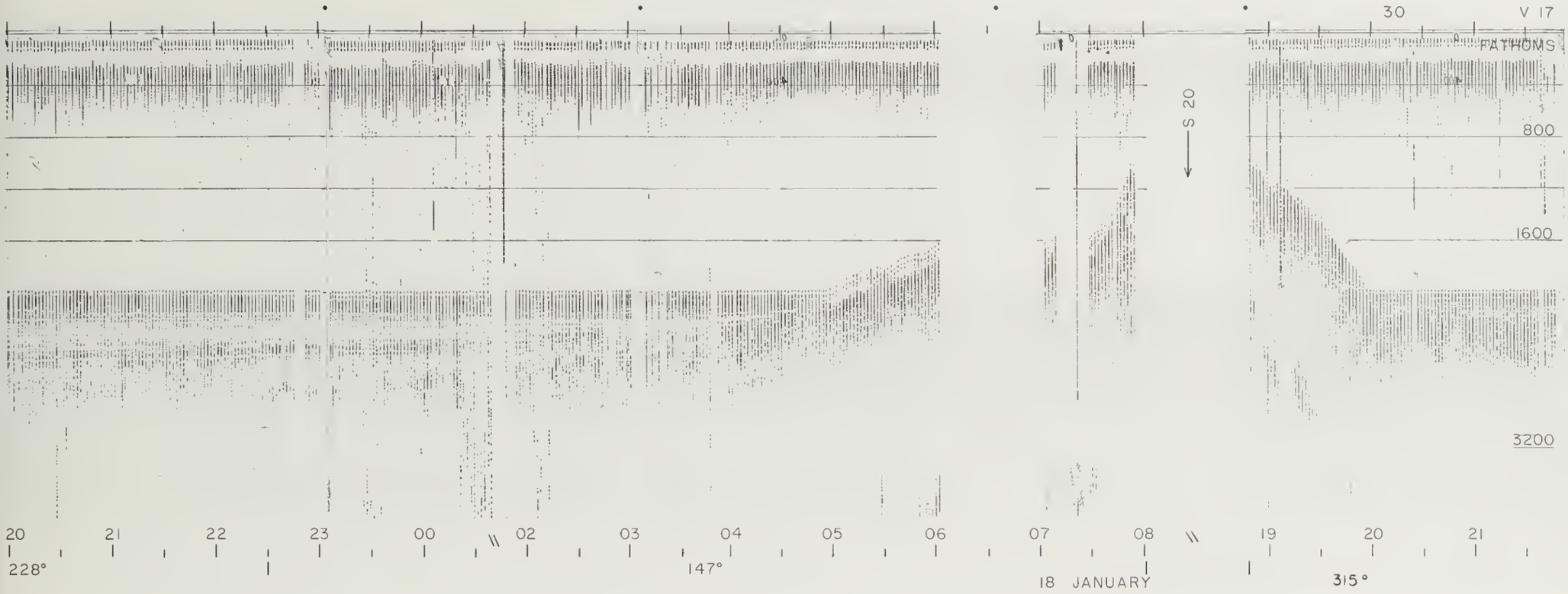

V 17
SECONDS
S 13
← S 1–7
KEY WEST, FLORIDA
← S 8–12
23 00 01 02 03 04 05 06 07 08 09 12 13 14 15
5 JANUARY
333°
326°
330°
6 JANUARY
V 17
SECONDS
← S 14–16
GALVESTON, TEXAS
← S 17
07 15 16 17 18 19 20 21 22 23 00 01 02
336°
140°
149°
15 JANUARY

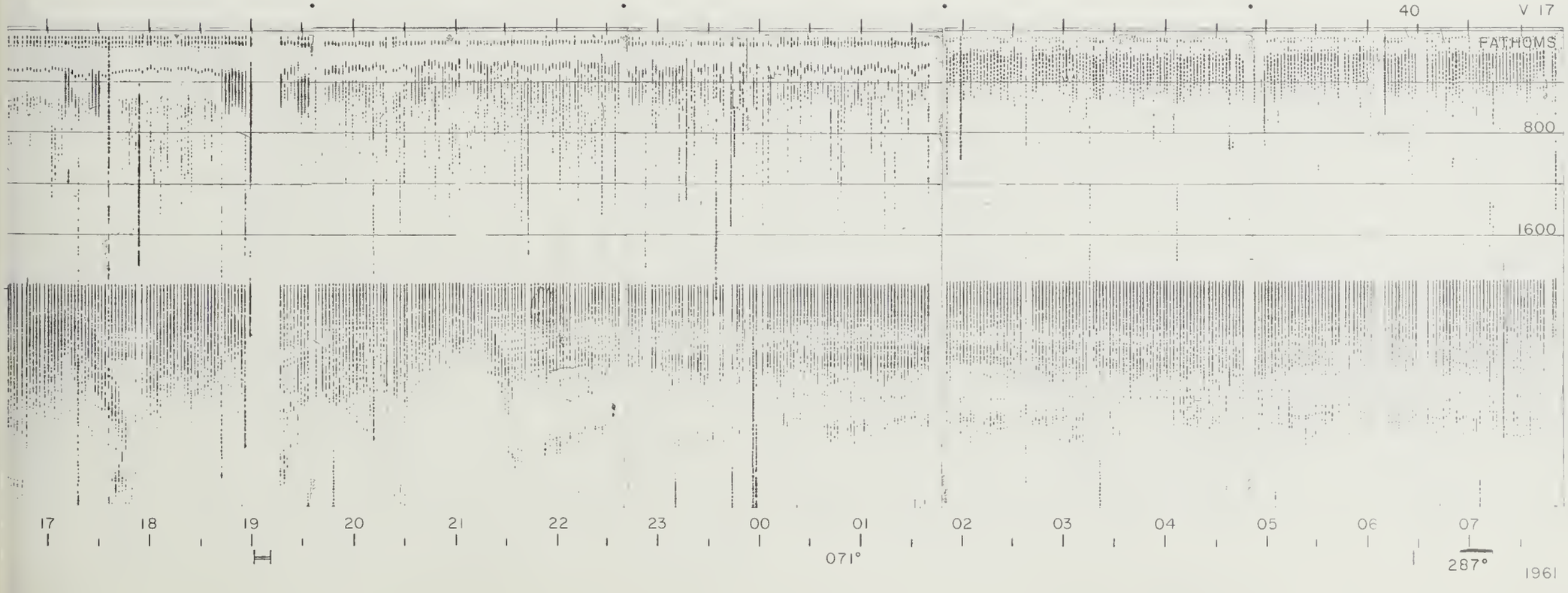

10
V 17
FATHOMS
800
1600
3200
16
17
18
19
20
21
22
23
00
01
02
03
04
05
06
327°
331°
7 JANUARY

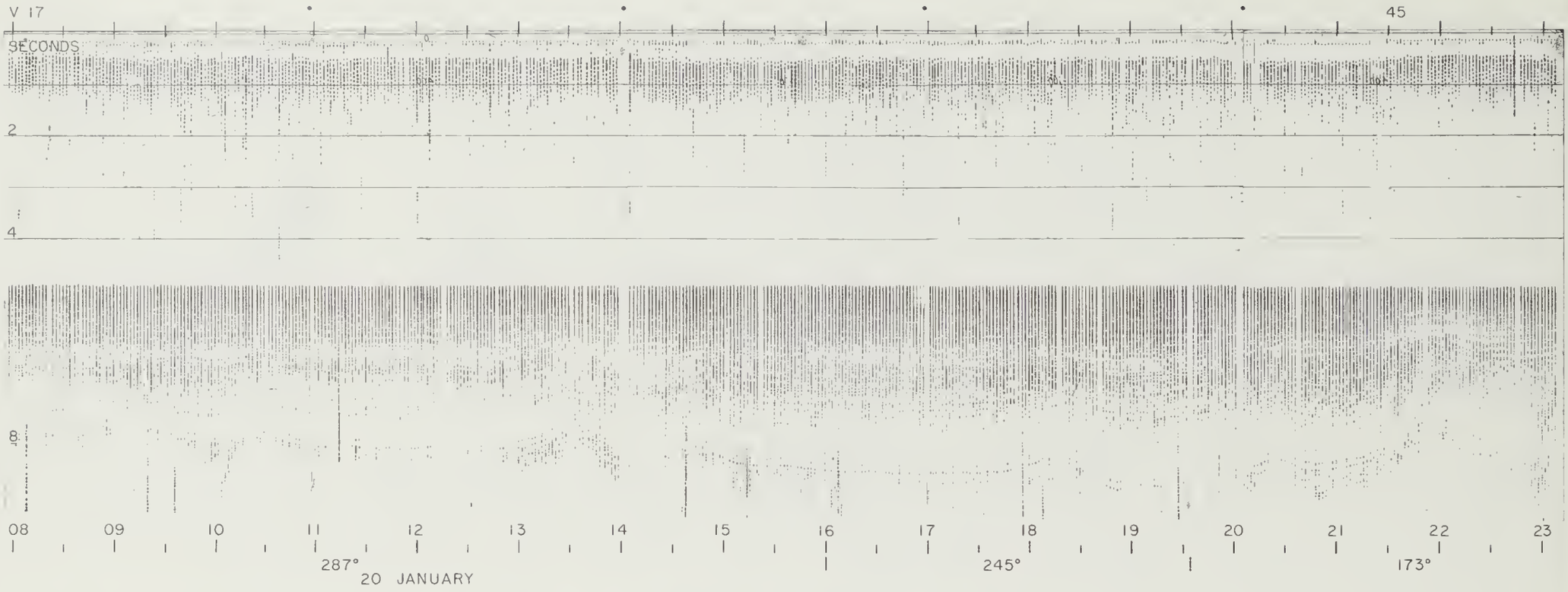

20
V 17
FATHOMS
S 18
800
1600
3200
03
04
05
06
07
08
09
10
11
12
13
18
19
20
321°
149°
145°
143°
16 JANUARY
1961

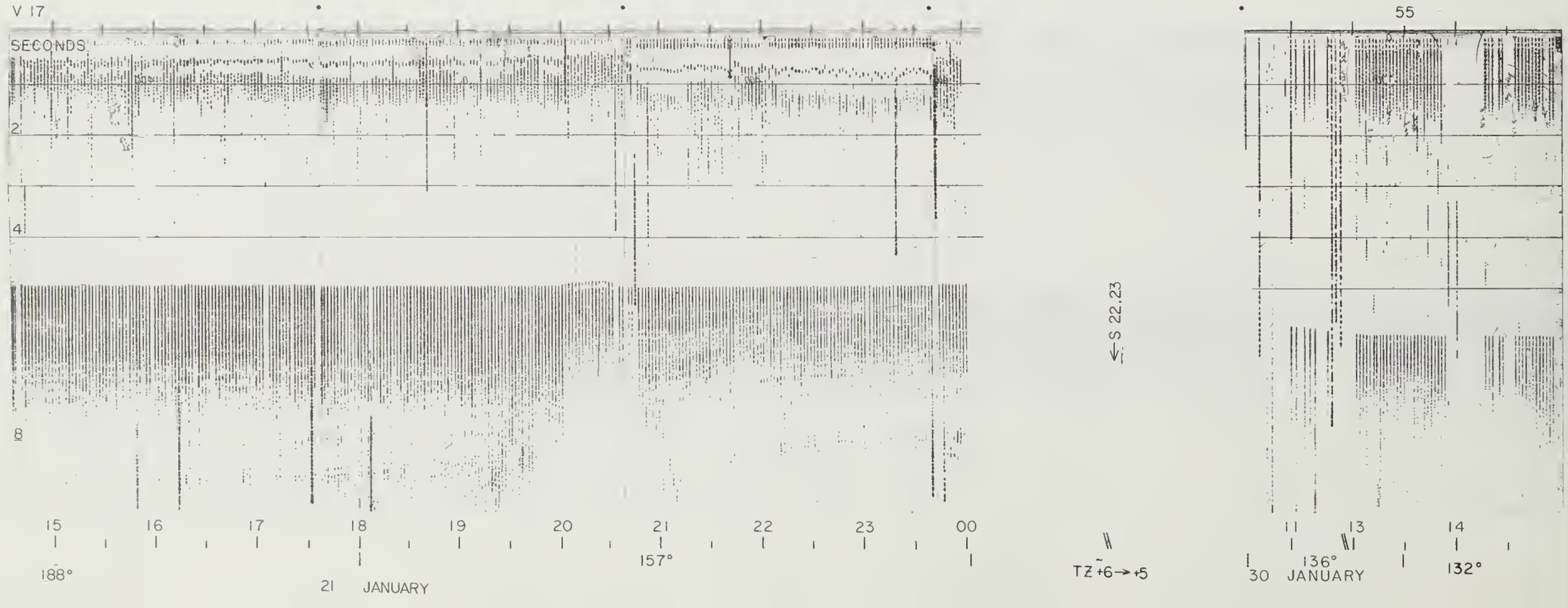

V 17
SECONDS
2
4
8
25
S 19
21
22
23
00
01
02
03
04
06
07
08
09
17
18
19
143°
332°
142°
142°
141°
326°
149°
17 JANUARY
330°
228°

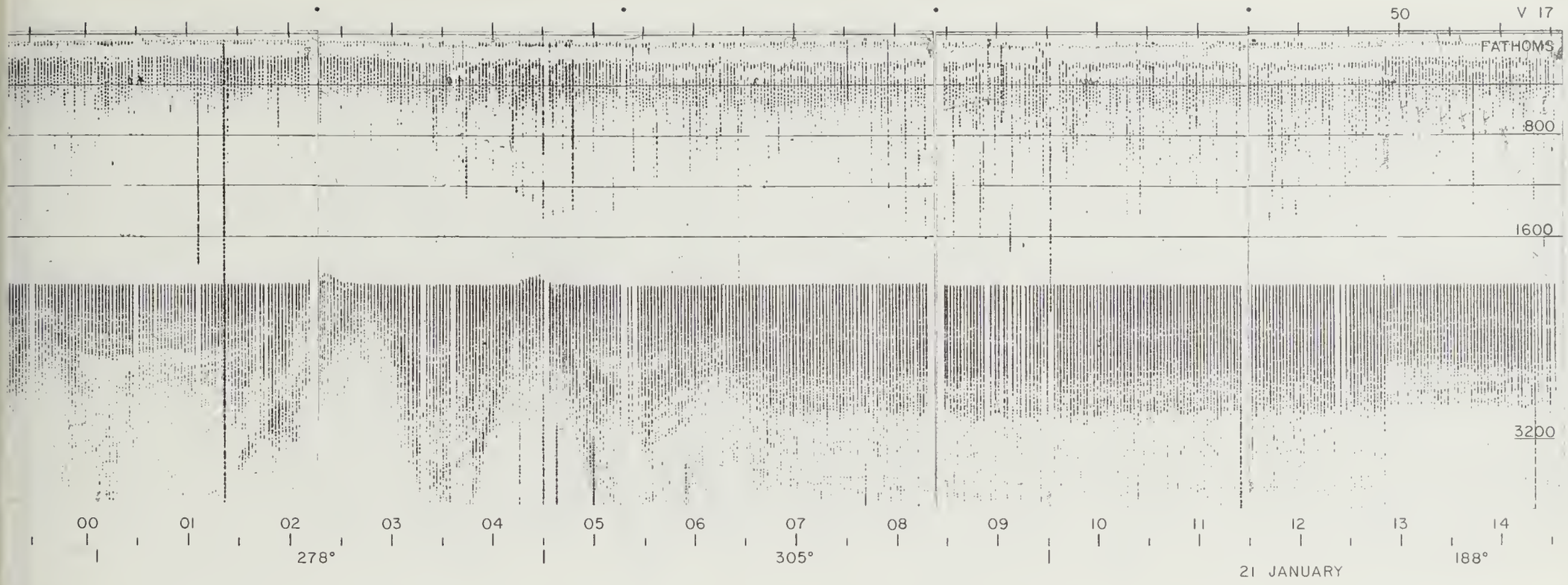

V 17
SECONDS
2
4
8
35
S 21
22
23
00
01
02
03
04
05
06
07
09
10
14
15
16
315°
316°
19 JANUARY
063°

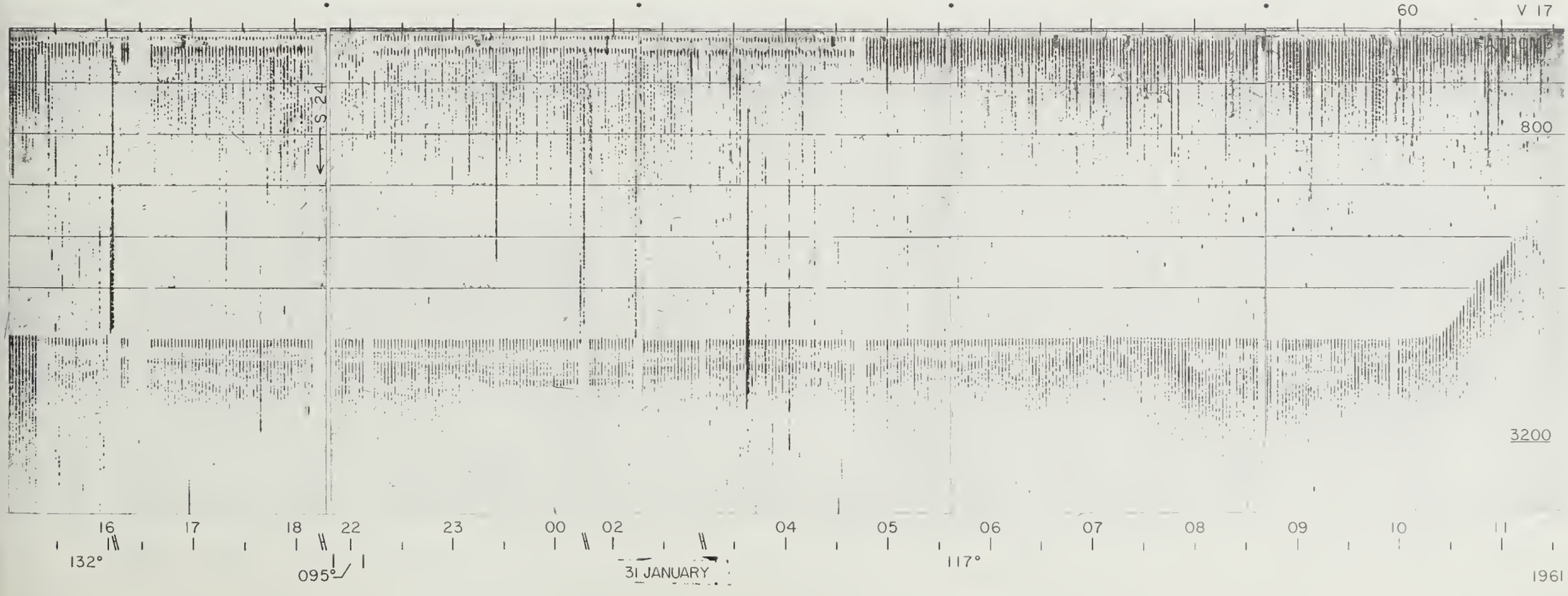

30
V 17
FATHOMS
S 20
800
1600
3200
20
21
22
23
00
02
03
04
05
06
07
08
19
20
21
228°
147°
18 JANUARY
315°

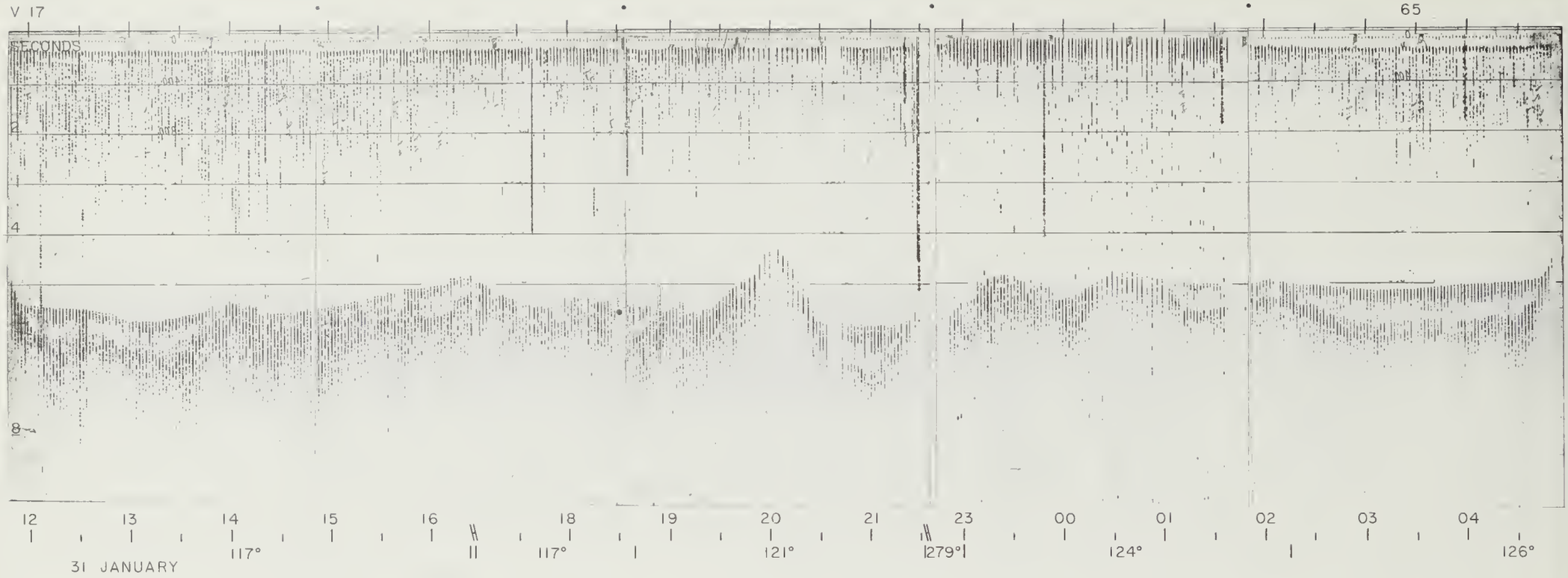

40
V 17
FATHOMS
800
1600
17
18
19
20
21
22
23
00
01
02
03
04
05
06
07
071°
287°
1961

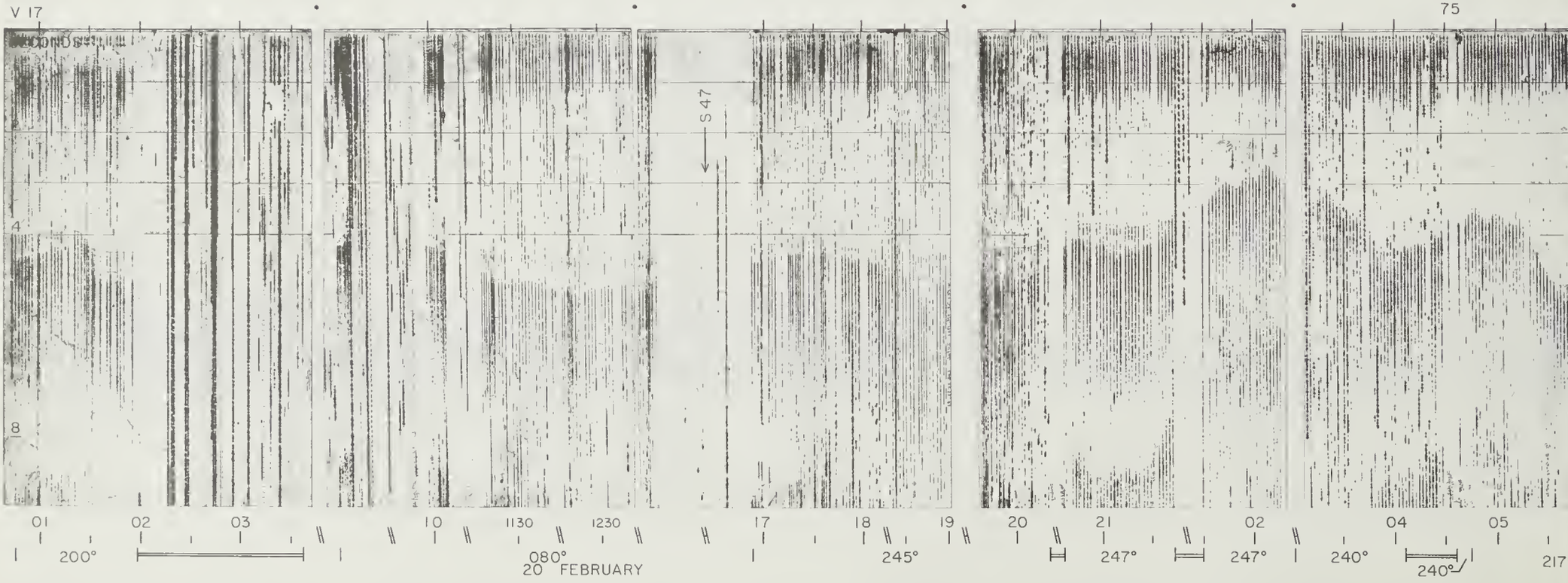

V 17
SECONDS
45
2
4
8
08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
287°
245°
173°
20 JANUARY

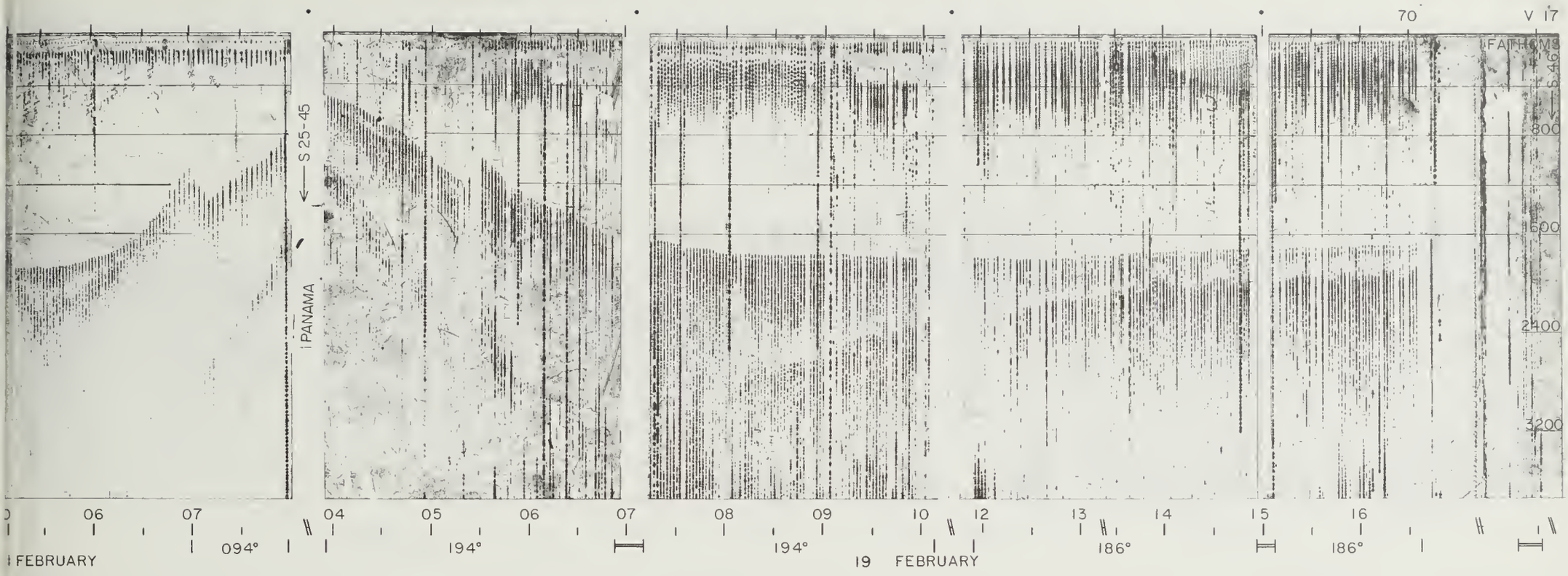

V 17
SECONDS
55
2
4
8
15 16 17 18 19 20 21 22 23 00
11 13 14
188°
157°
136°
132°
S 22.23
TZ +6→+5
21 JANUARY
30 JANUARY

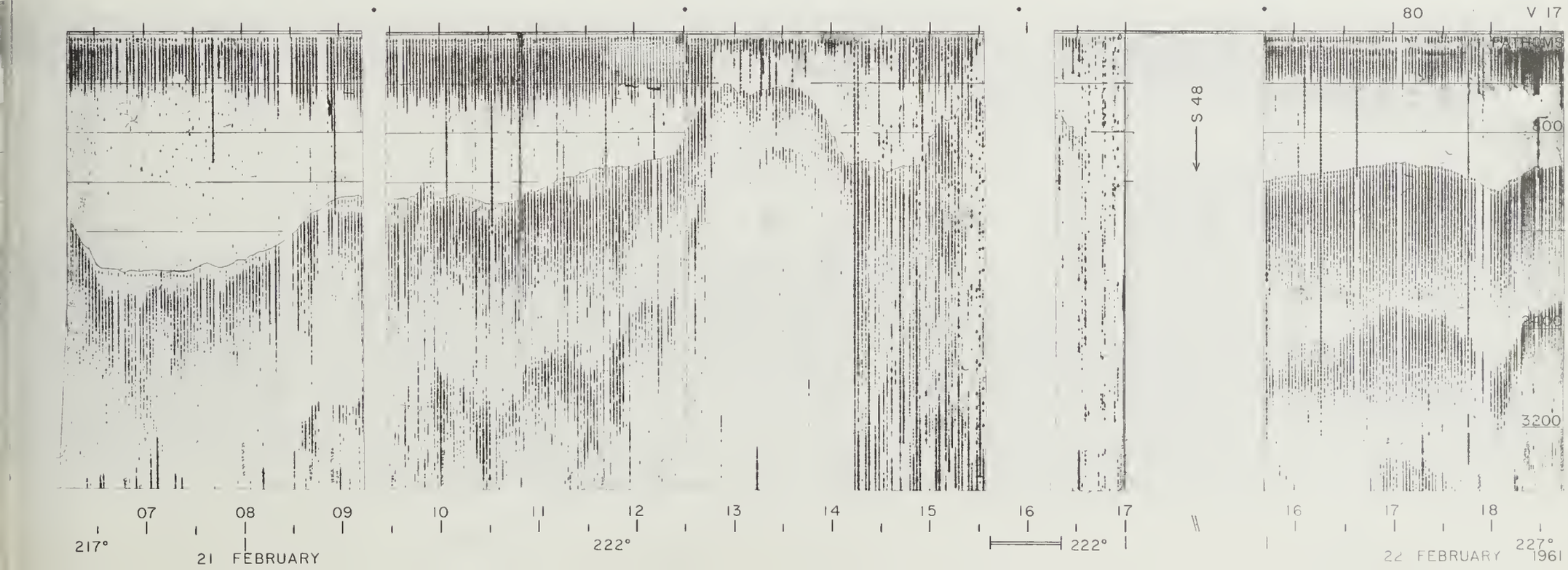

50
V 17
FATHOMS
800
1600
3200
00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
278°
305°
188°
21 JANUARY

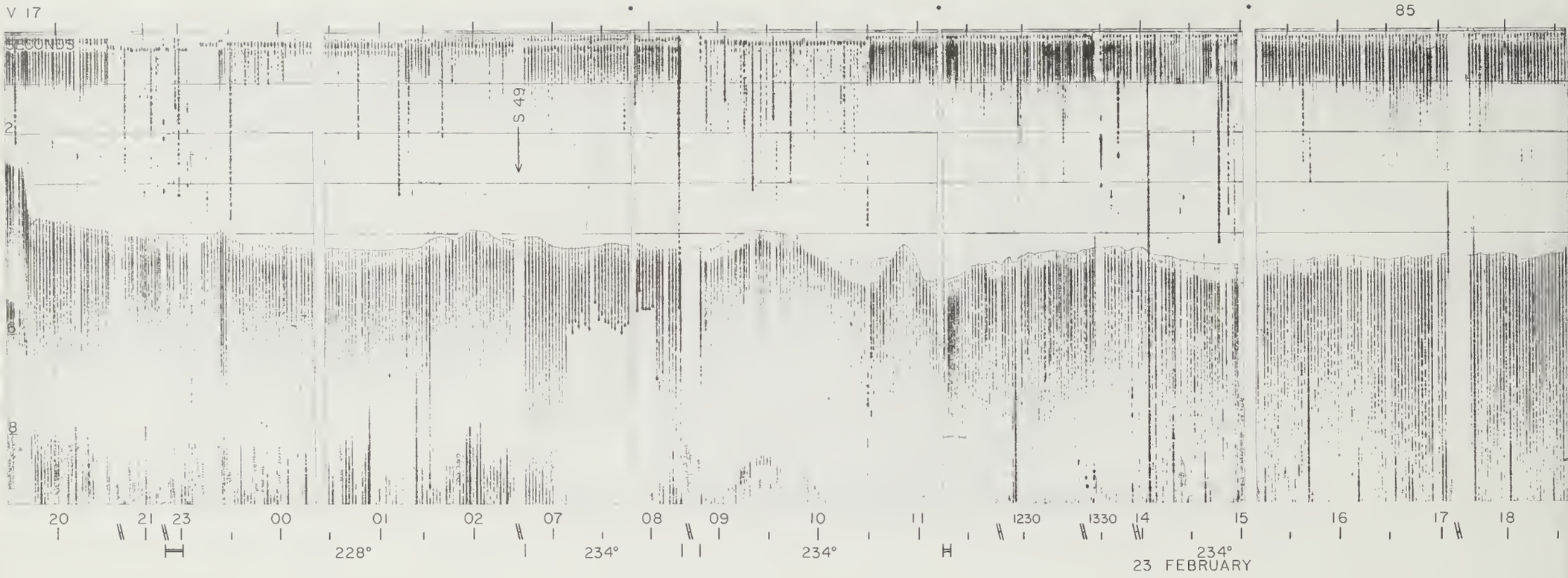

60
V 17
FATHOMS
800
3200
S 24
16
17
18
22
23
00
02
04
05
06
07
08
09
10
11
132°
095°
31 JANUARY
117°
1961

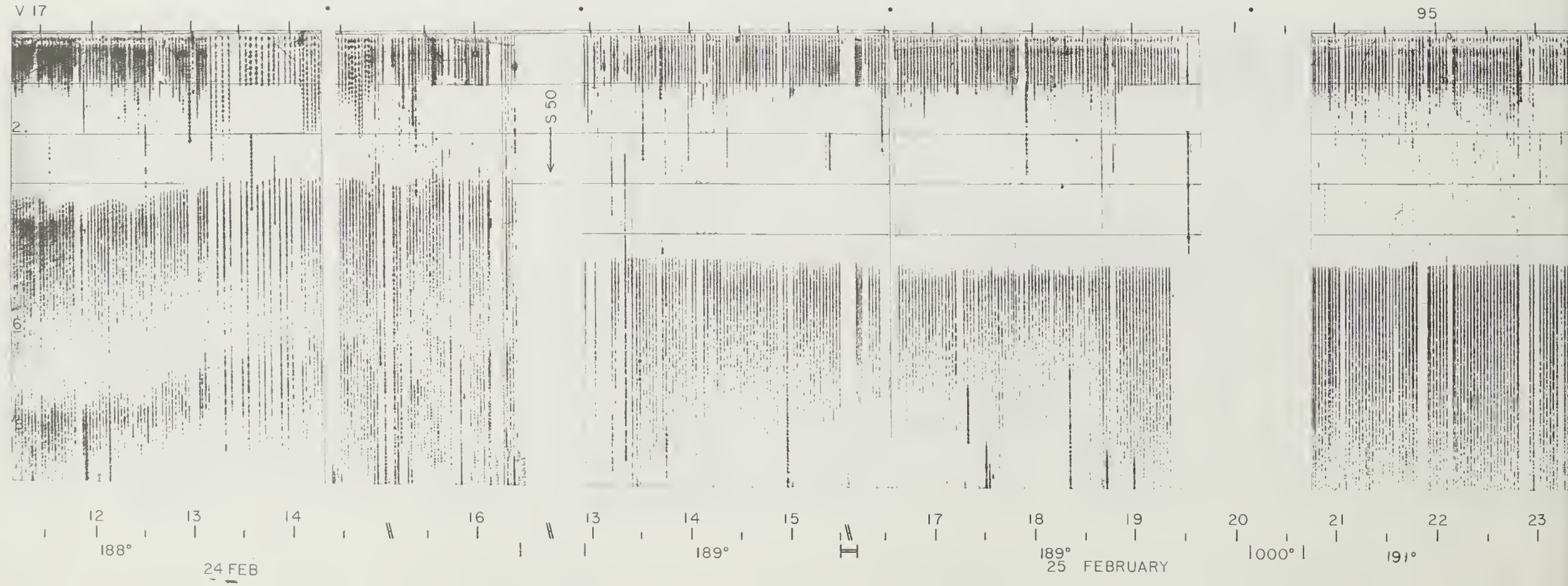

V 17
65
SECONDS
0
.05
0
.05
4
8
12
13
14
15
16
18
19
20
21
23
00
01
02
03
04
117°
117°
121°
279°
124°
126°
31 JANUARY

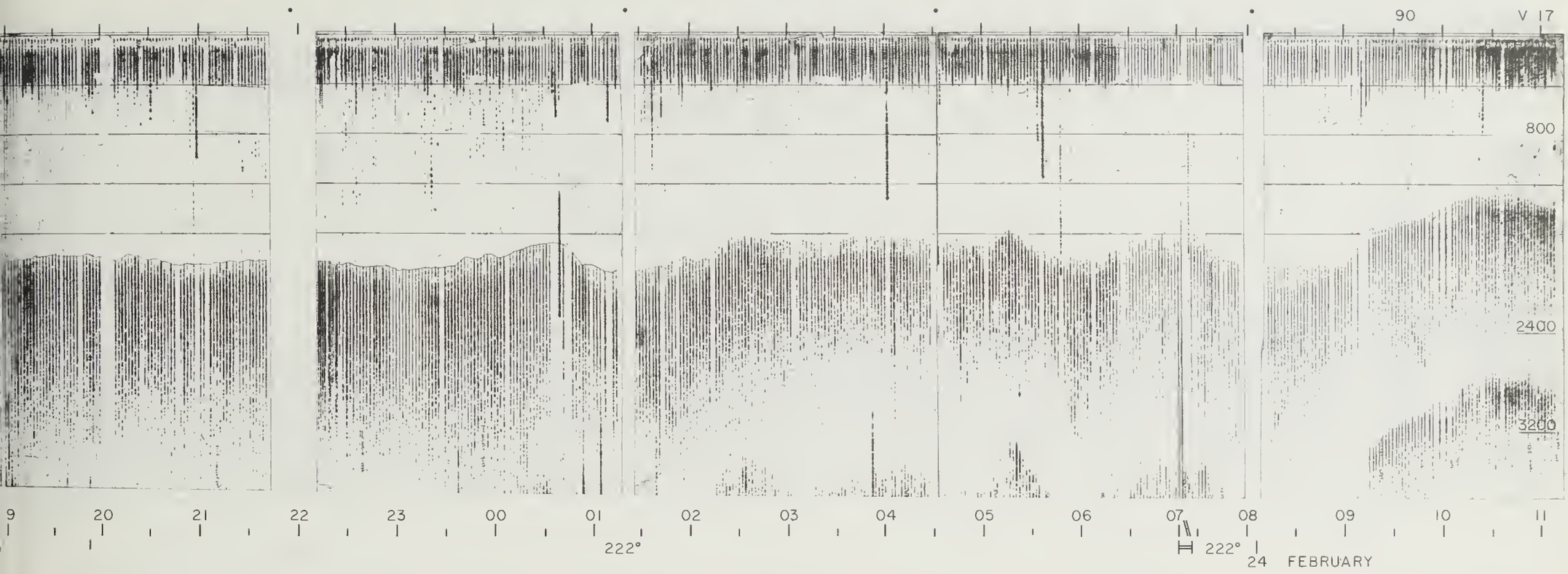

V 17
75
SECONDS
0
.05
0
.05
S47
4
8
01
02
03
10
1130
1230
17
18
19
20
21
02
04
05
200°
080°
245°
247°
247°
240°
240°
217°
20 FEBRUARY

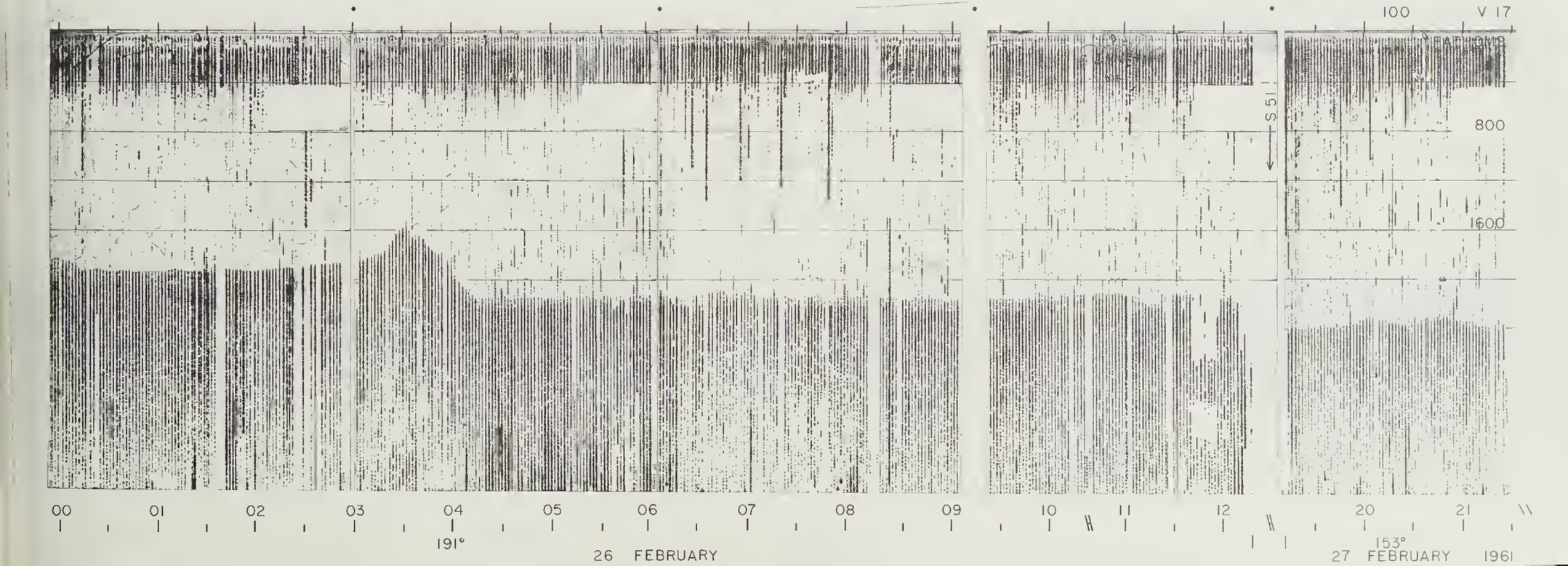

70
V 17
FATHOMS
S 25-45
PANAMA
800
1600
2400
3200
06
07
04
05
06
07
08
09
10
12
13
14
15
16
094°
194°
194°
186°
186°
FEBRUARY
19 FEBRUARY

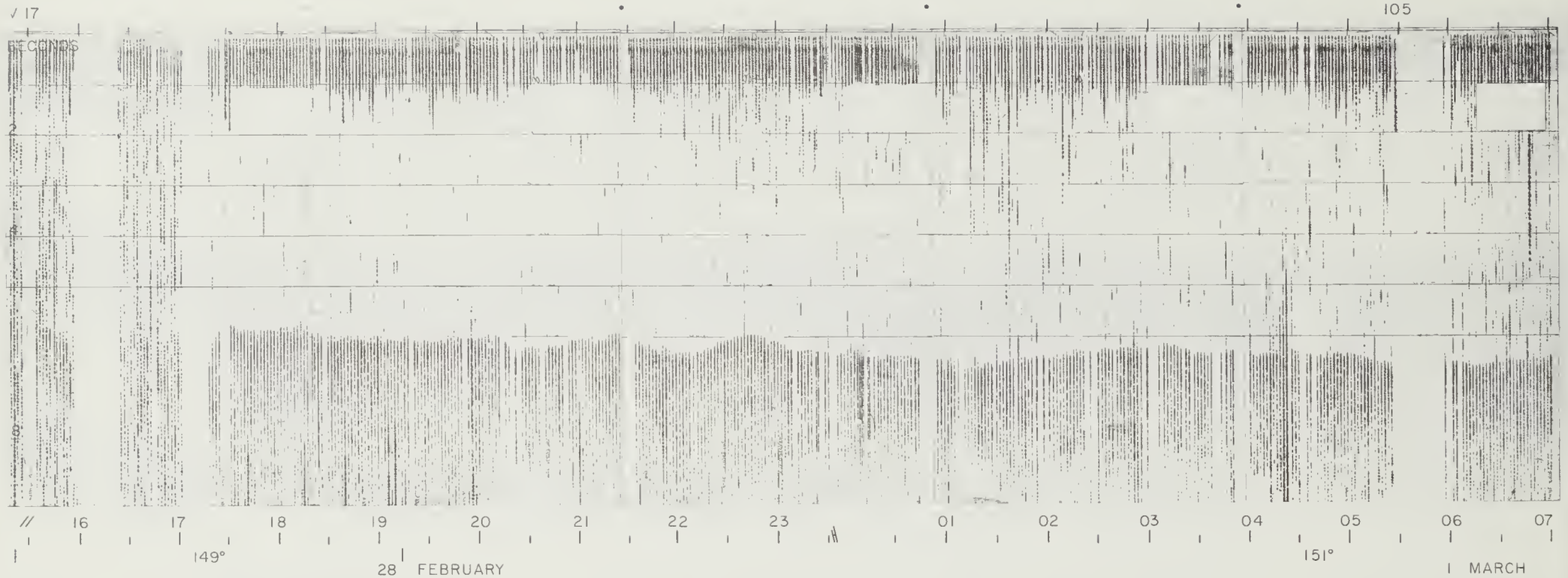

80
V 17
FATHOMS
S 48
800
1600
2400
3200
07
08
09
10
11
12
13
14
15
16
17
16
17
18
217°
222°
222°
227°
21 FEBRUARY
22 FEBRUARY 1961

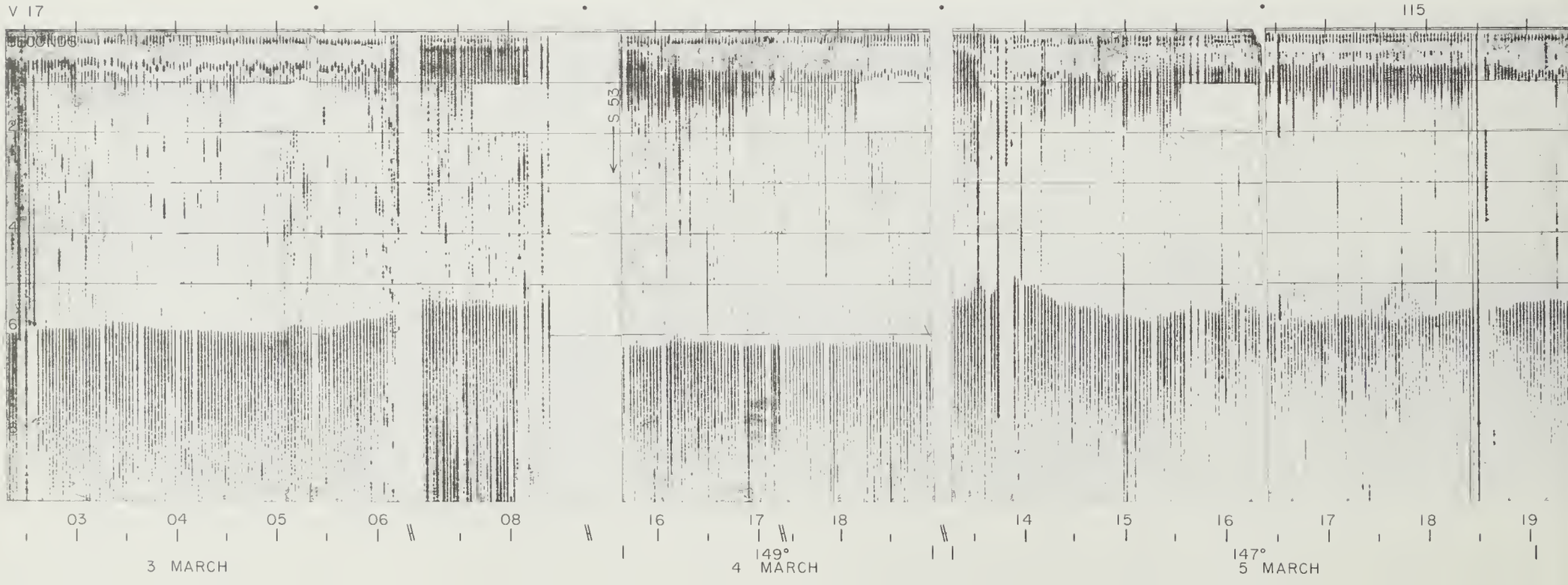

V 17
85
SECONDS
2
6
8
S 49
20
21
23
00
01
02
07
08
09
10
11
1230
1330
14
15
16
17
18
228°
234°
234°
234°
23 FEBRUARY

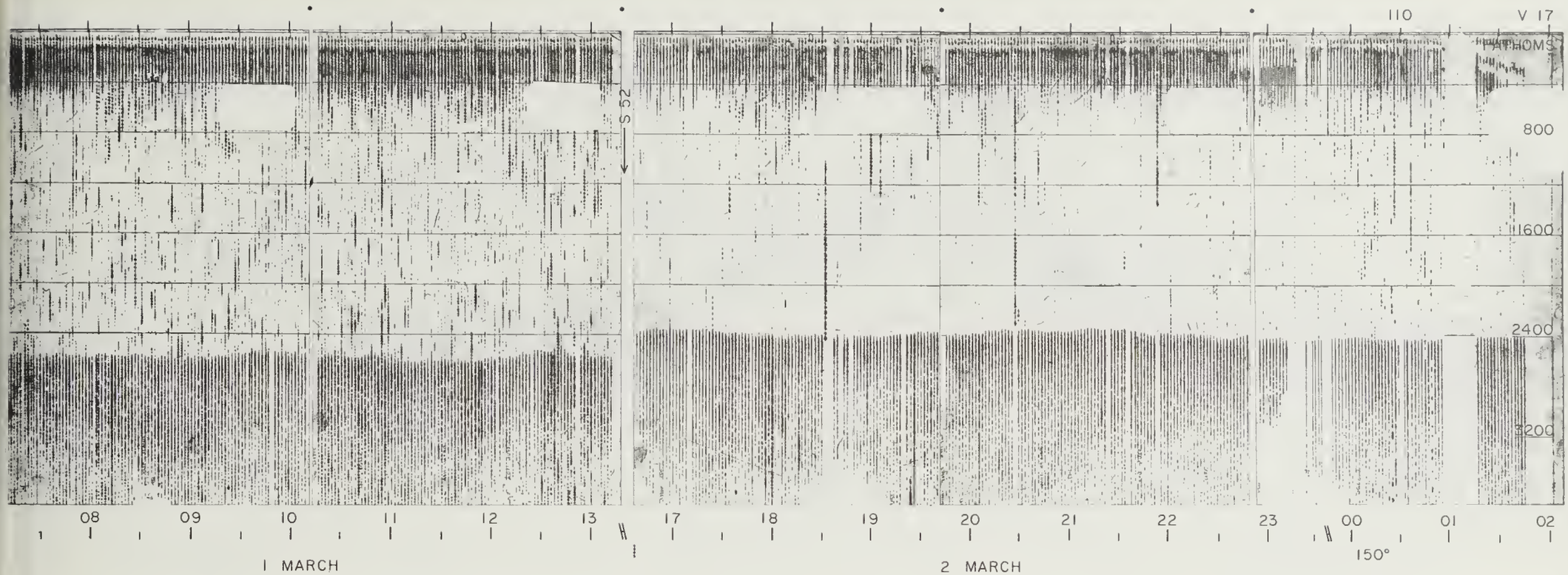

V 17
95
2
6
S 50
12
13
14
16
13
14
15
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20
21
22
23
188°
189°
189°
000°
191°
24 FEB
25 FEBRUARY

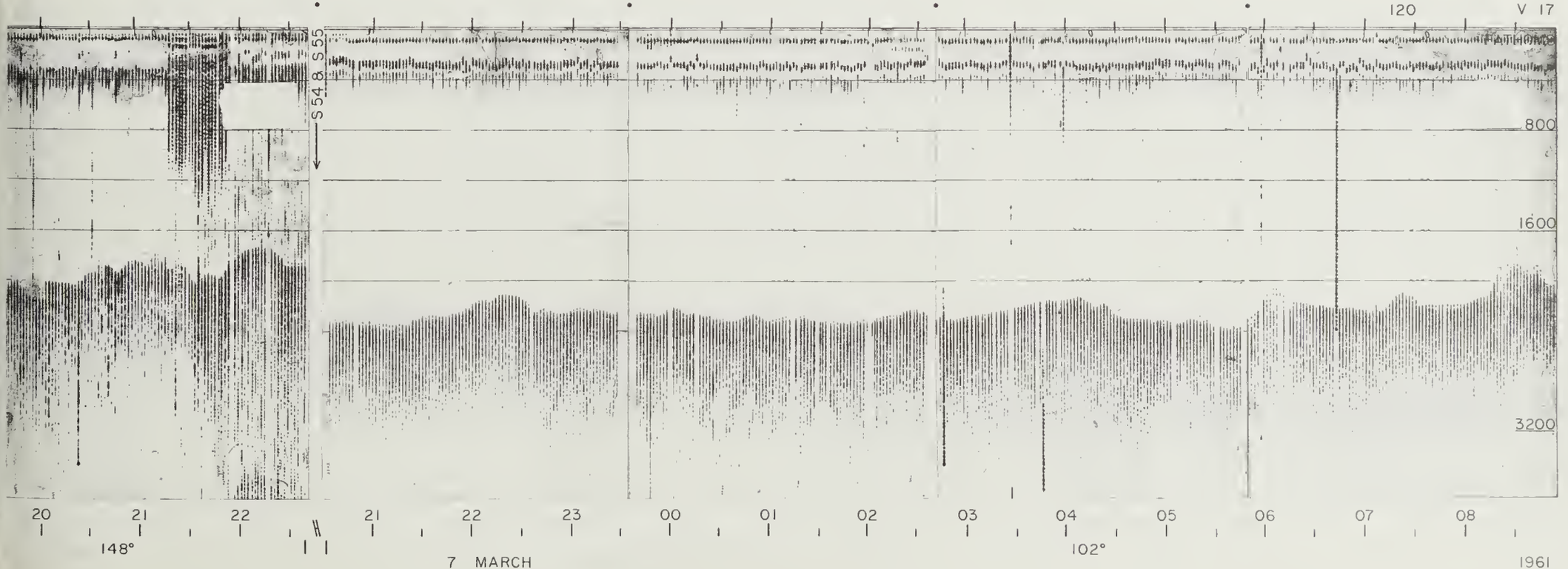

90
V 17
800
2400
3200
9
20
21
22
23
00
01
02
03
04
05
06
07
08
09
10
11
222°
222°
24 FEBRUARY


100
V 17
S 51
800
1600
00
01
02
03
04
05
06
07
08
09
10
11
12
20
21
191°
26 FEBRUARY
153°
27 FEBRUARY 1961

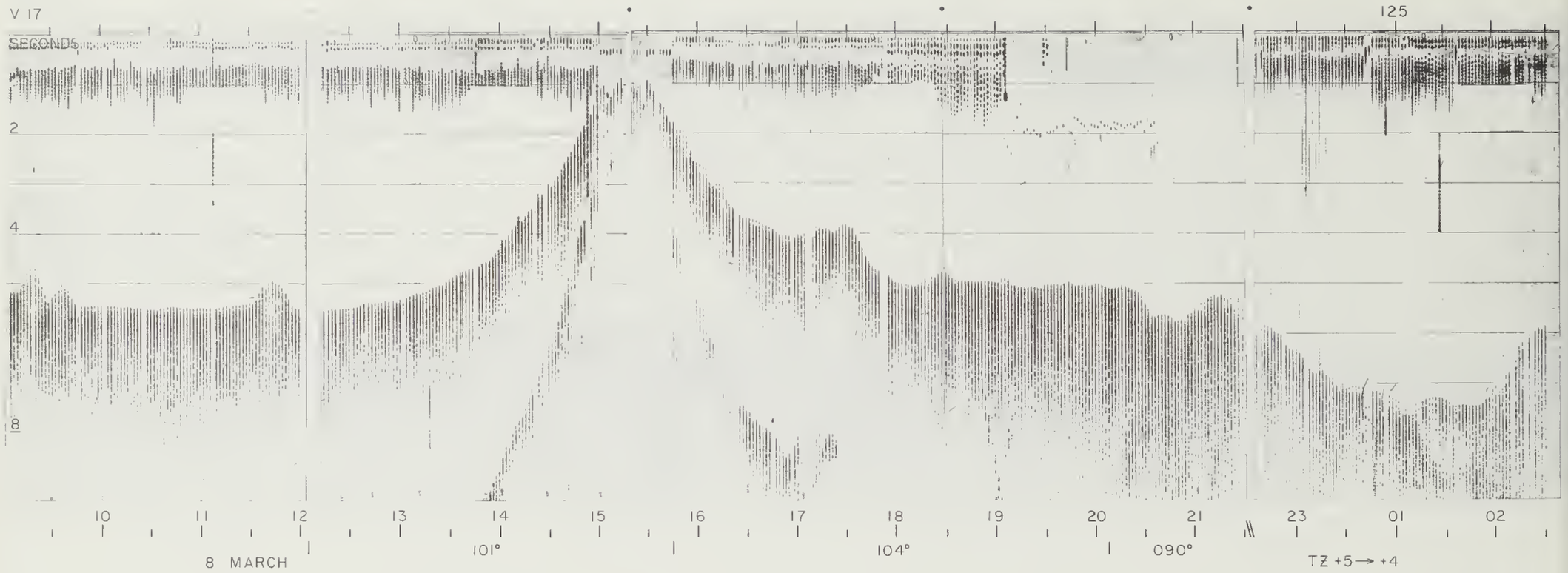

V 17
105
SECONDS
2
4
6
8
16
17
18
19
20
21
22
23
01
02
03
04
05
06
07
149°
28 FEBRUARY
151°
1 MARCH

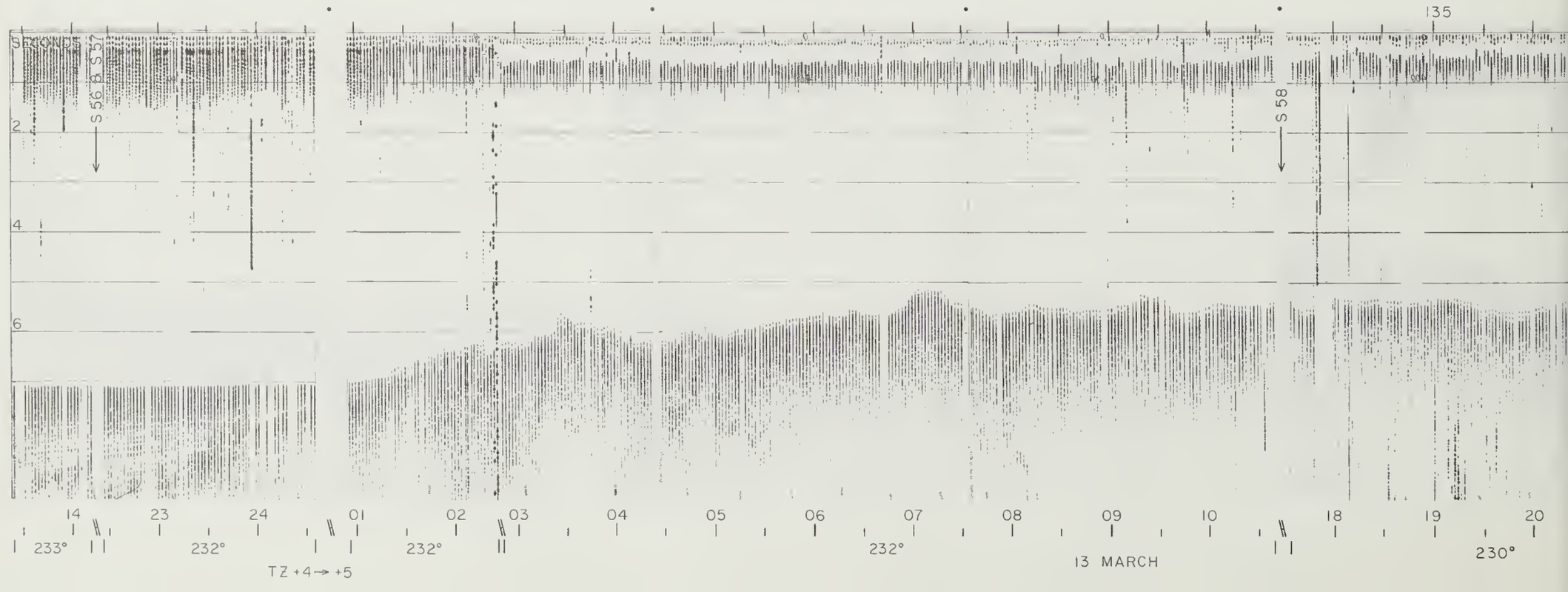

V 17
115
SECONDS
2
4
6
8
S 53
03
04
05
06
08
16
17
18
14
15
16
17
18
19
3 MARCH
149°
4 MARCH
147°
5 MARCH

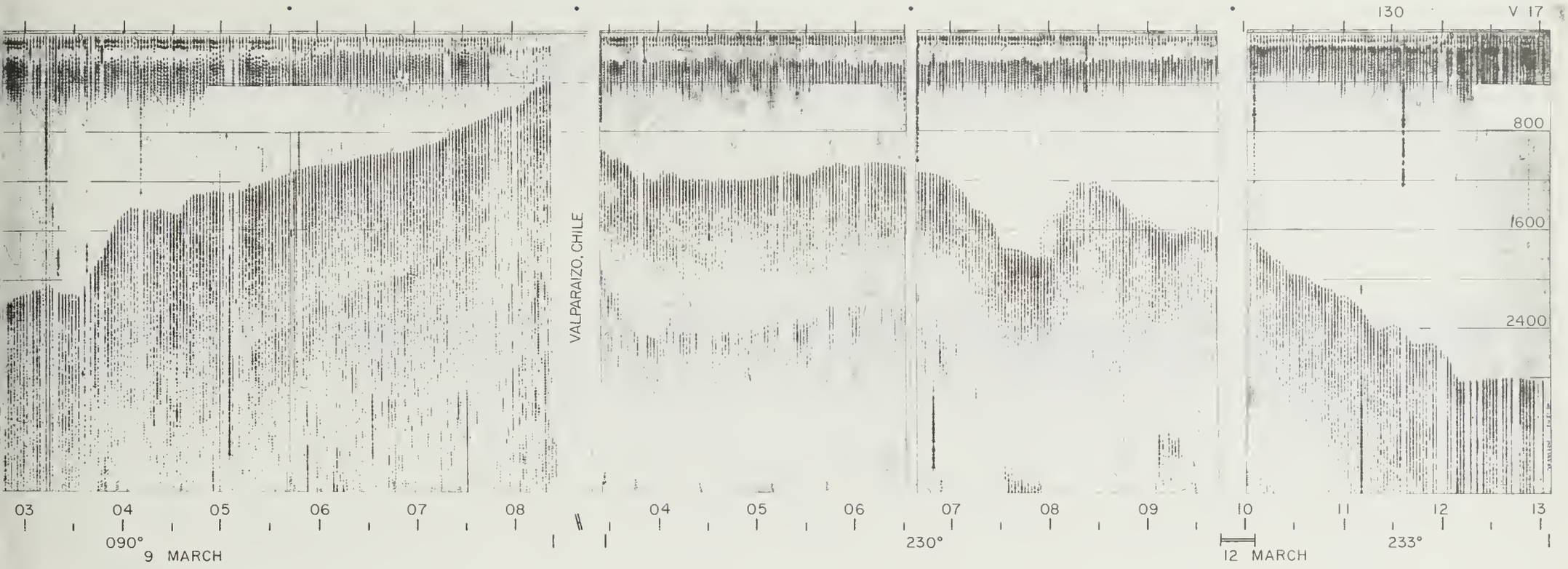

110
V 17
FATHOMS
800
1600
2400
3200
S 52
08
09
10
11
12
13
17
18
19
20
21
22
23
00
01
02
1 MARCH
2 MARCH
150°

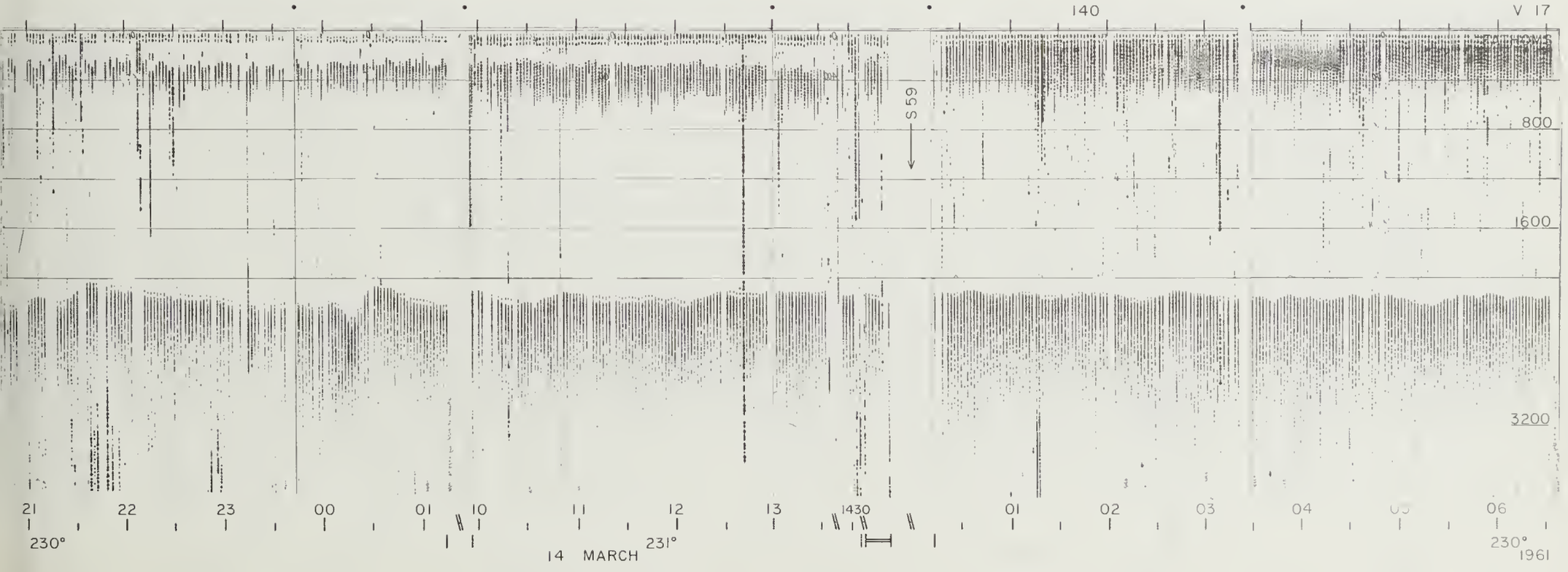

120
V 17
FATHOMS
800
1600
3200
S 54
S 55
20
21
22
21
22
23
00
01
02
03
04
05
06
07
08
148°
7 MARCH
102°

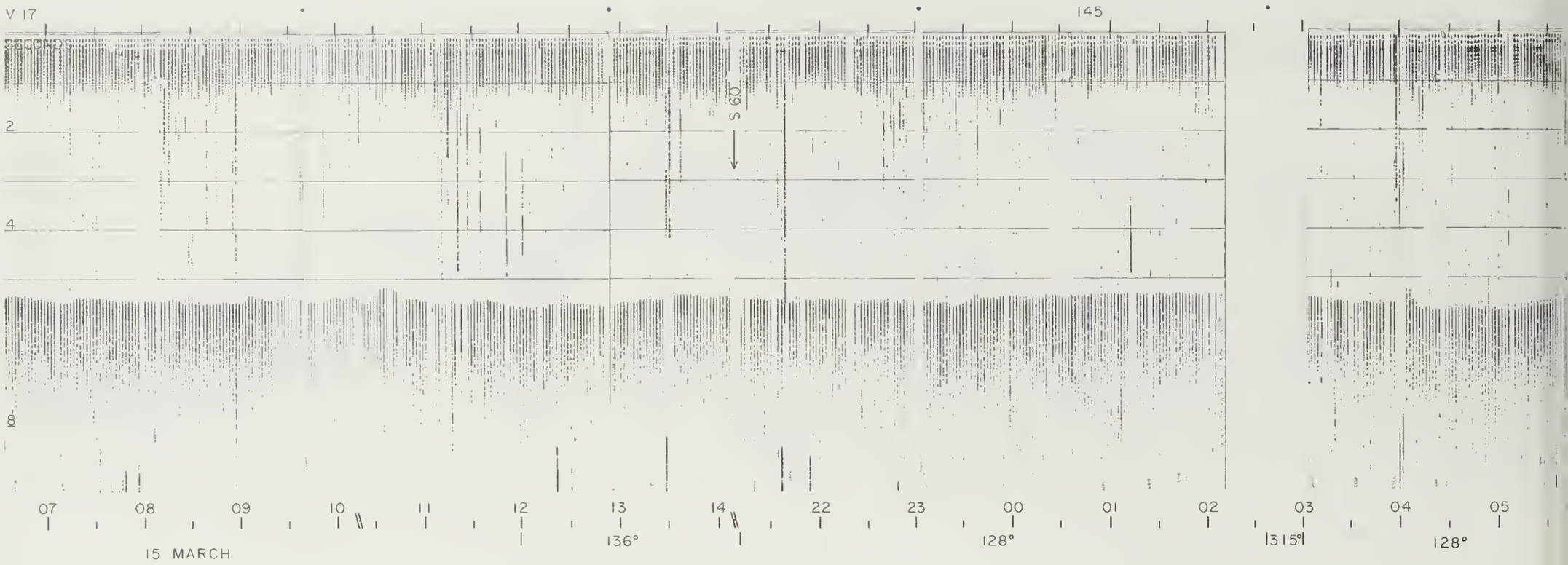
1961

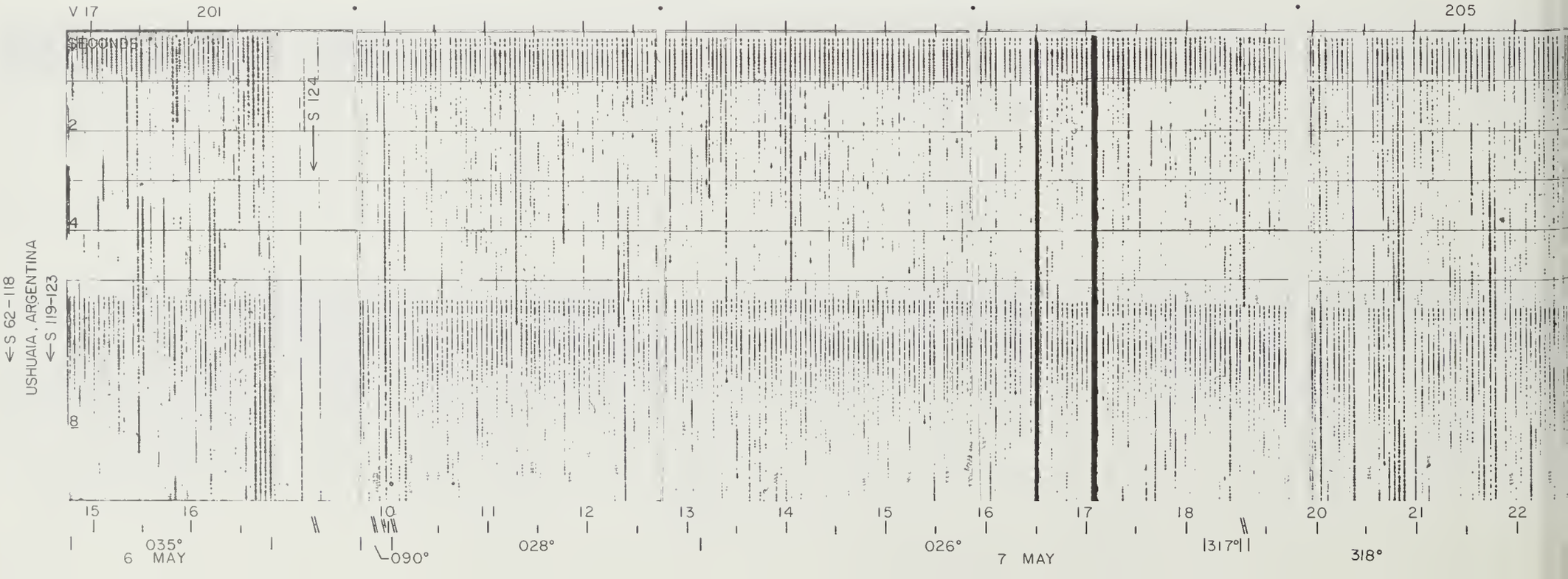

V 17
SECONDS
2
4
8
125
10
11
12
13
14
15
16
17
18
19
20
21
23
01
02
8 MARCH
101°
104°
090°
TZ +5→ +4

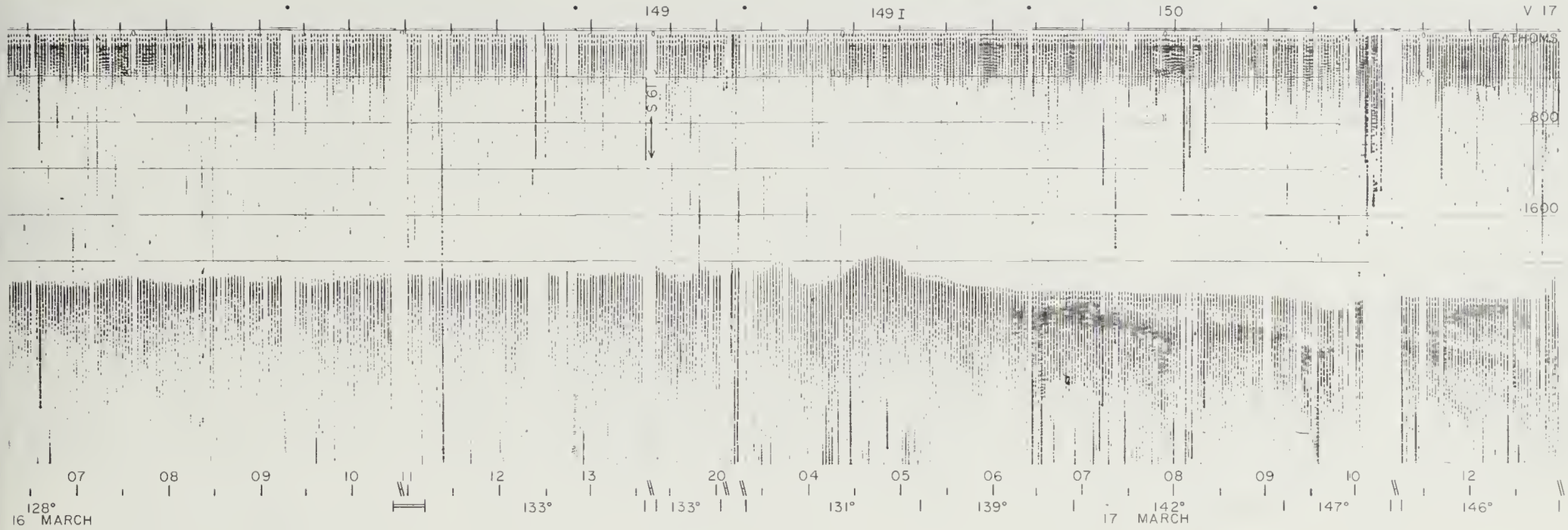

S 56
S 57
S 58
135
2
4
6
14
23
24
01
02
03
04
05
06
07
08
09
10
18
19
20
233°
232°
232°
232°
230°
TZ +4→ +5
13 MARCH

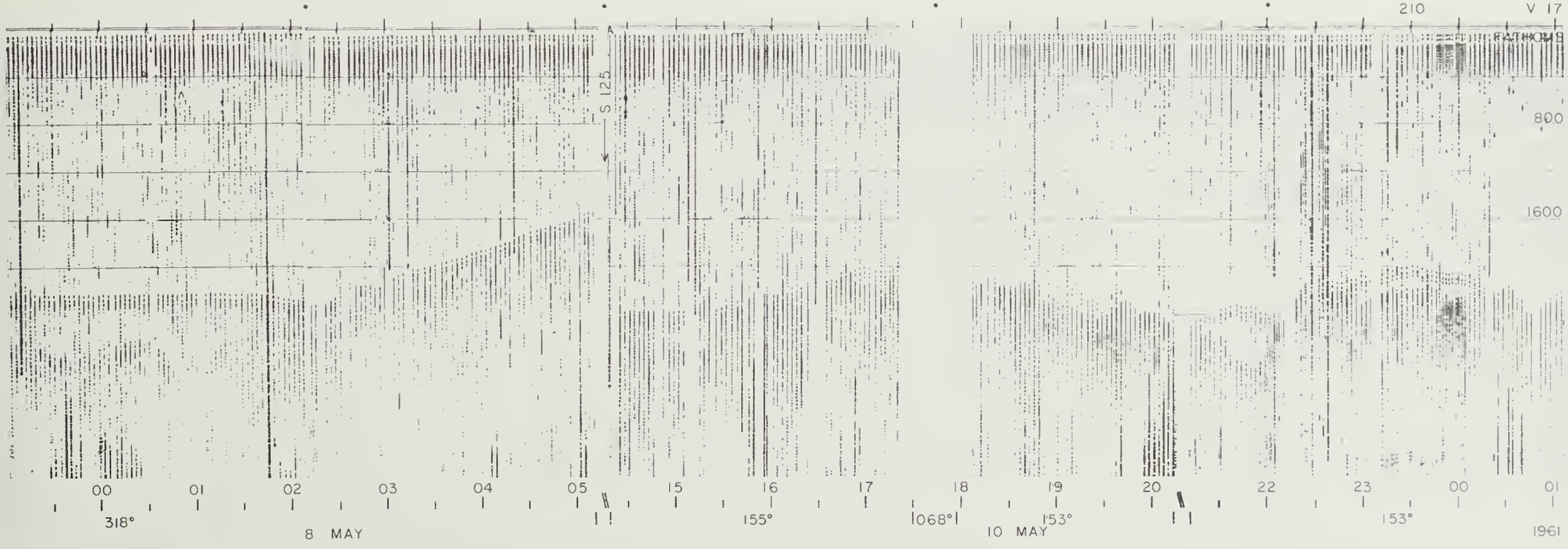

130
V 17
800
1600
2400
VALPARAIZO, CHILE
03
04
05
06
07
08
04
05
06
07
08
09
10
11
12
13
090°
9 MARCH
230°
12 MARCH
233°

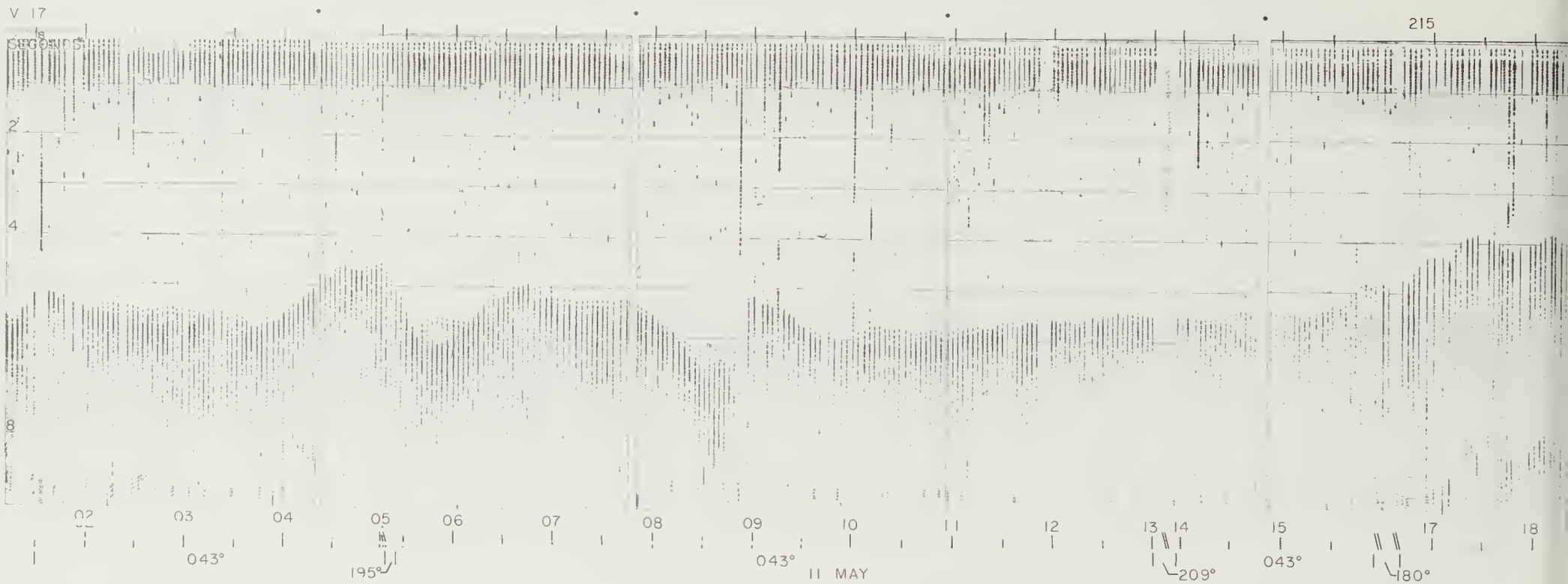

140
V 17
S 59
800
1600
3200
21
22
23
00
01
10
11
12
13
1430
01
02
03
04
05
06
230°
14 MARCH
231°
230°
1961

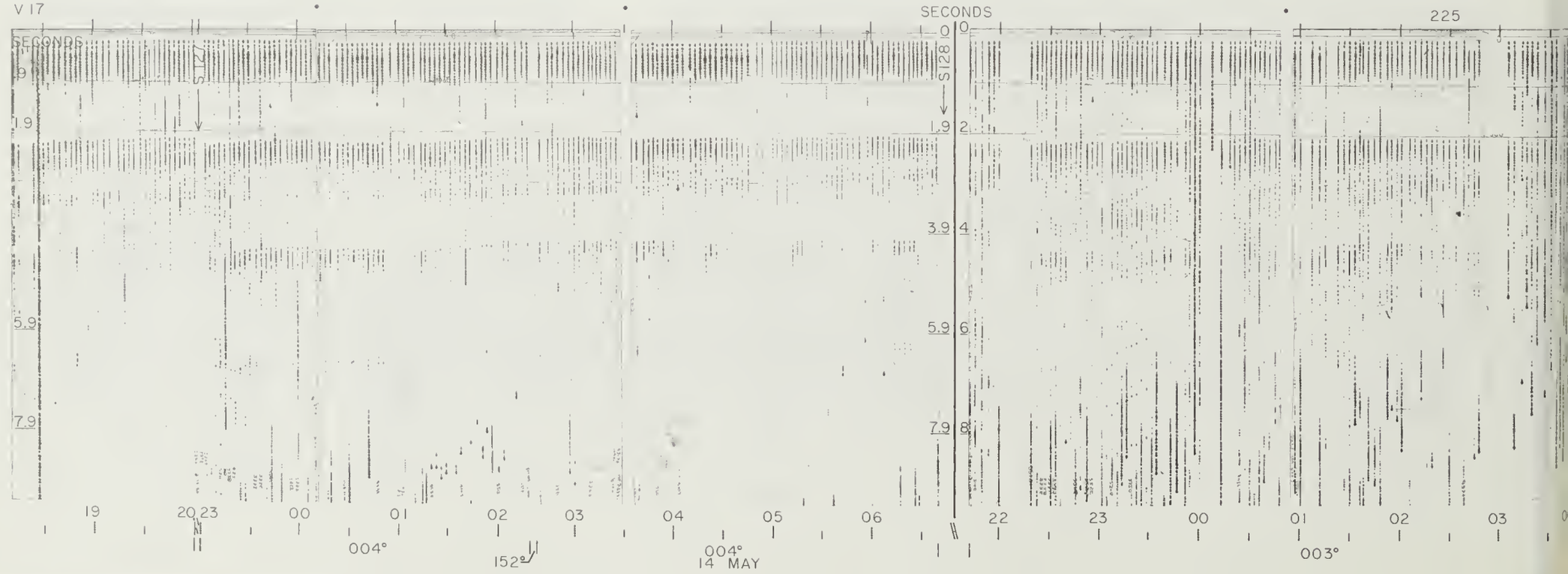

V 17
145
S 60
07
08
09
10
11
12
13
14
22
23
00
01
02
03
04
05
136°
128°
315°
128°
15 MARCH

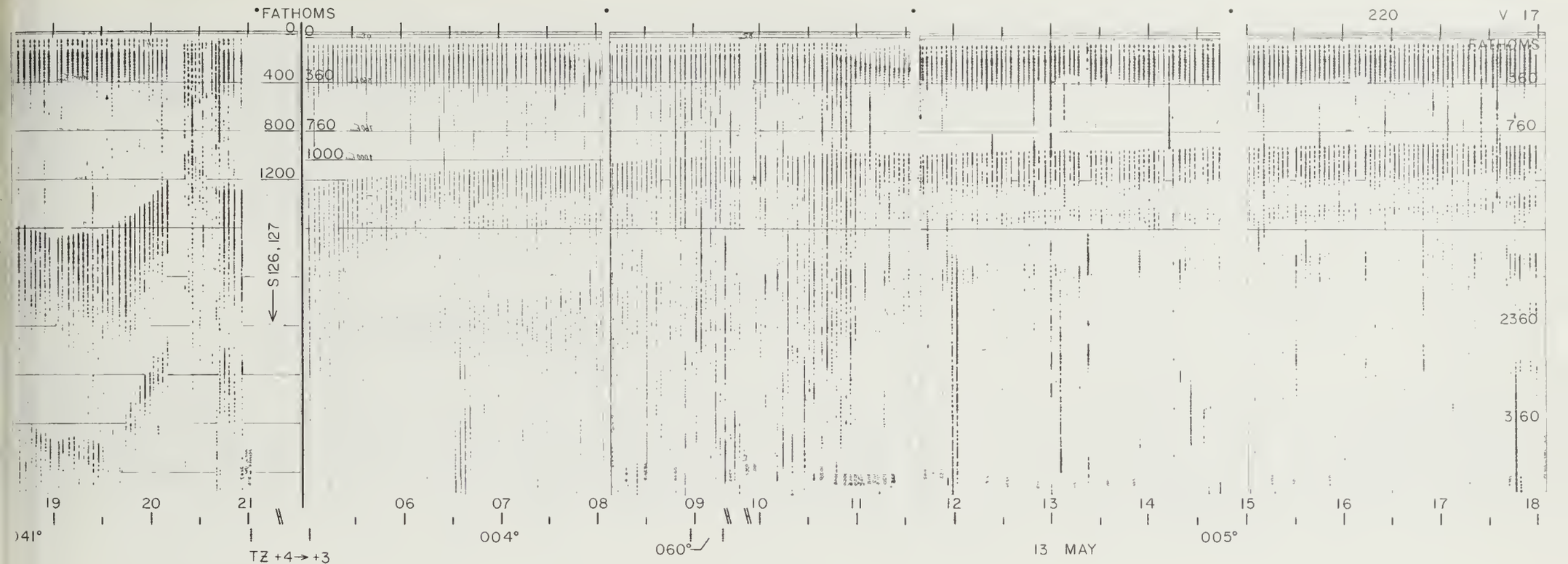

V 17
201
205
SECONDS
S 124
← S 62-118
USHUAIA, ARGENTINA
← S 119-123
15
16
10
11
12
13
14
15
16
17
18
20
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22
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6 MAY
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317°
318°

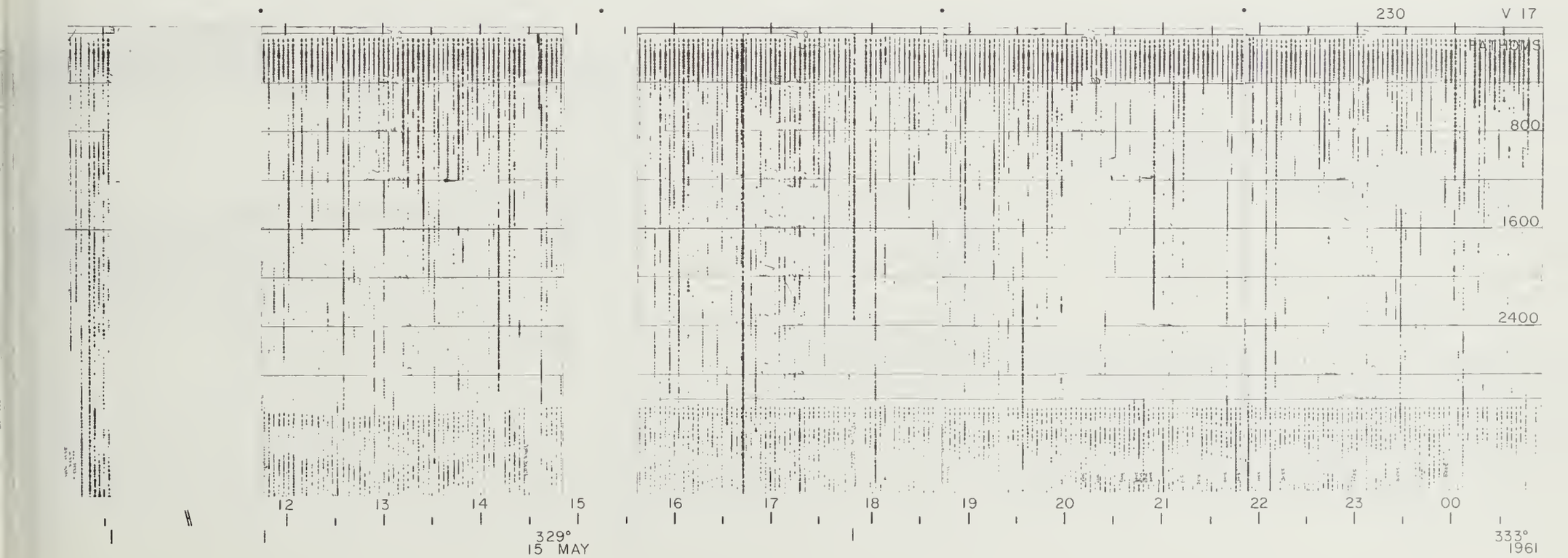

149
149 I
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V 17
FATHOMS
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146°
16 MARCH
17 MARCH

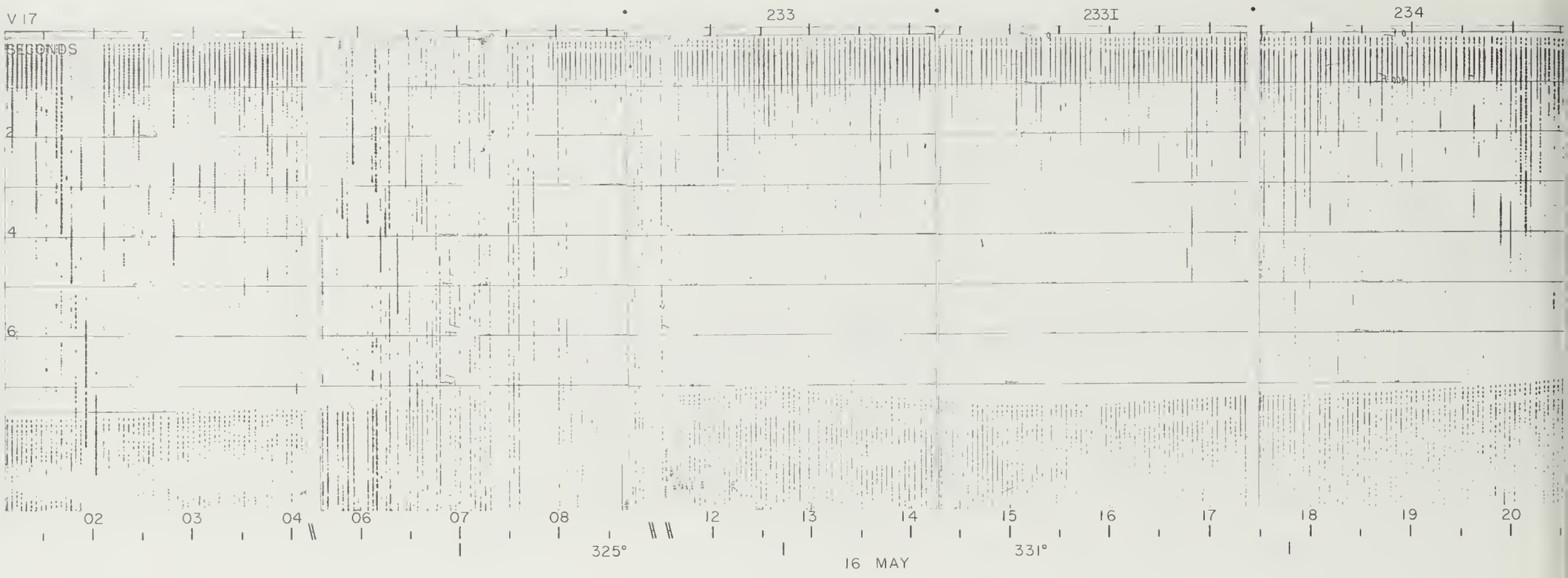

210
V 17
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10 MAY
1961

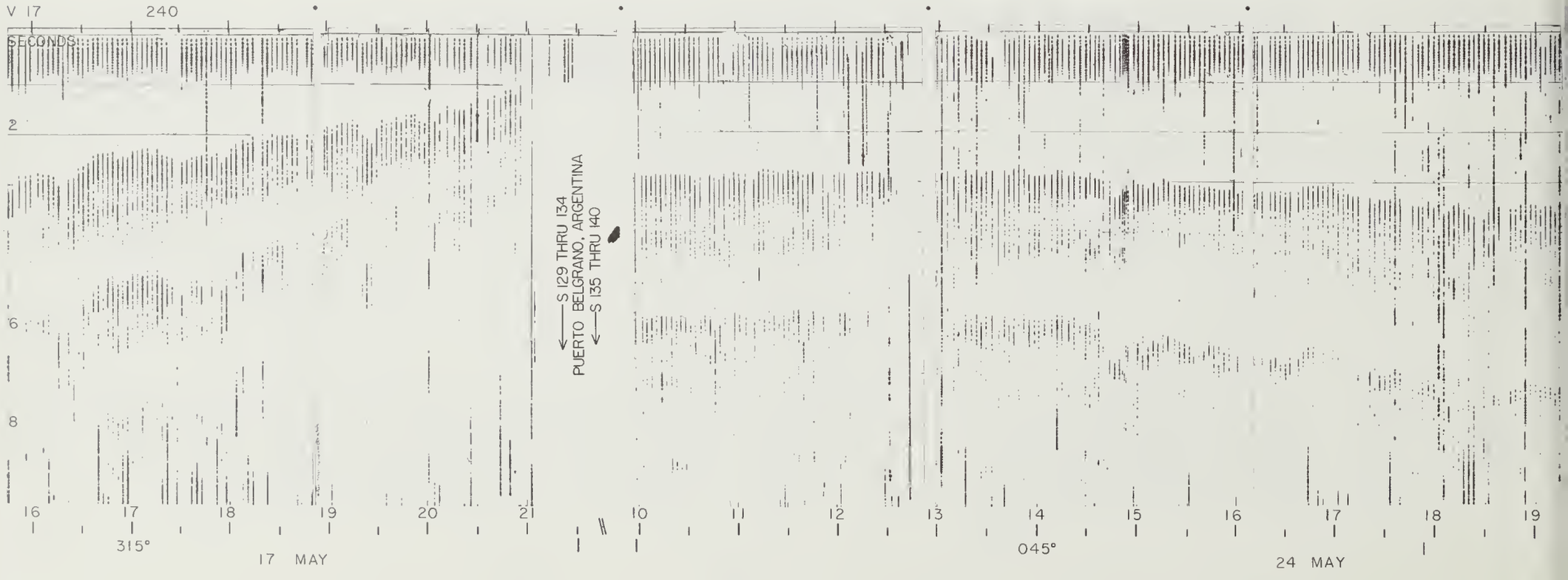

V 17
SECONDS
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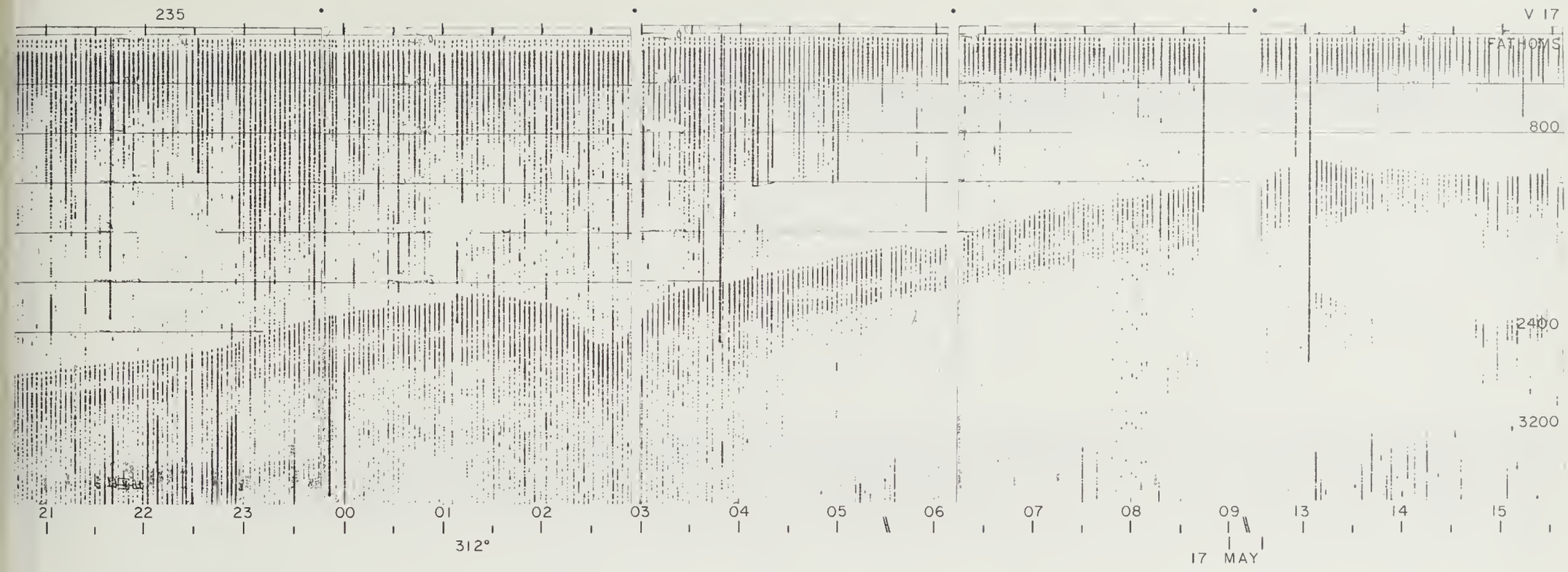

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SECONDS
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SECONDS
S128
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004°
14 MAY
003°

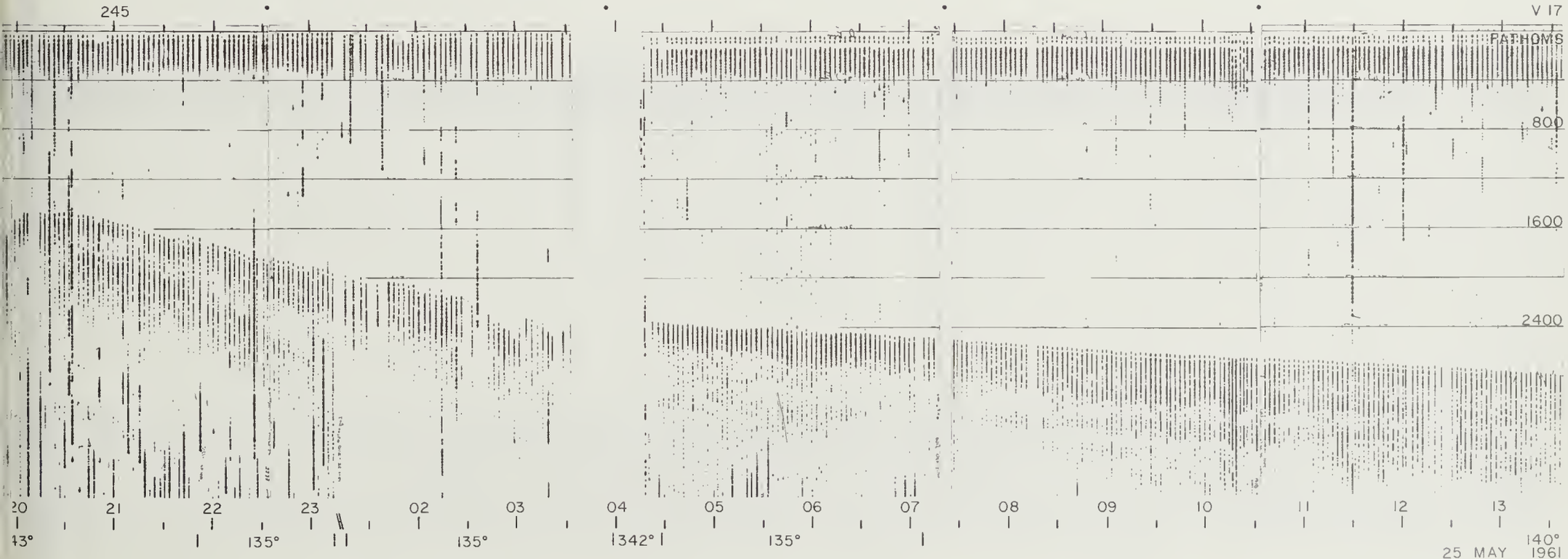

FATHOMS
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V 17
FATHOMS
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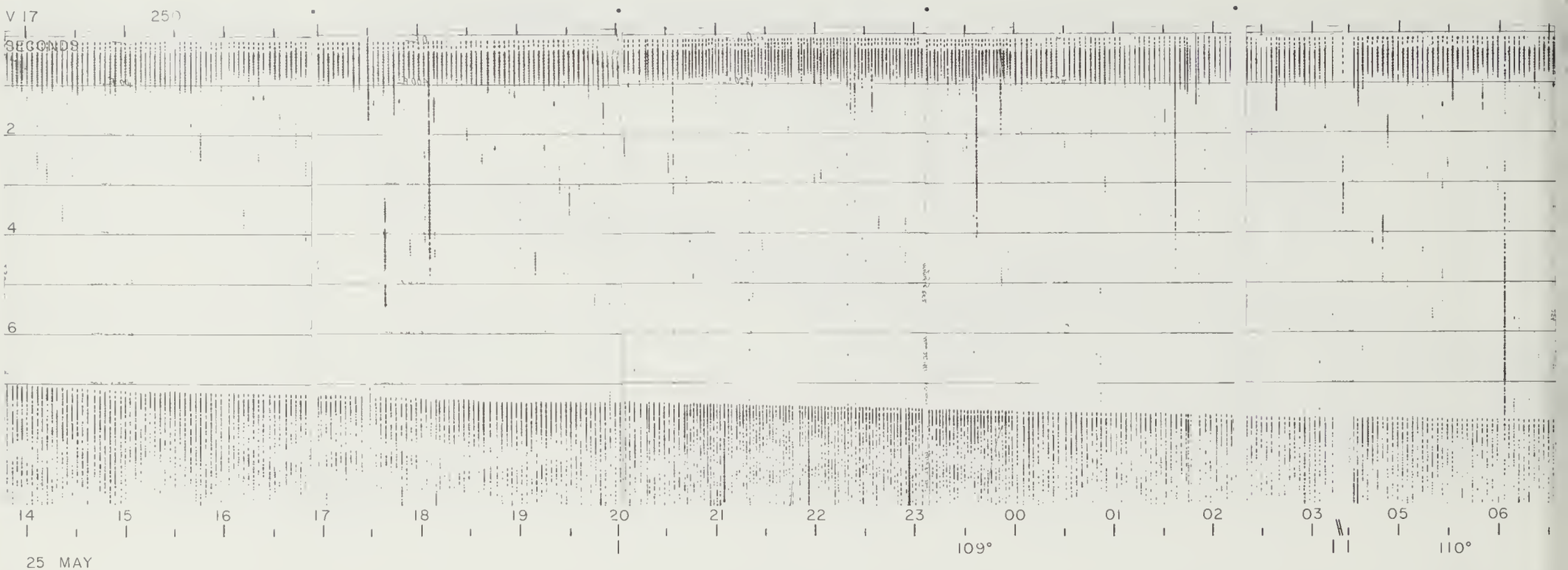

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15 MAY
333°
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V 17
FATHOMS
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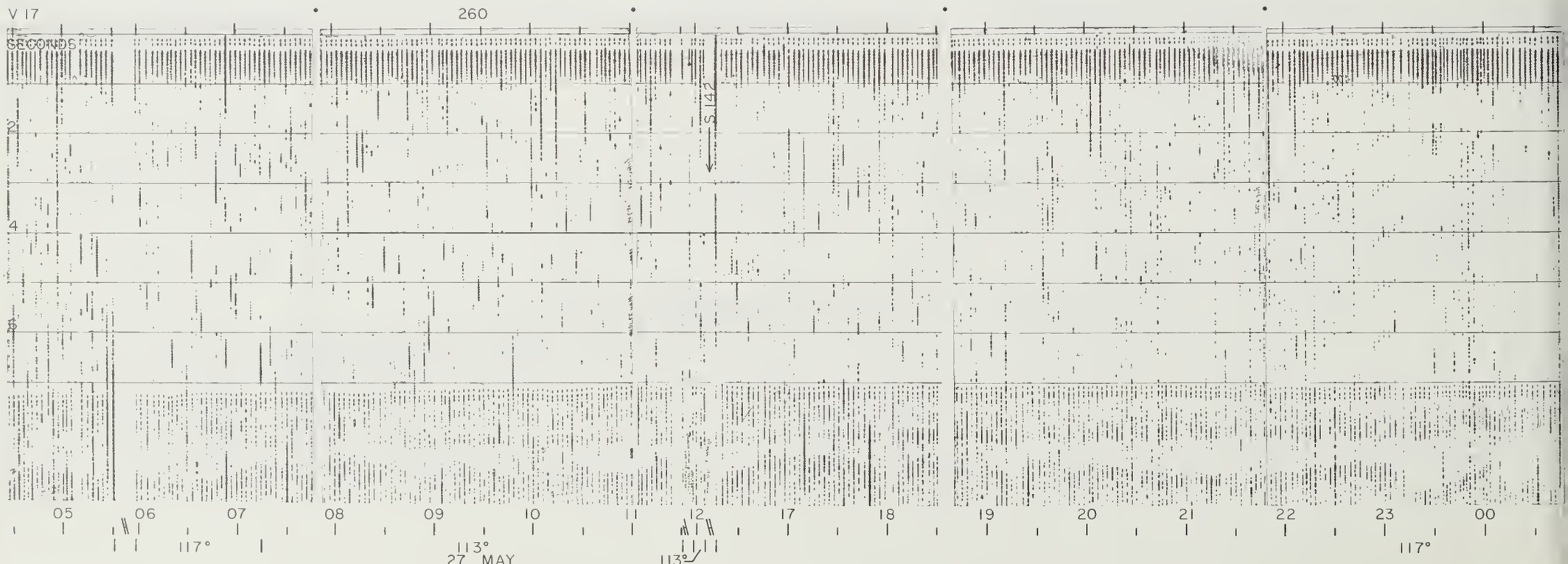

V 17
SECONDS
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325°
331°
16 MAY

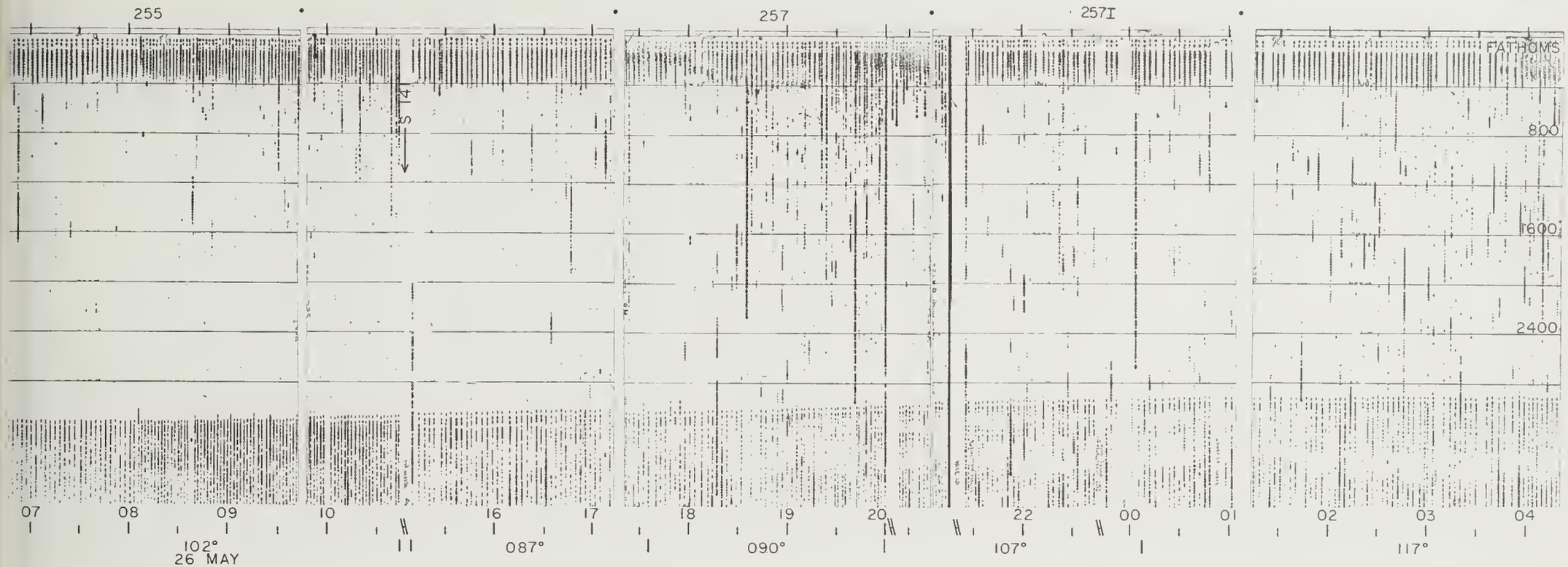

V 17
240
SECONDS
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S 129 THRU 134
PUERTO BELGRANO, ARGENTINA
S 135 THRU 140
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315°
17 MAY
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24 MAY

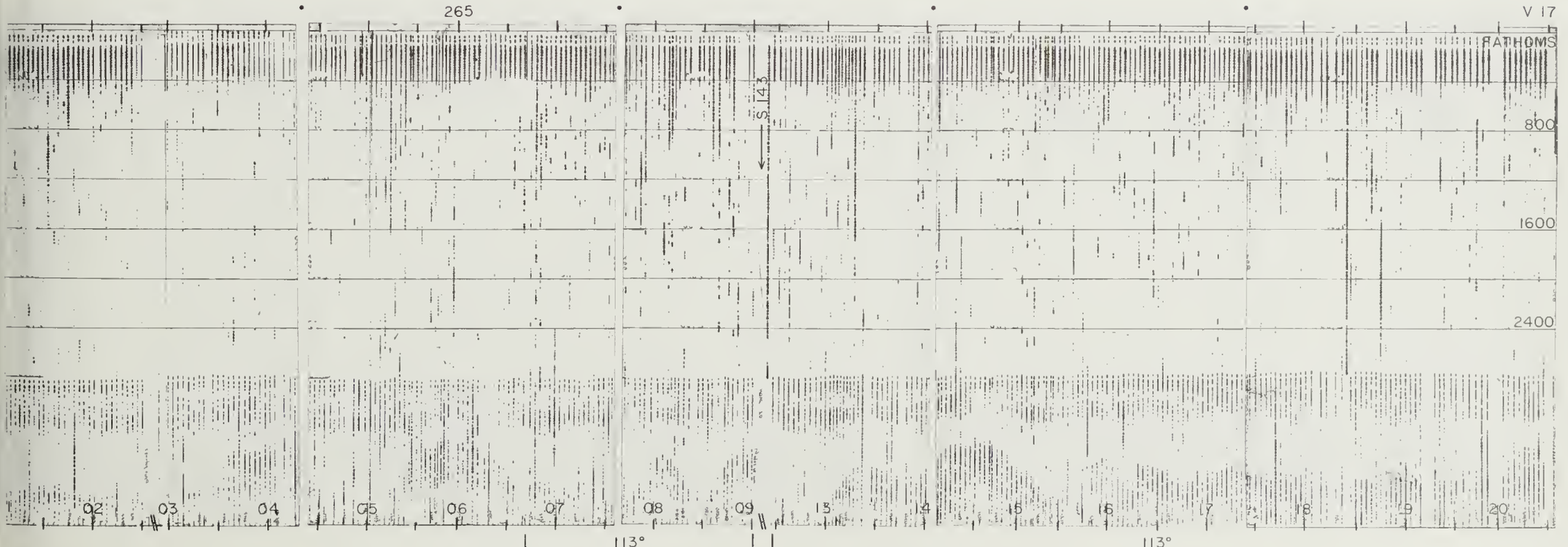

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V 17
FATHOMS
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312°
17 MAY


245
V 17
FATHOMS
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140°
25 MAY 1961

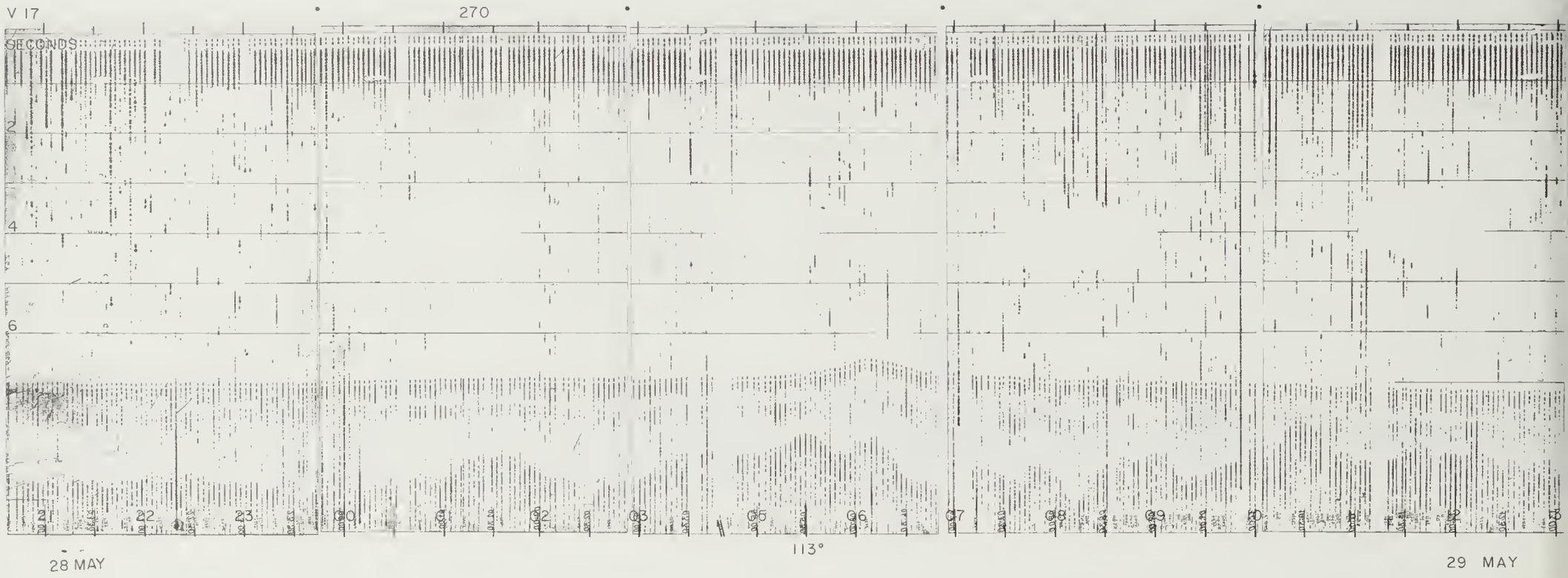

V 17
250
SECONDS
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110°
25 MAY

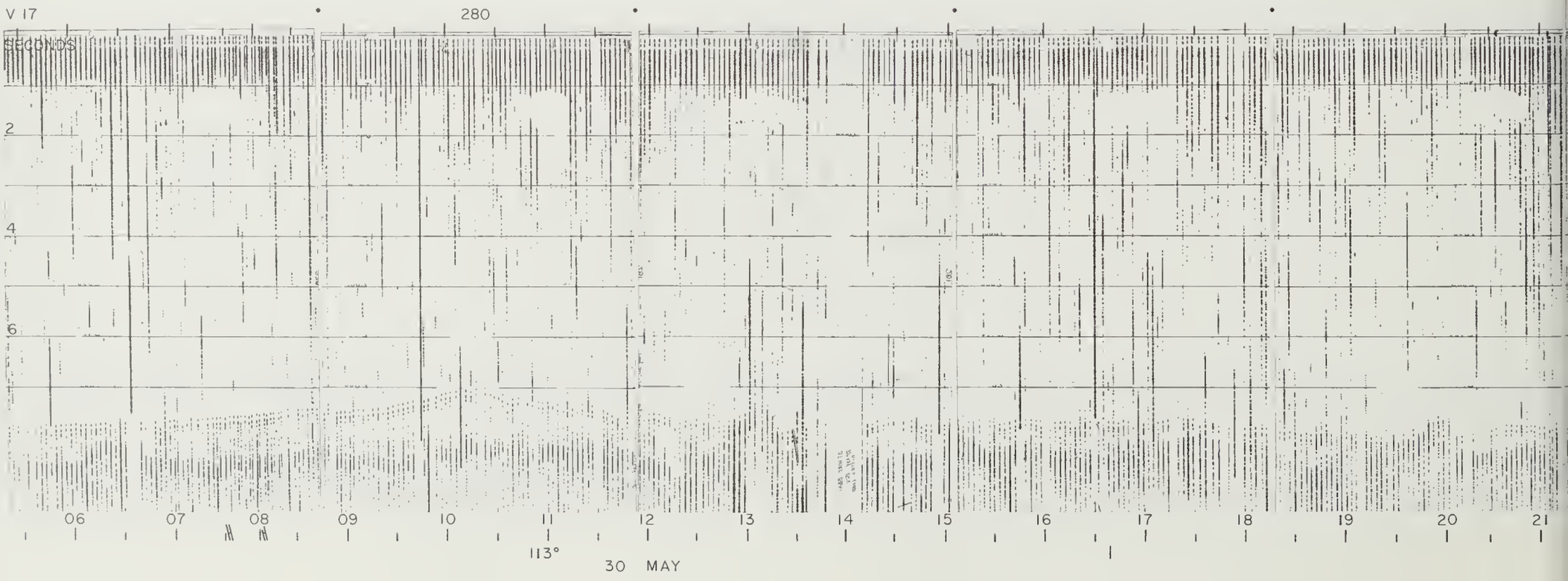

V 17
260
SECONDS
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27 MAY
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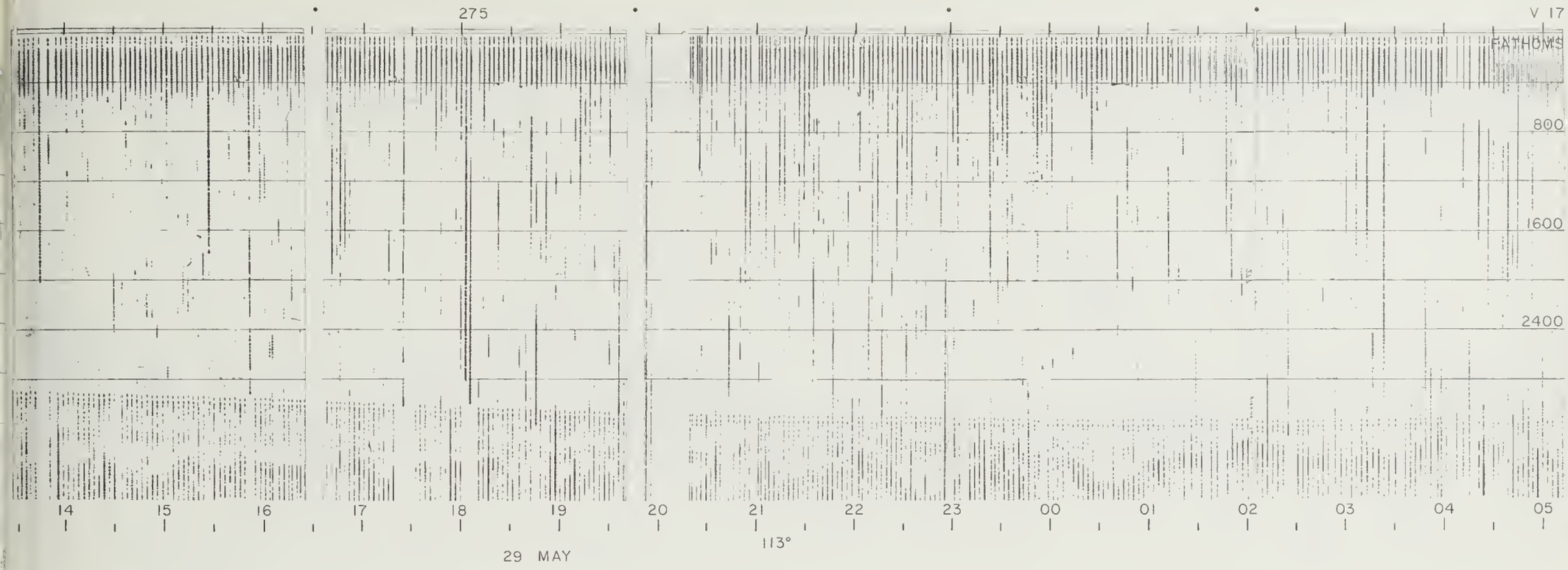

255
257
257I
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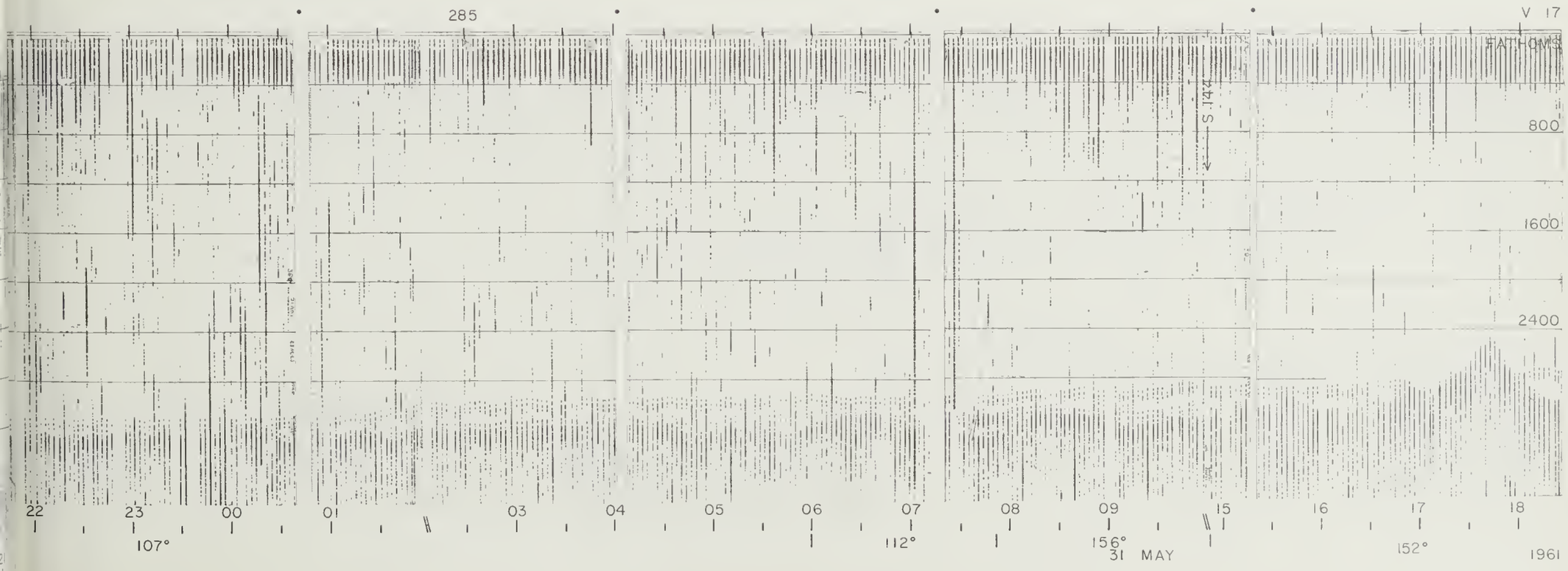

265
V 17
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28 MAY
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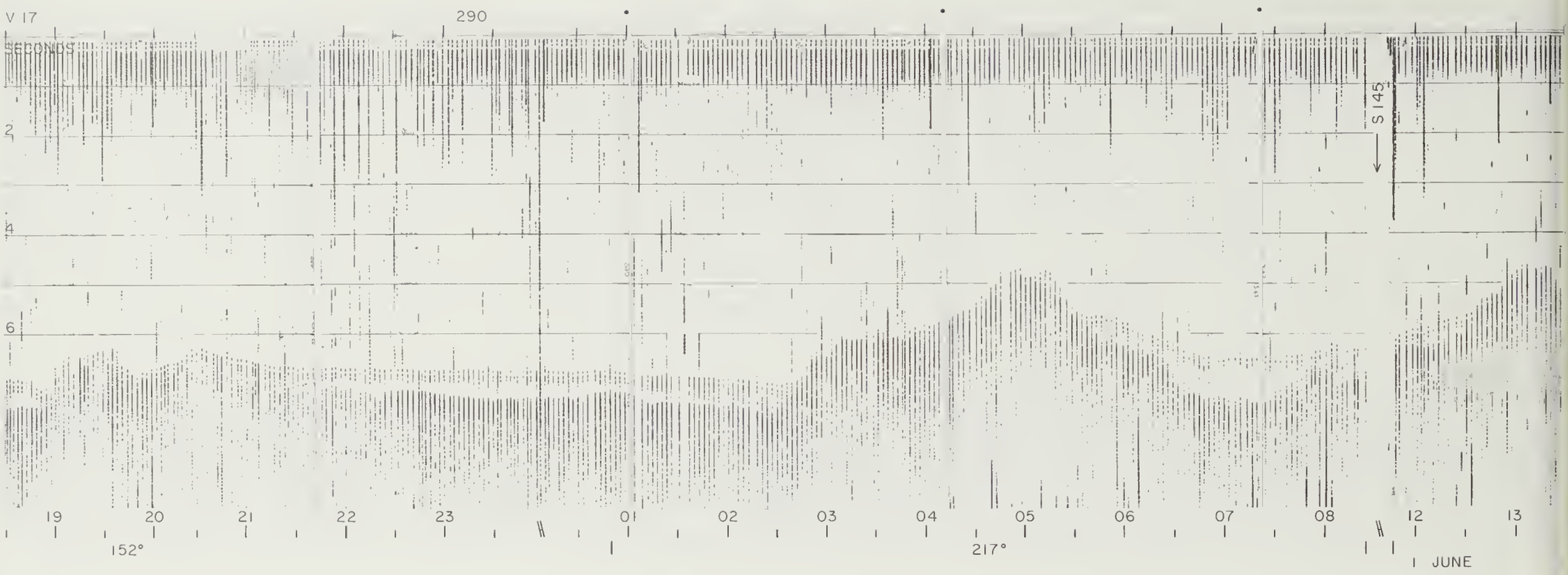
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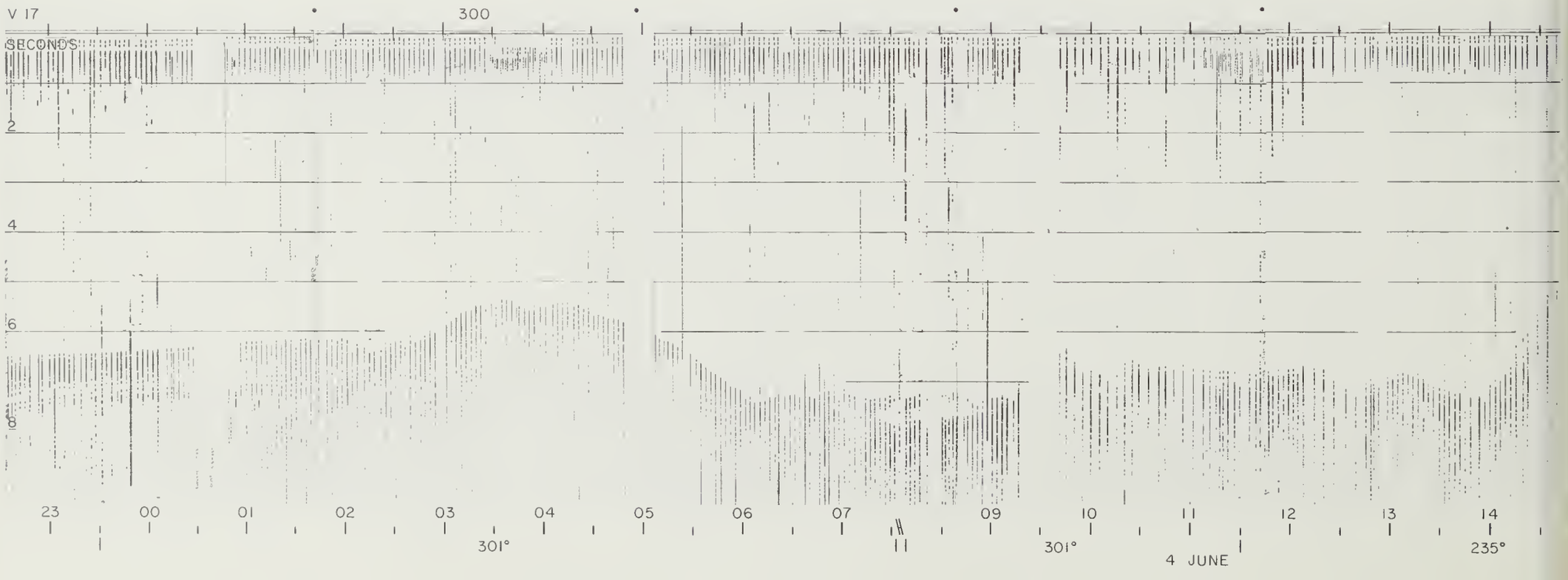

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270
SECONDS
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28 MAY
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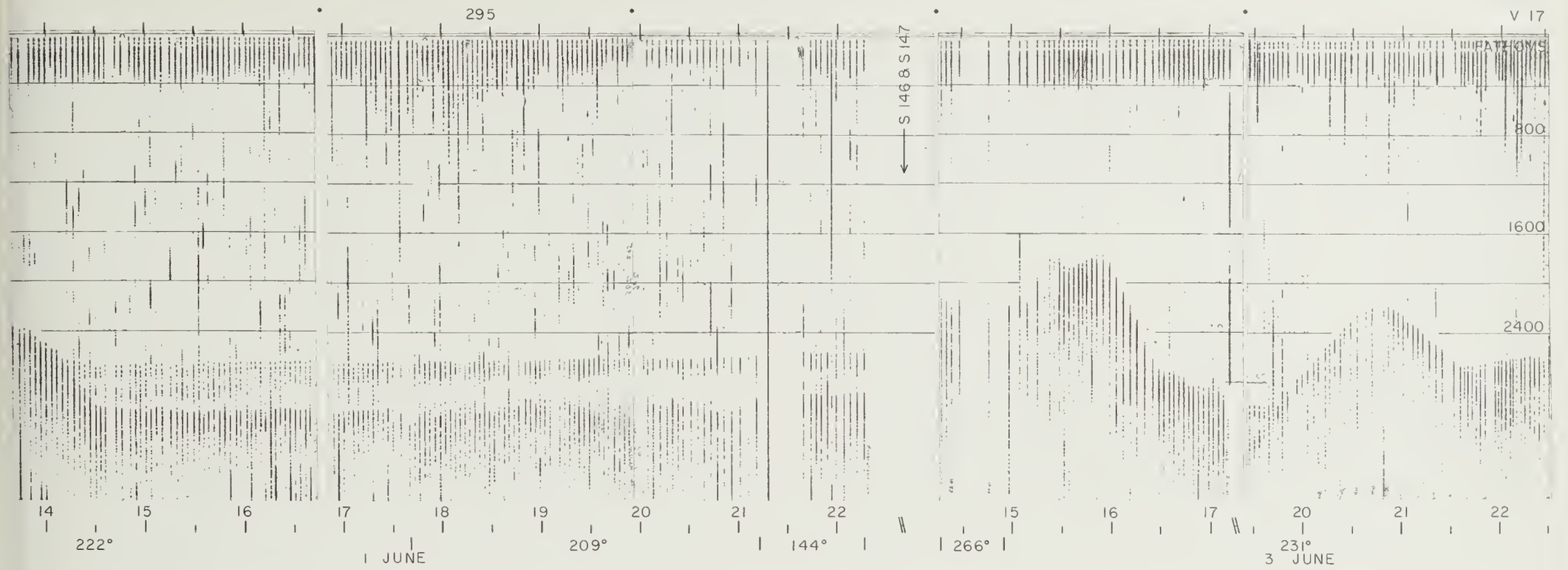

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280
SECONDS
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30 MAY

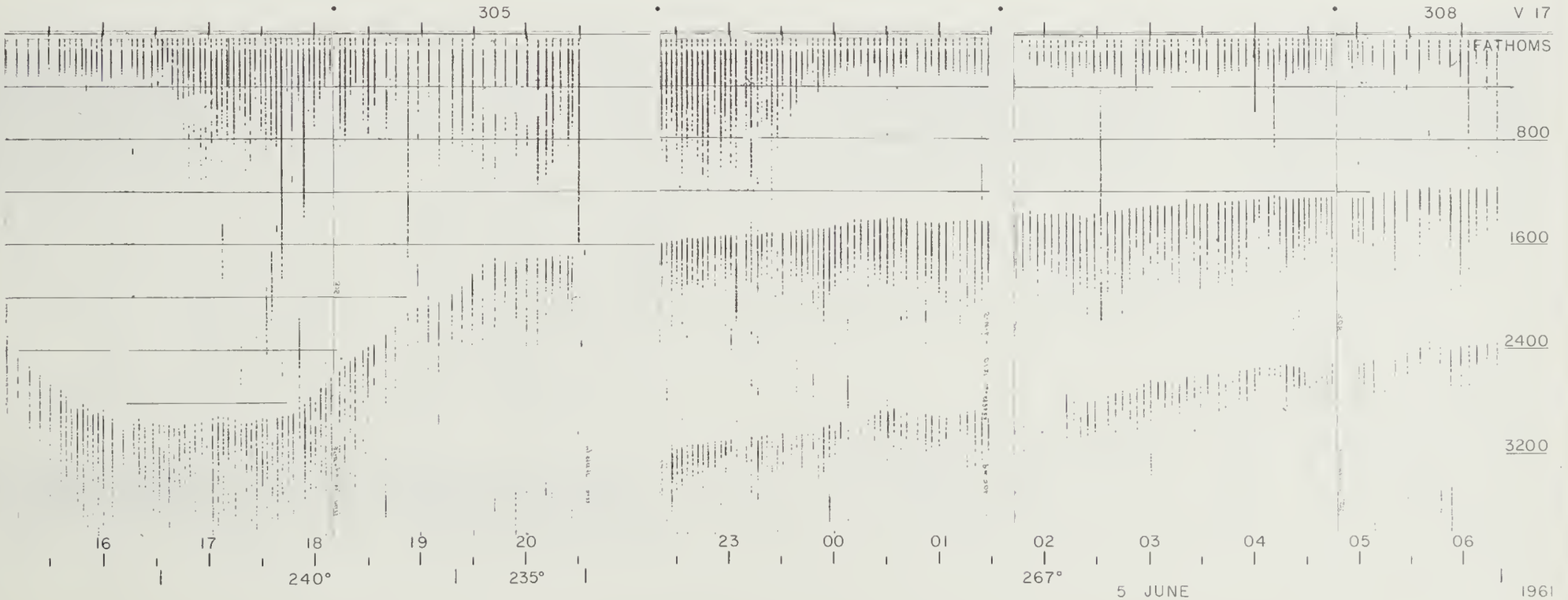

275
V 17
FATHOMS
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29 MAY

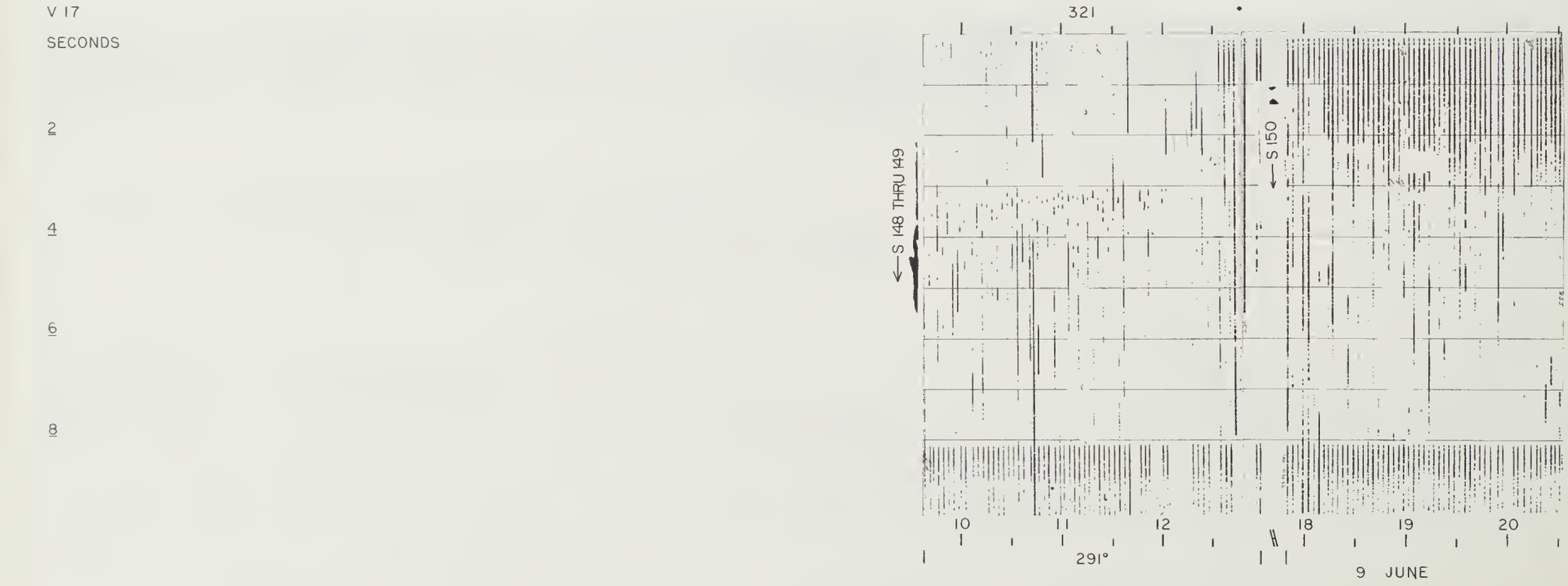

285
V 17
FATHOMS
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31 MAY
1961

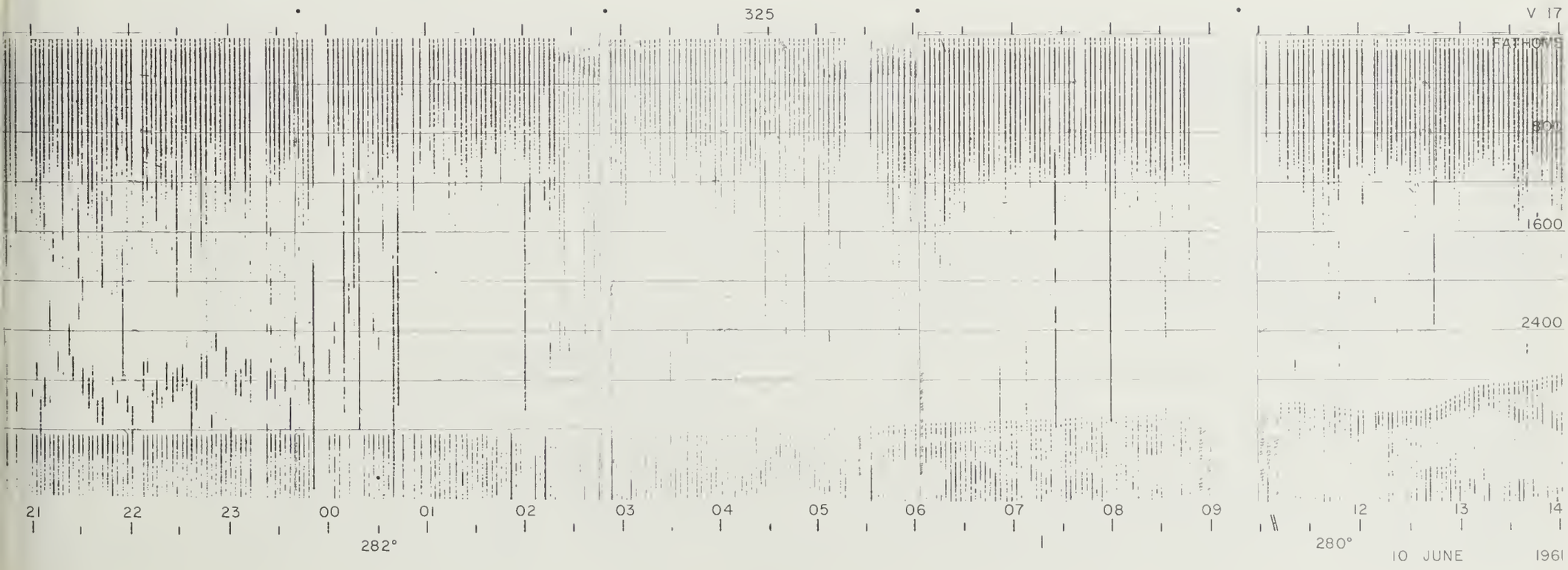

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290
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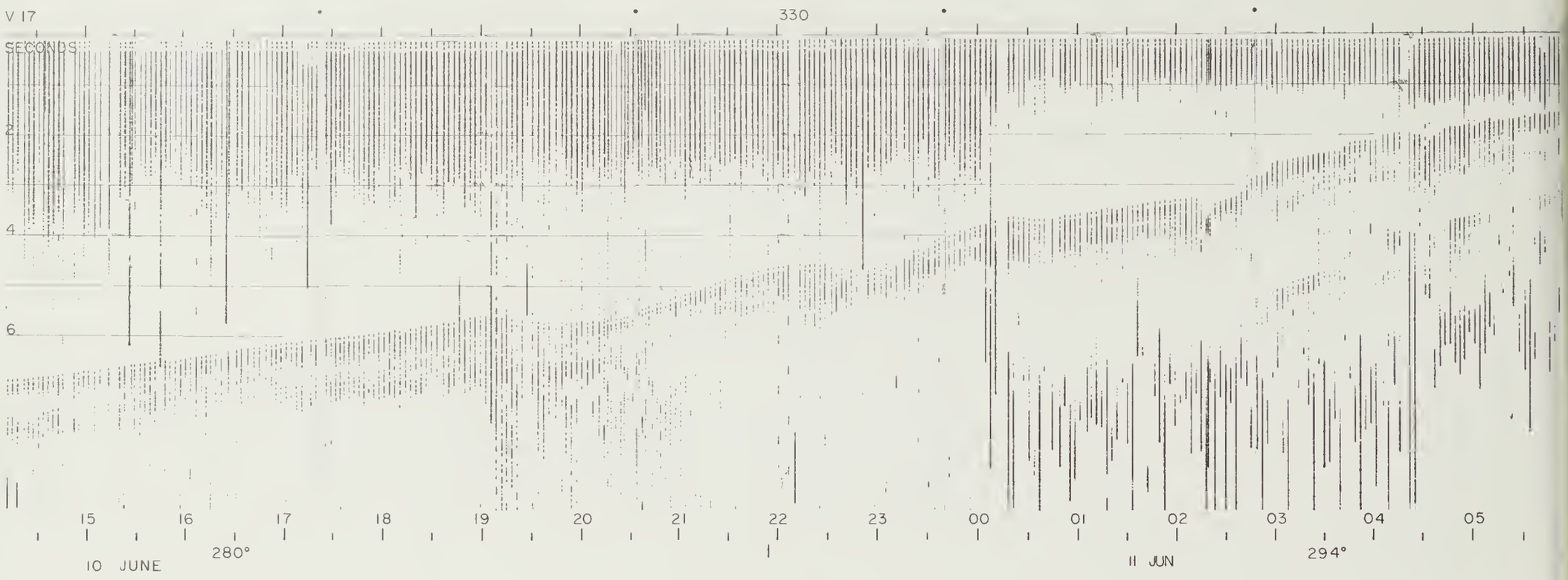

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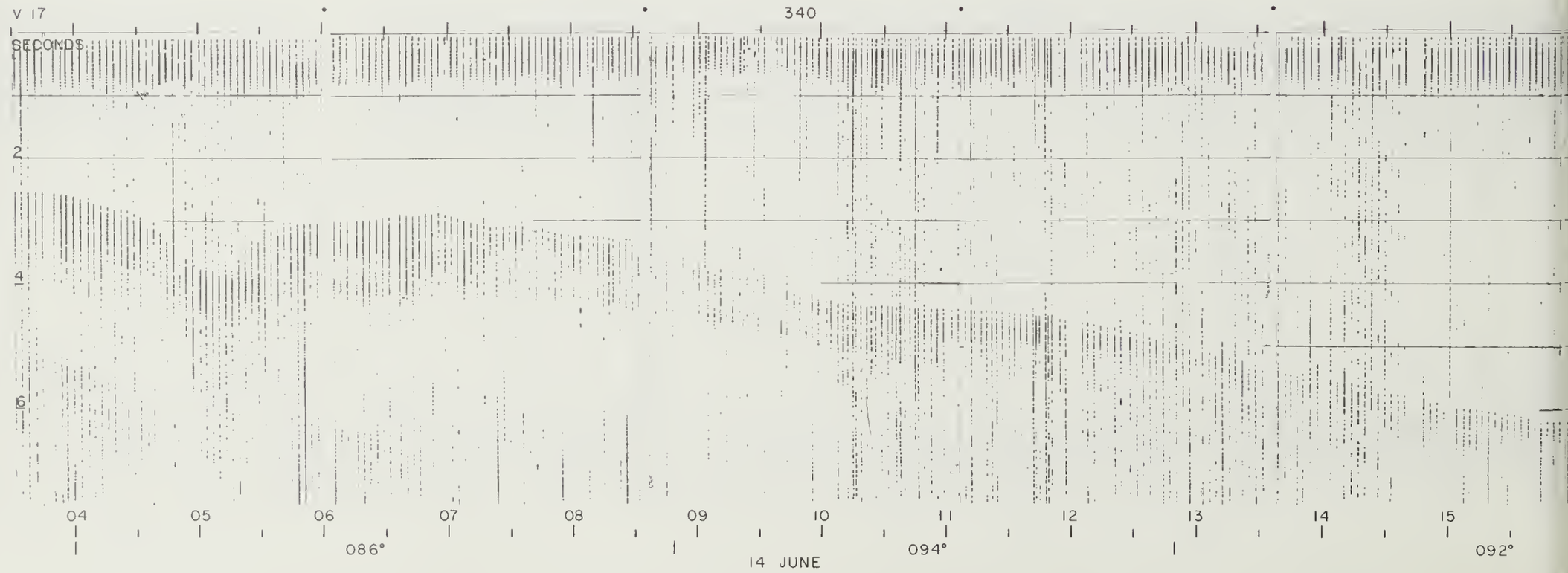

295
S 146 & S 147
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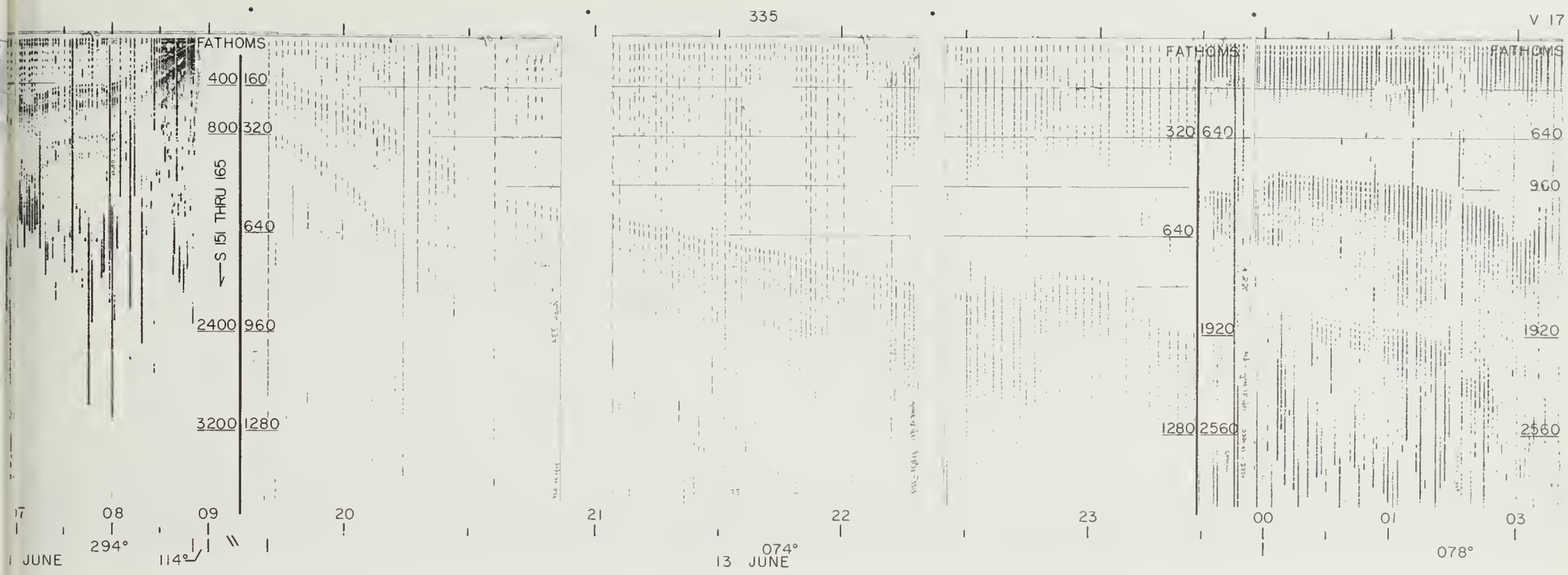

305
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V 17
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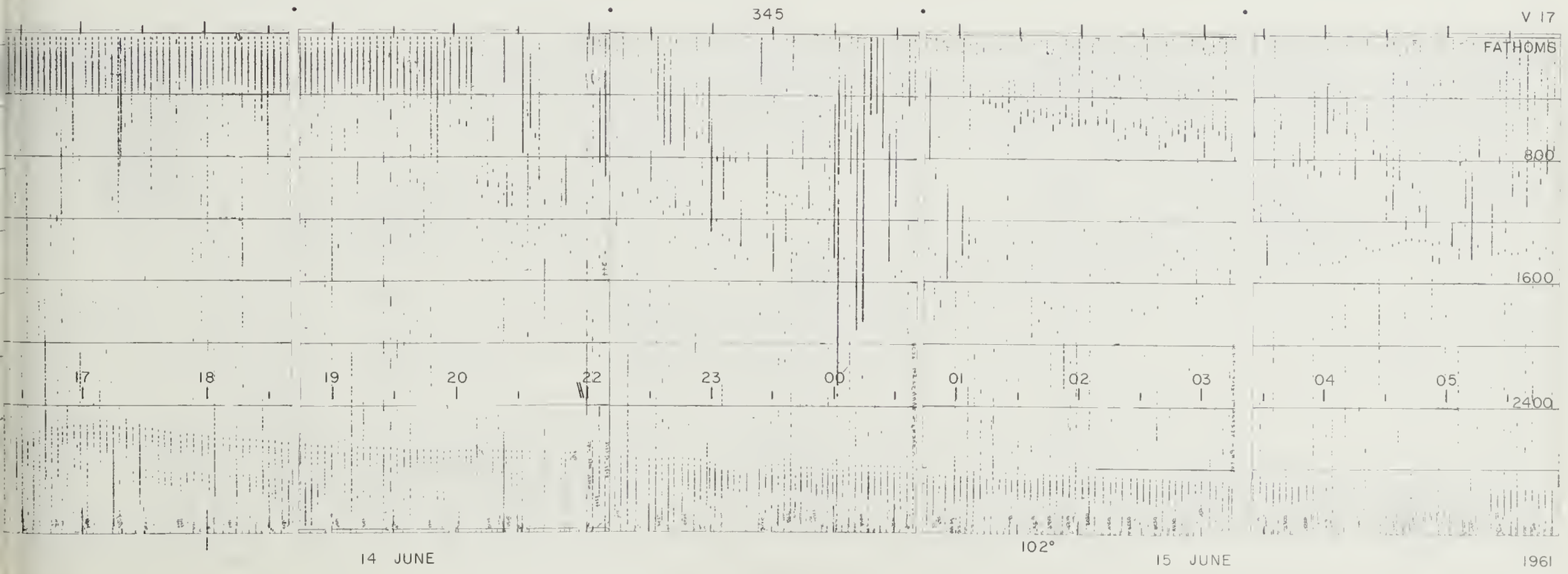

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9 JUNE

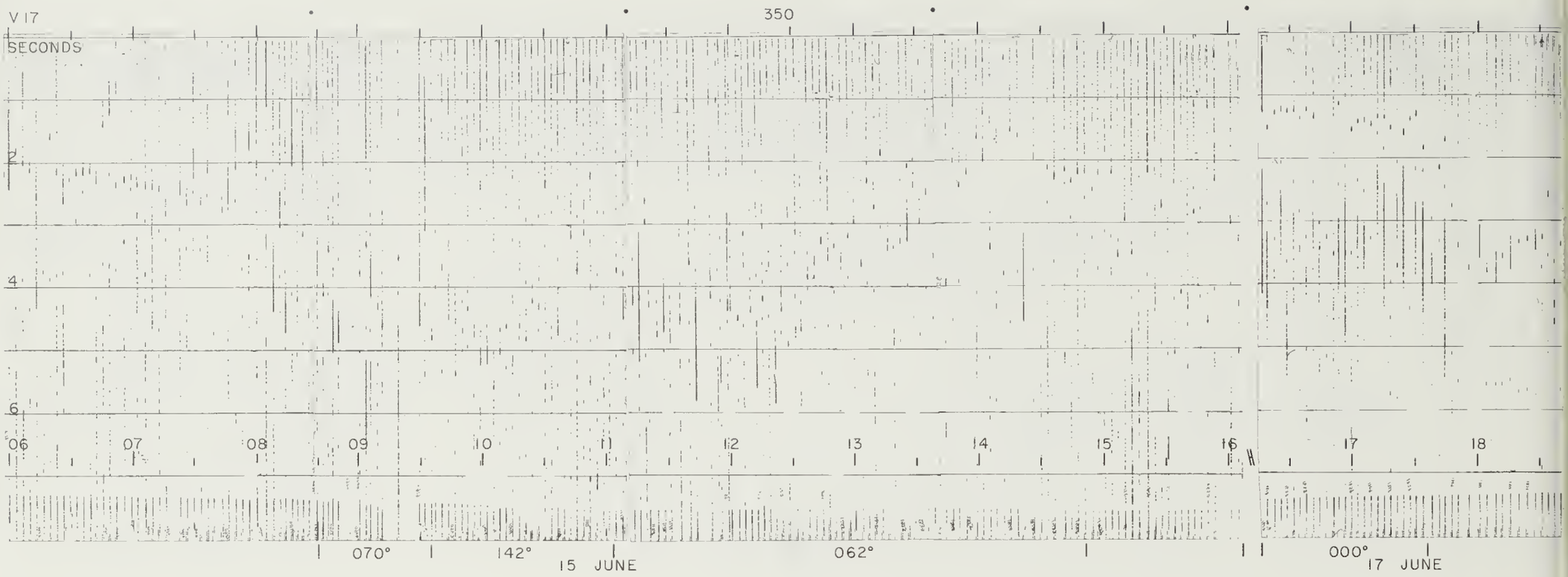

325
V 17
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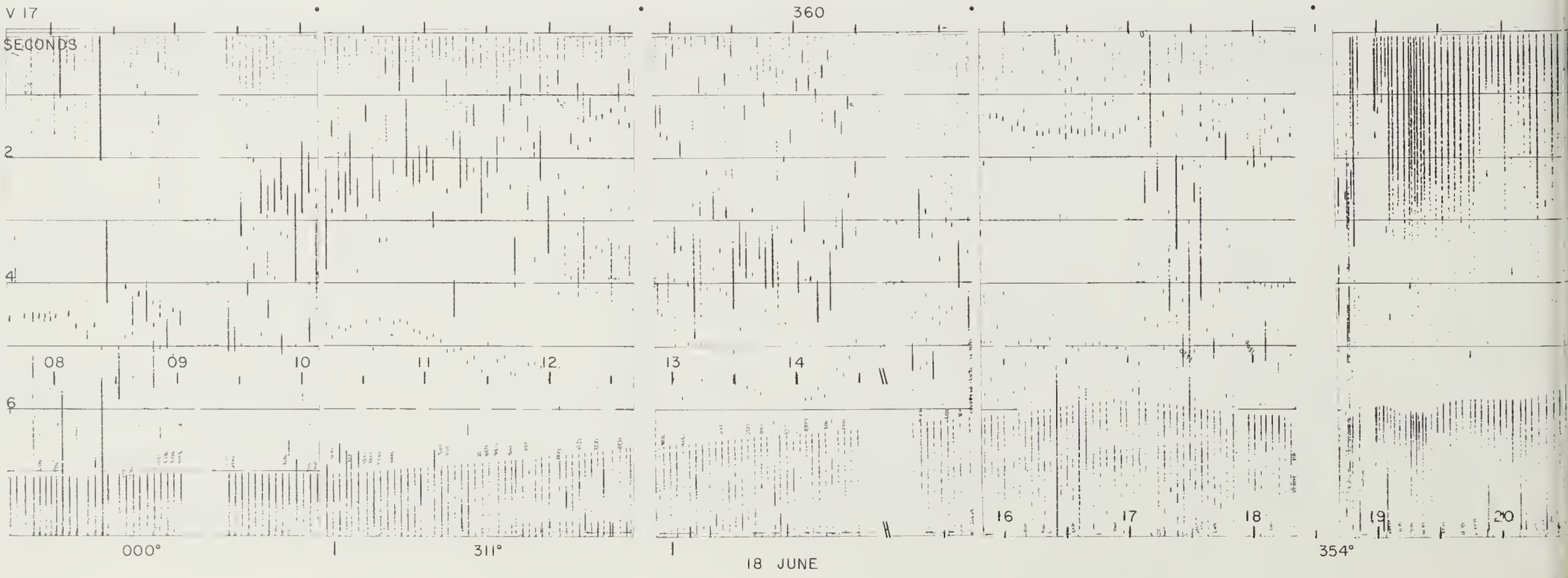

V 17
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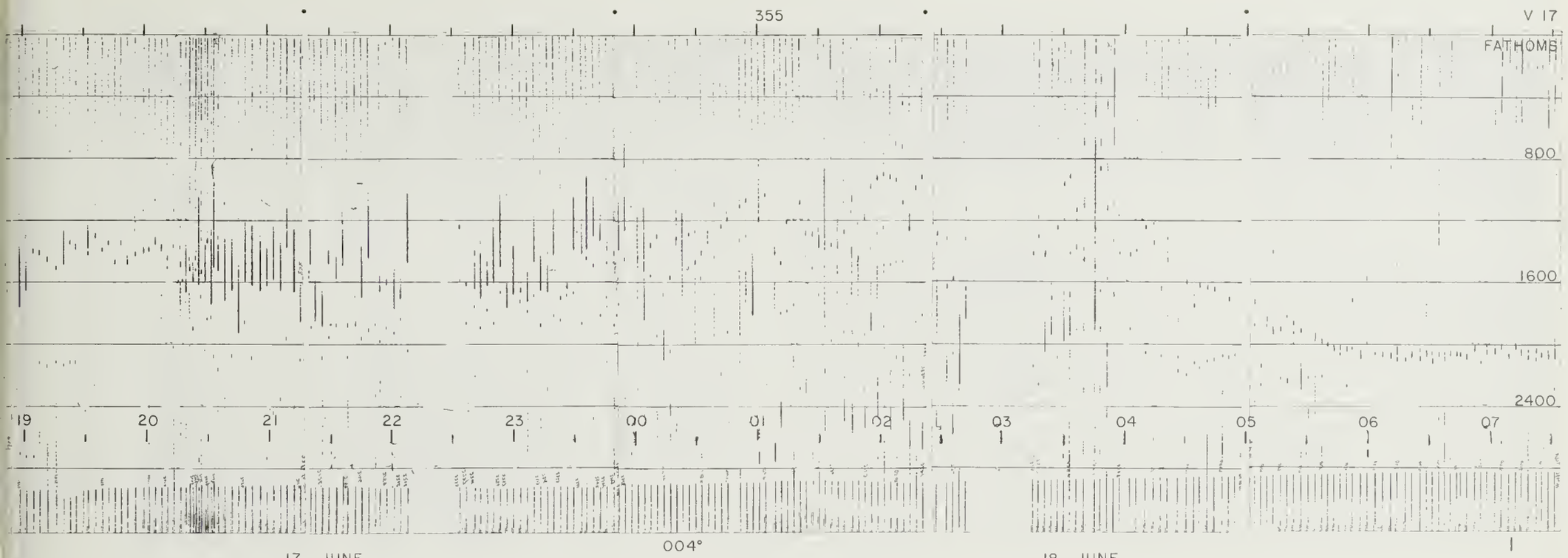

V 17
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092°
14 JUNE


FATHOMS
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FATHOMS
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15 JUNE
1961


V 17
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15 JUNE
17 JUNE

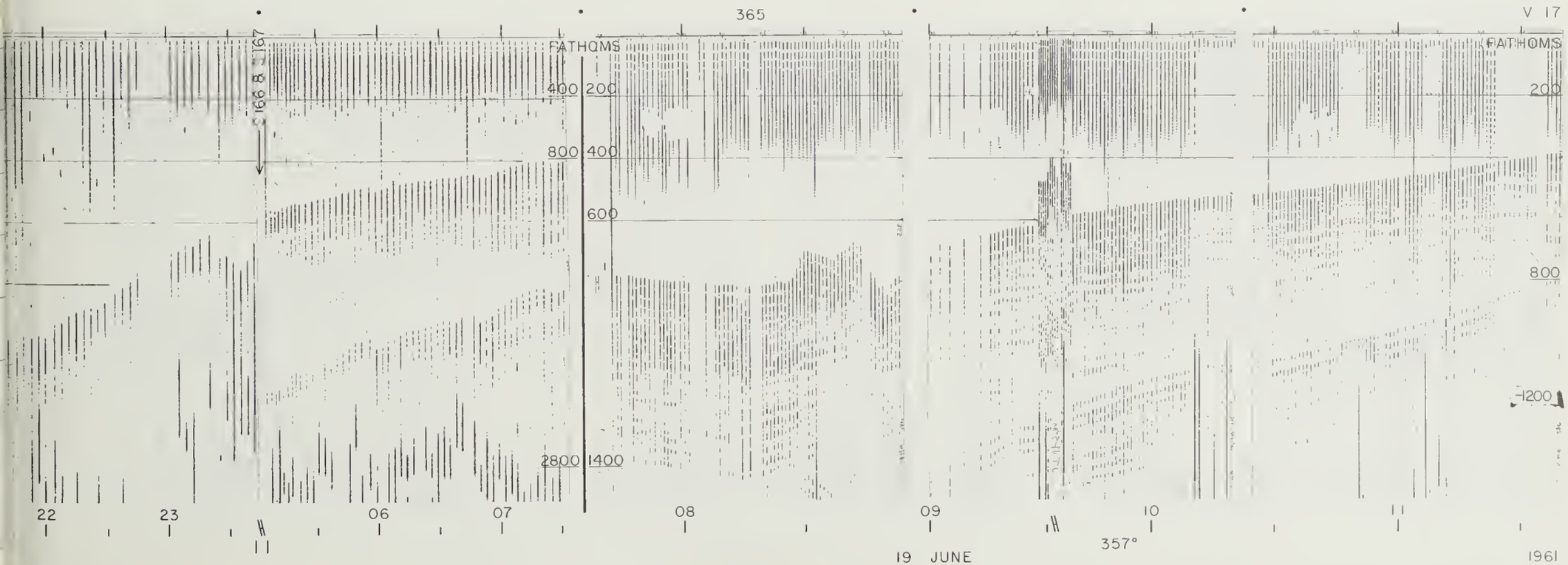

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18 JUNE



17 JUNE

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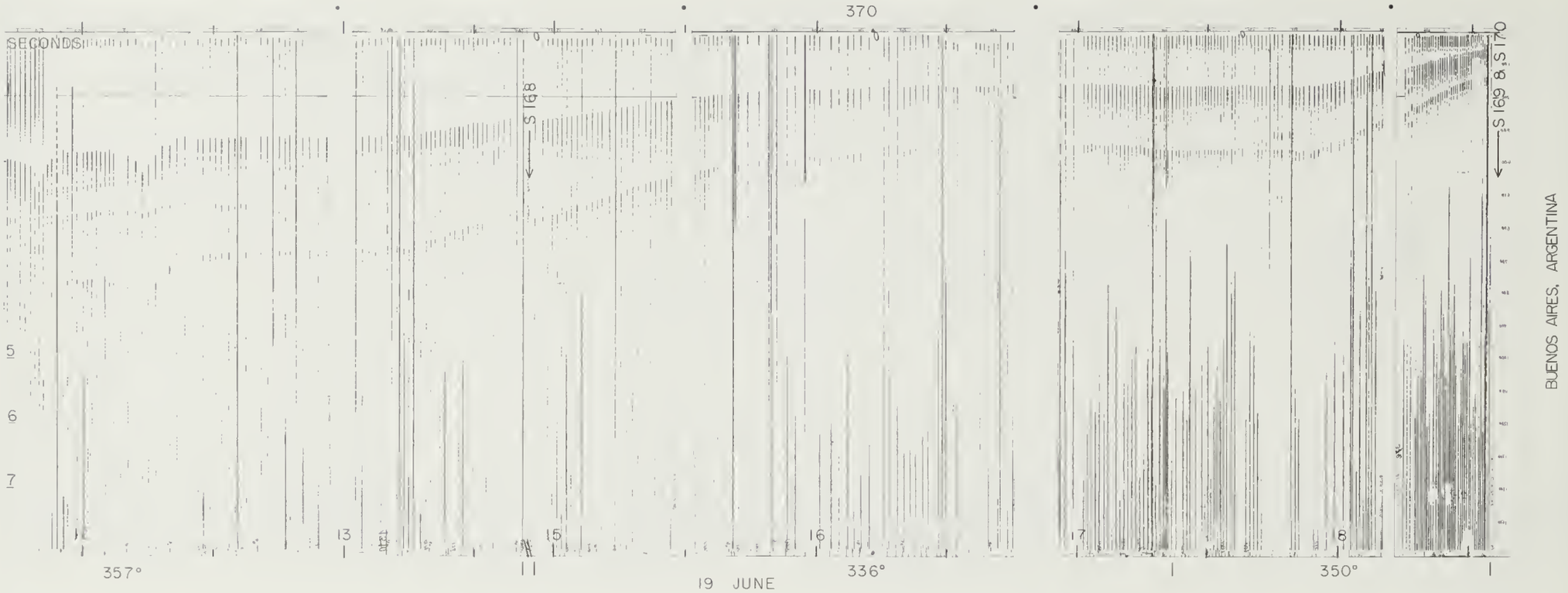
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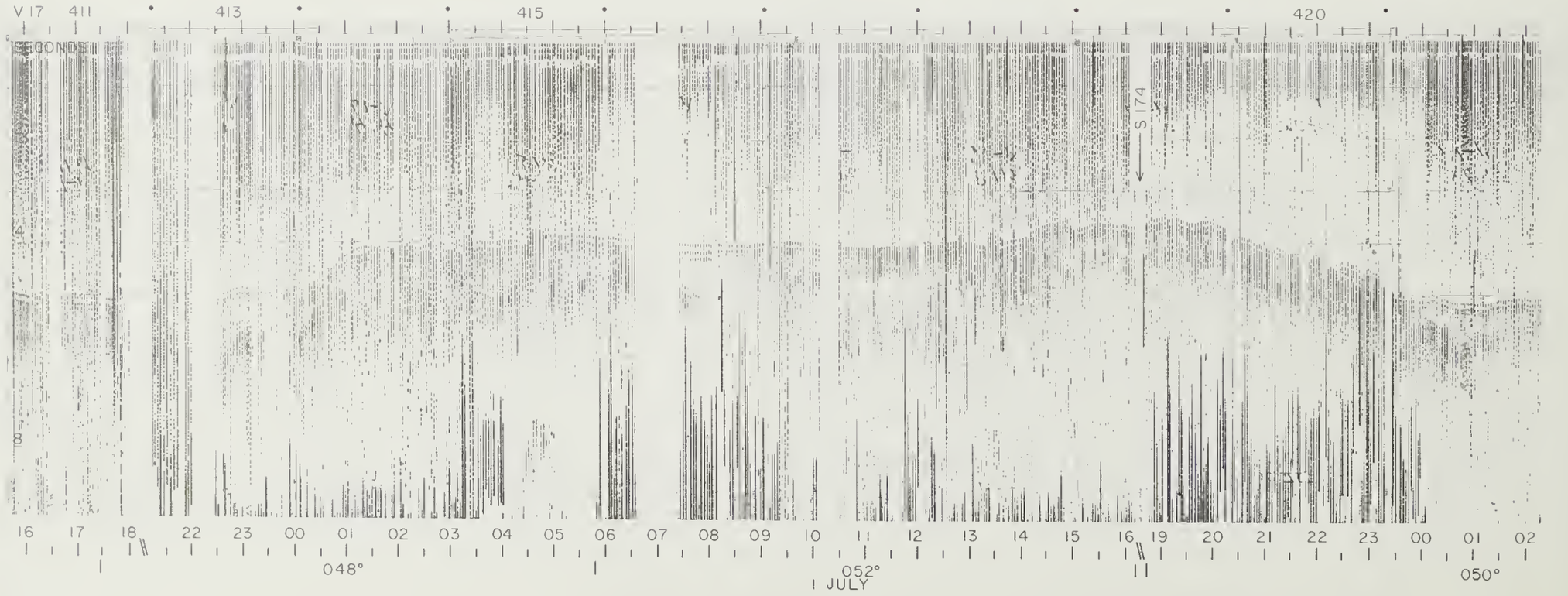


19 JUNE

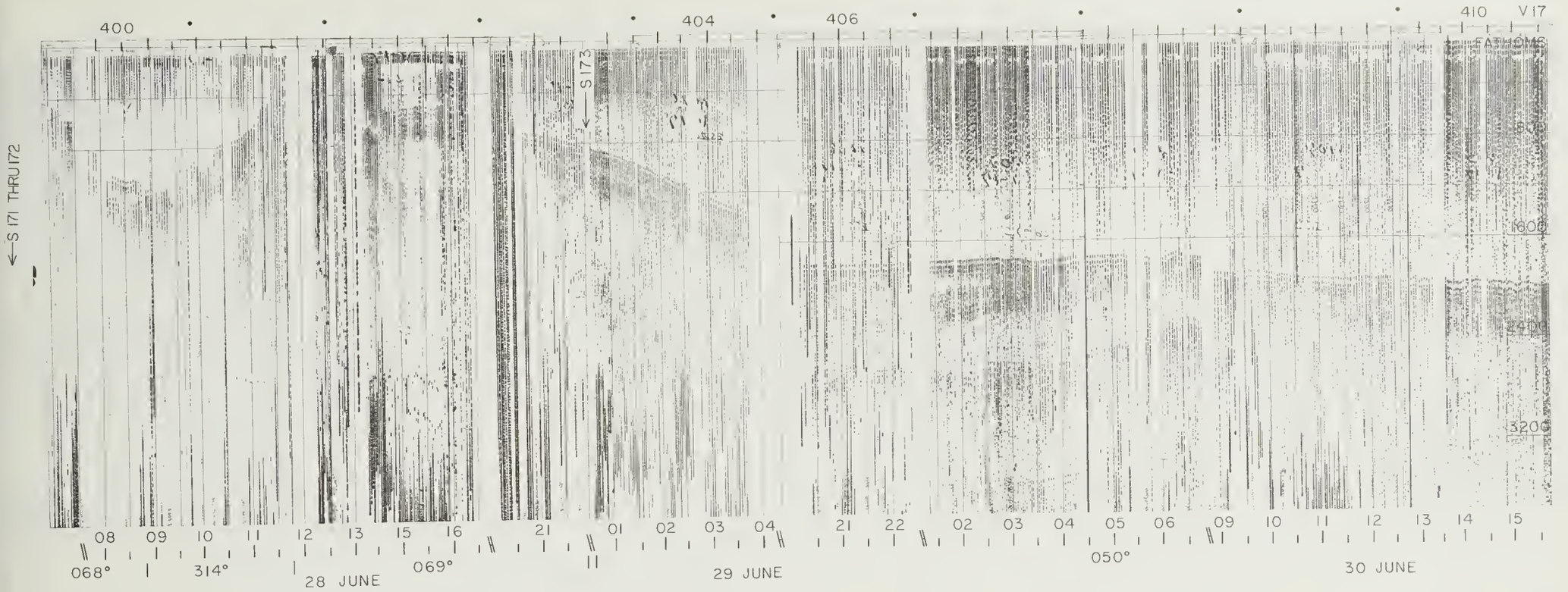
357°

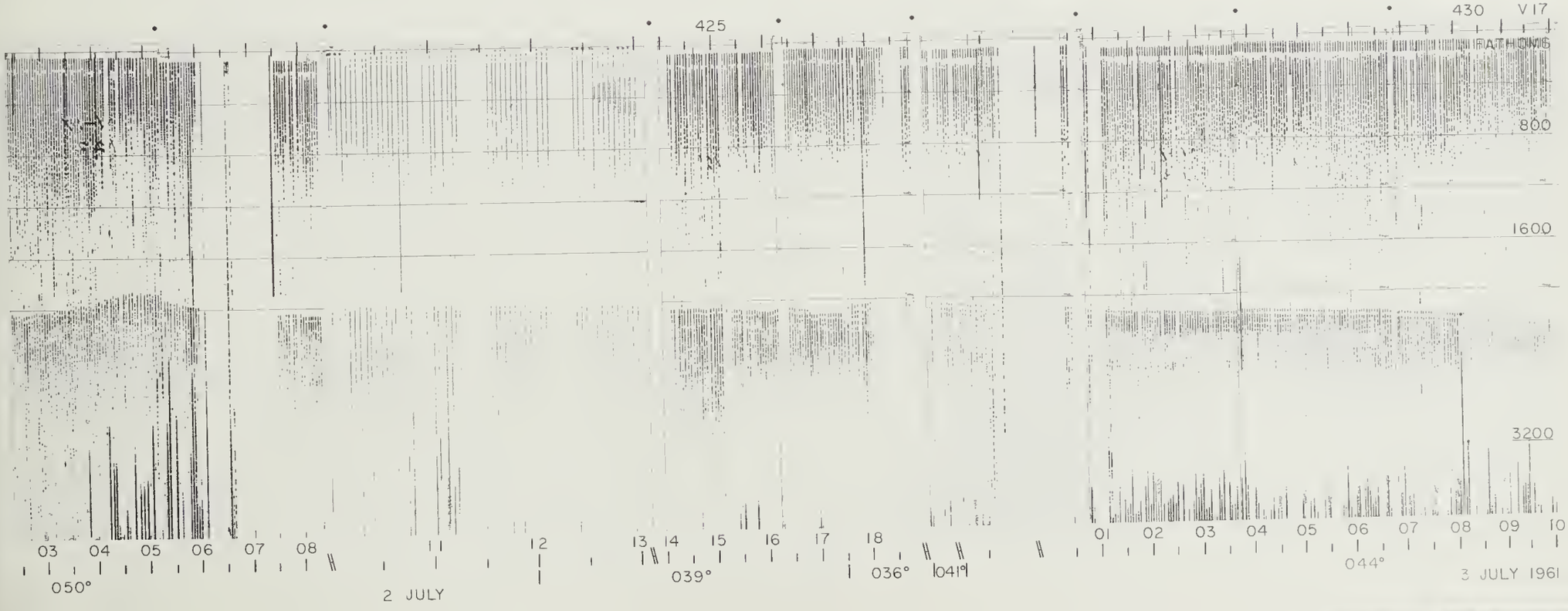
1961

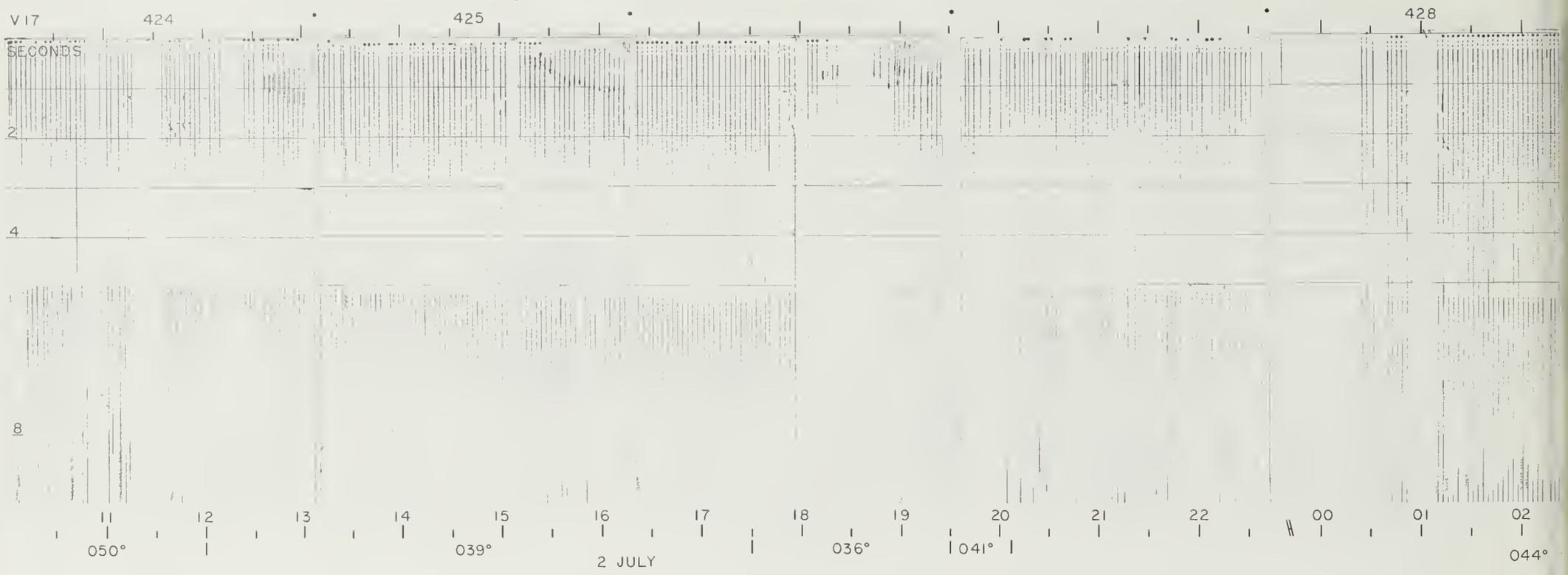


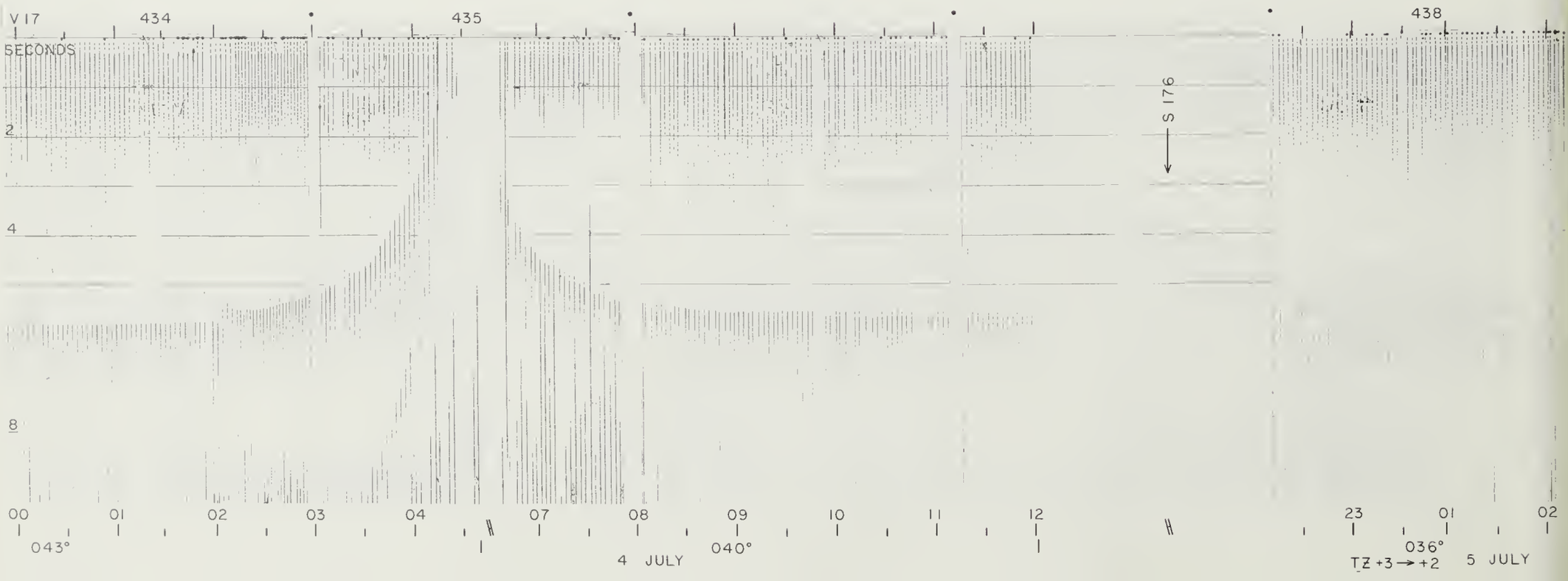


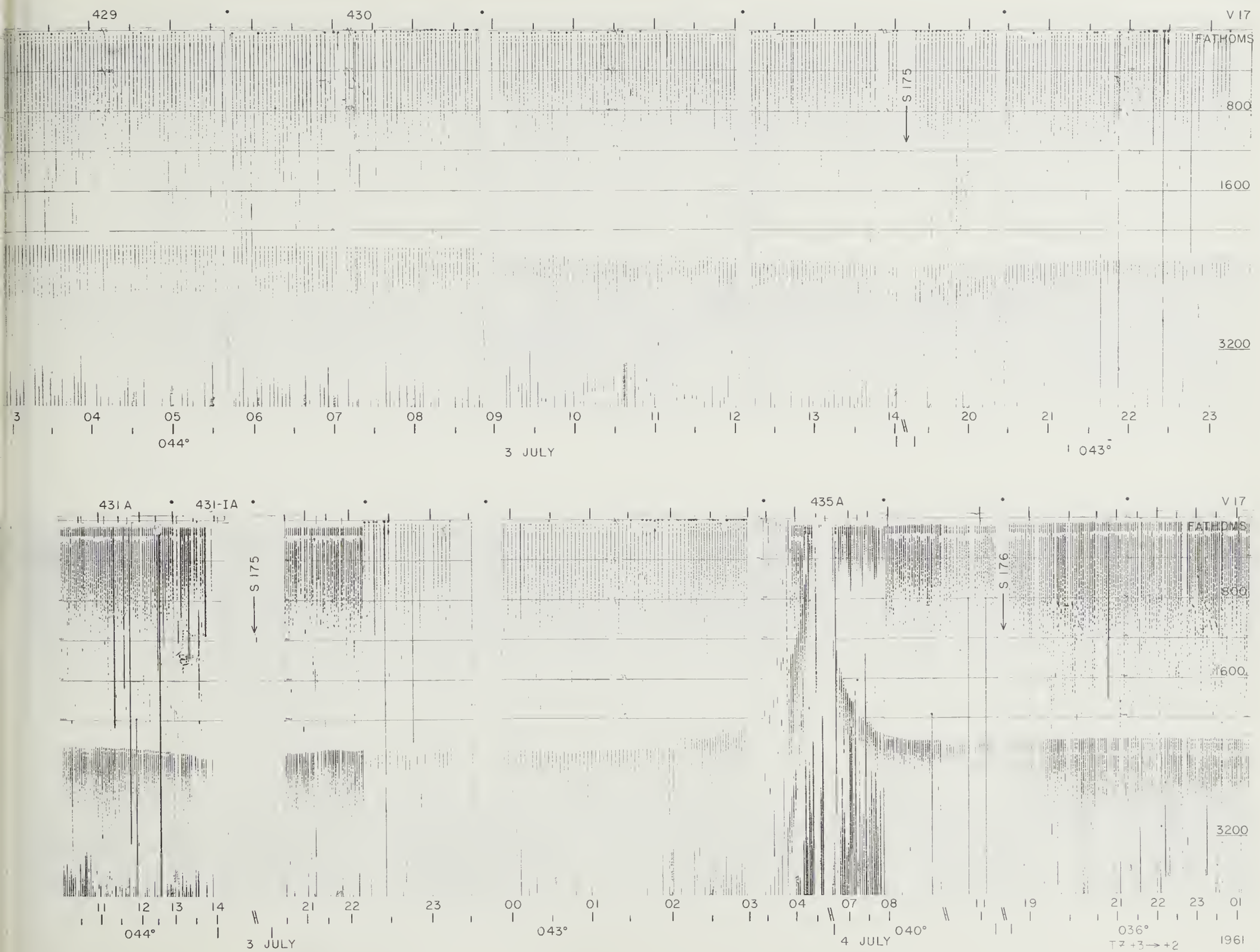
BUENOS AIRES, ARGENTINA

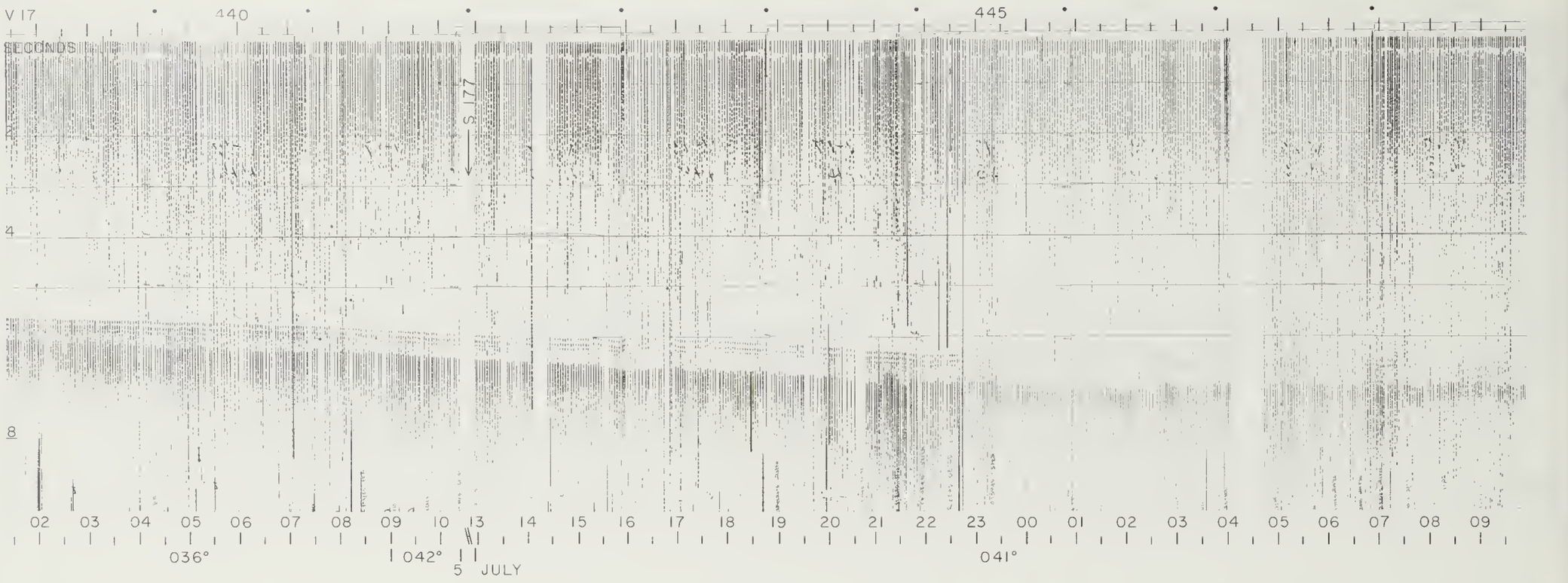

400
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← S 171 THRU 172
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28 JUNE
29 JUNE
21 22 02 03 04 05 06 09 10 11 12 13 14 15
050°
30 JUNE

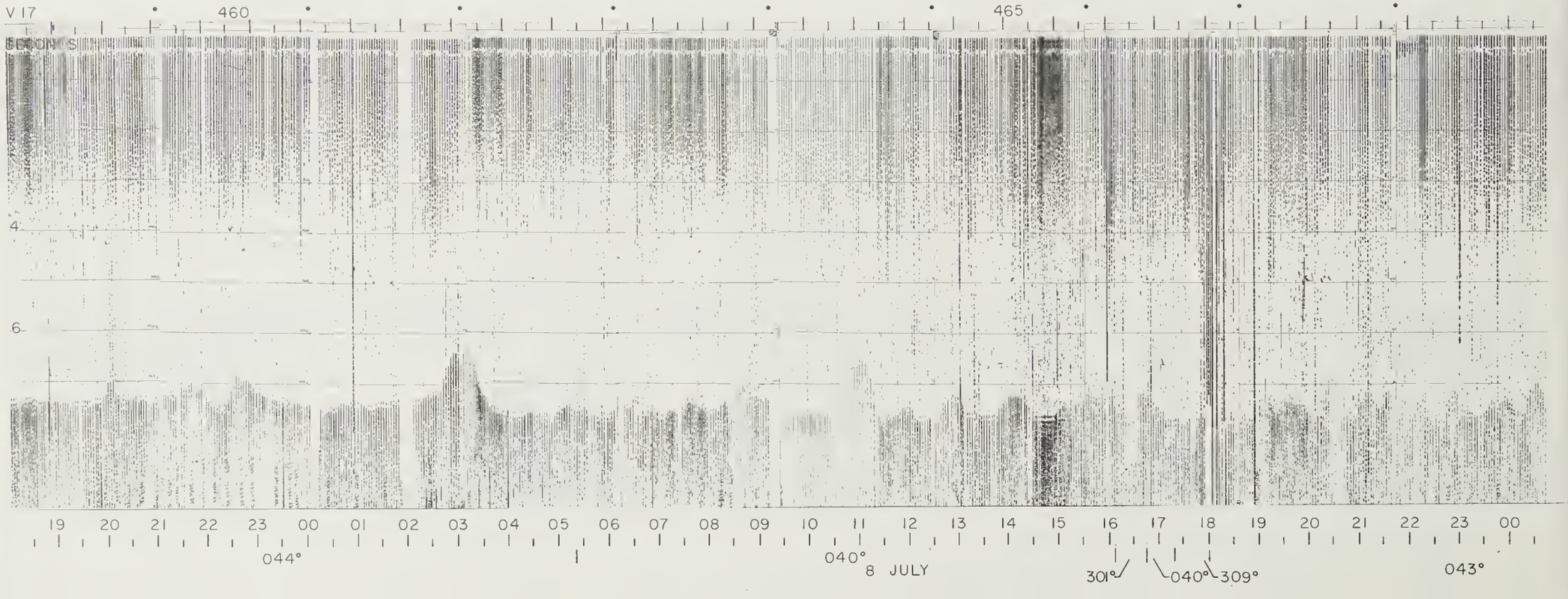

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V17
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044°
3 JULY 1961

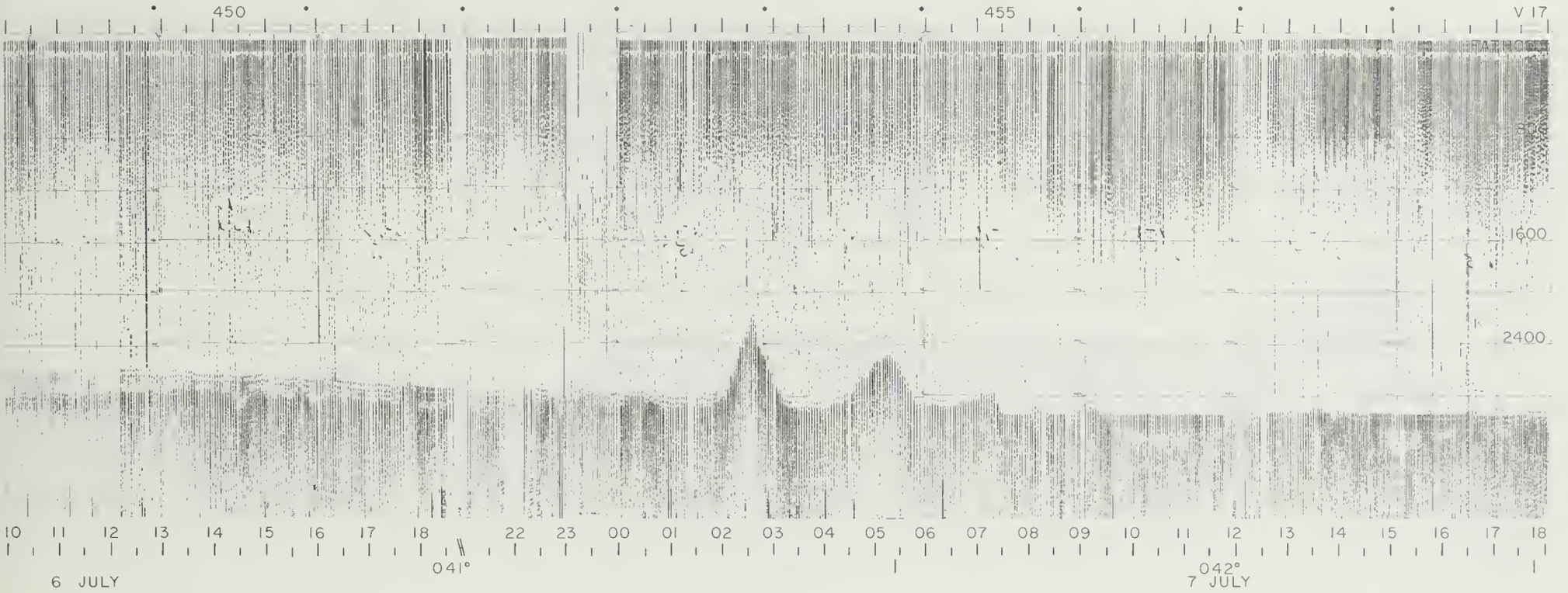

V17
424
425
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SECONDS
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15
16
17
18
19
20
21
22
00
01
02
050°
039°
036°
041°
044°
2 JULY

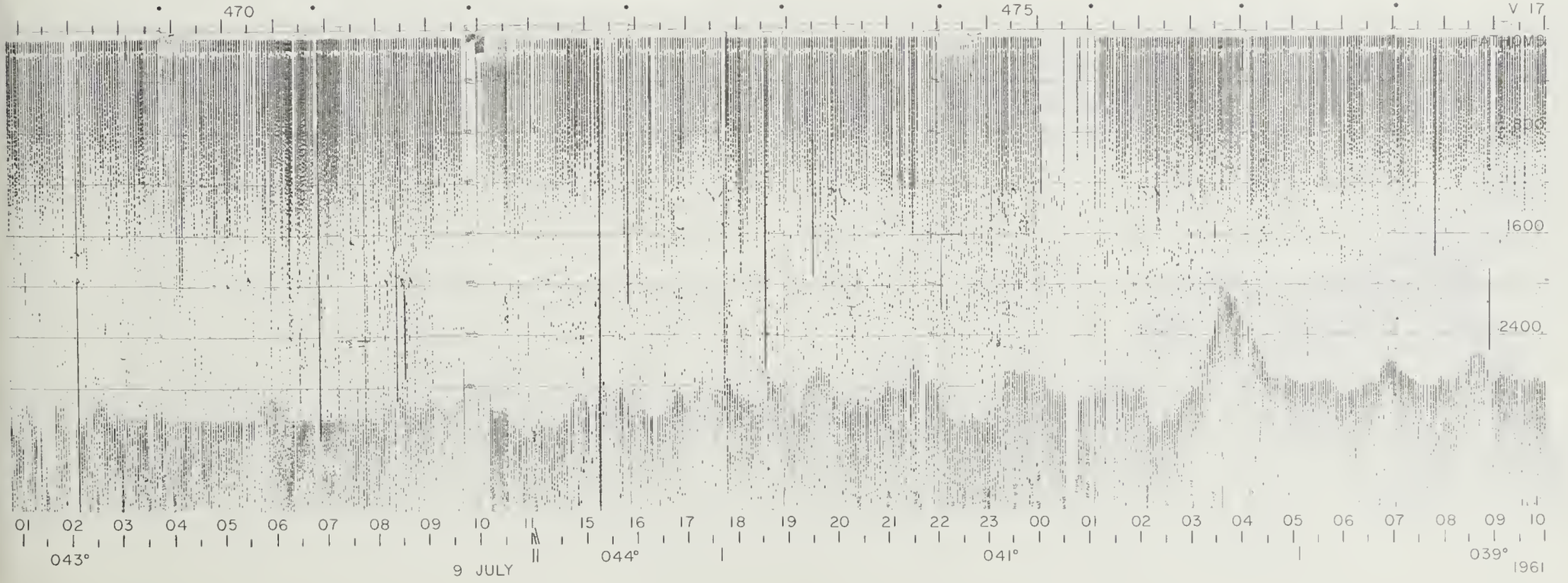

V17
434
435
438
SECONDS
2
4
8
S 176
00
01
02
03
04
07
08
09
10
11
12
23
01
02
043°
040°
036°
4 JULY
TZ +3 → +2
5 JULY

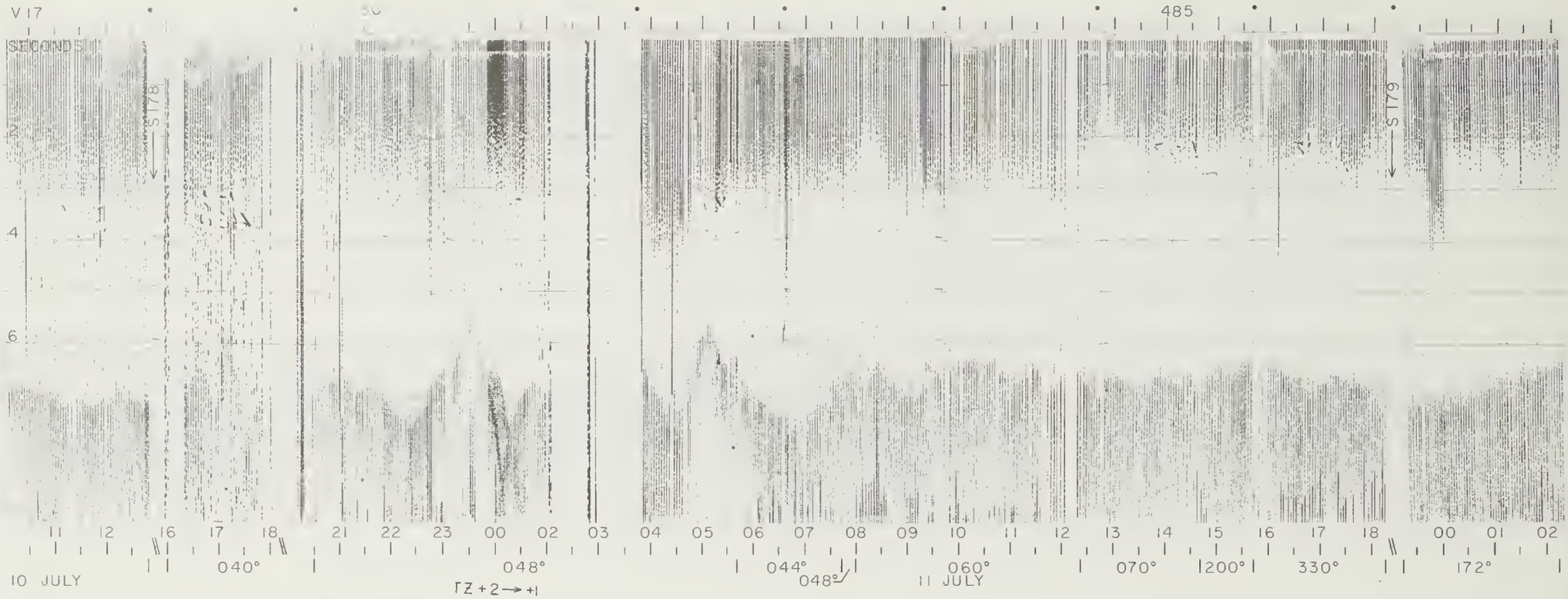

429
430
V 17
FATHOMS
S 175
800
1600
3200
3 04 05 06 07 08 09 10 11 12 13 14 20 21 22 23
044°
3 JULY
043°
431 A
431-IA
S 175
435 A
S 176
11 12 13 14 21 22 23 00 01 02 03 04 07 08 11 19 21 22 23 01
044°
3 JULY
043°
040°
4 JULY
036°
TZ +3 → +2
1961

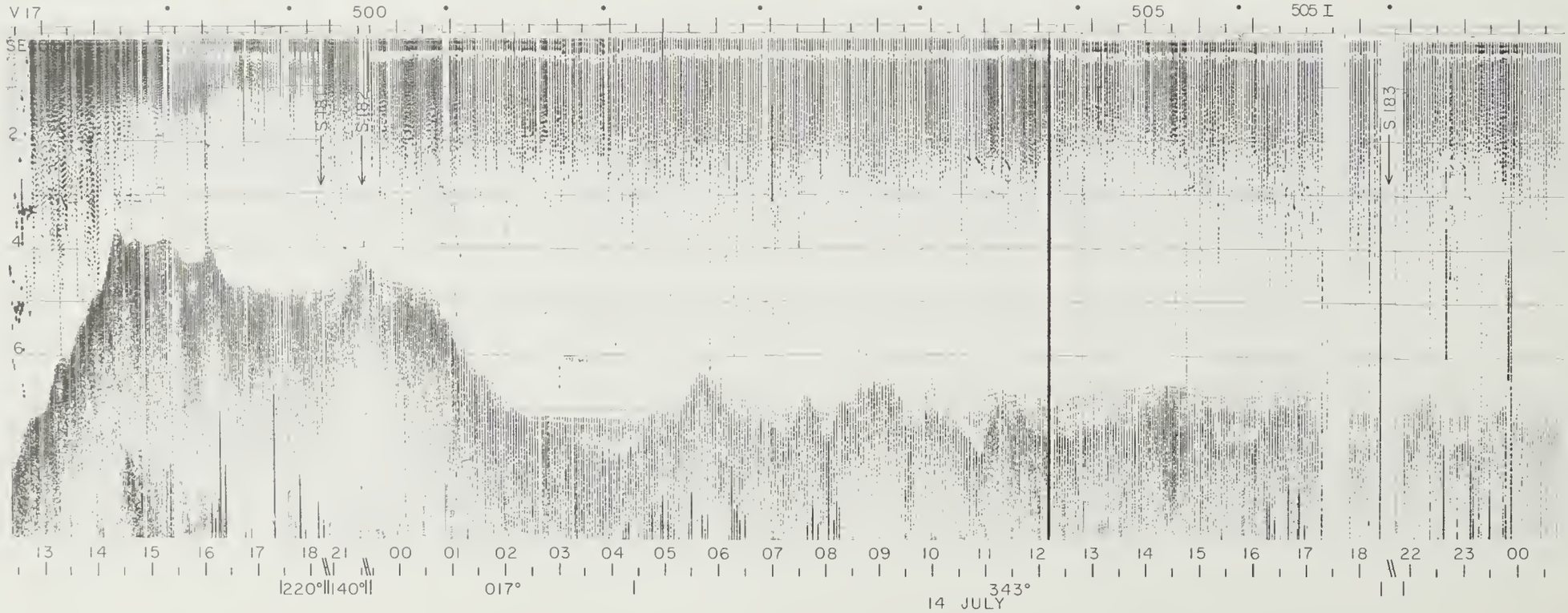

V 17
440
445
SECONDS
4
8
S 17
02 03 04 05 06 07 08 09 10 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
036°
042°
041°
5 JULY

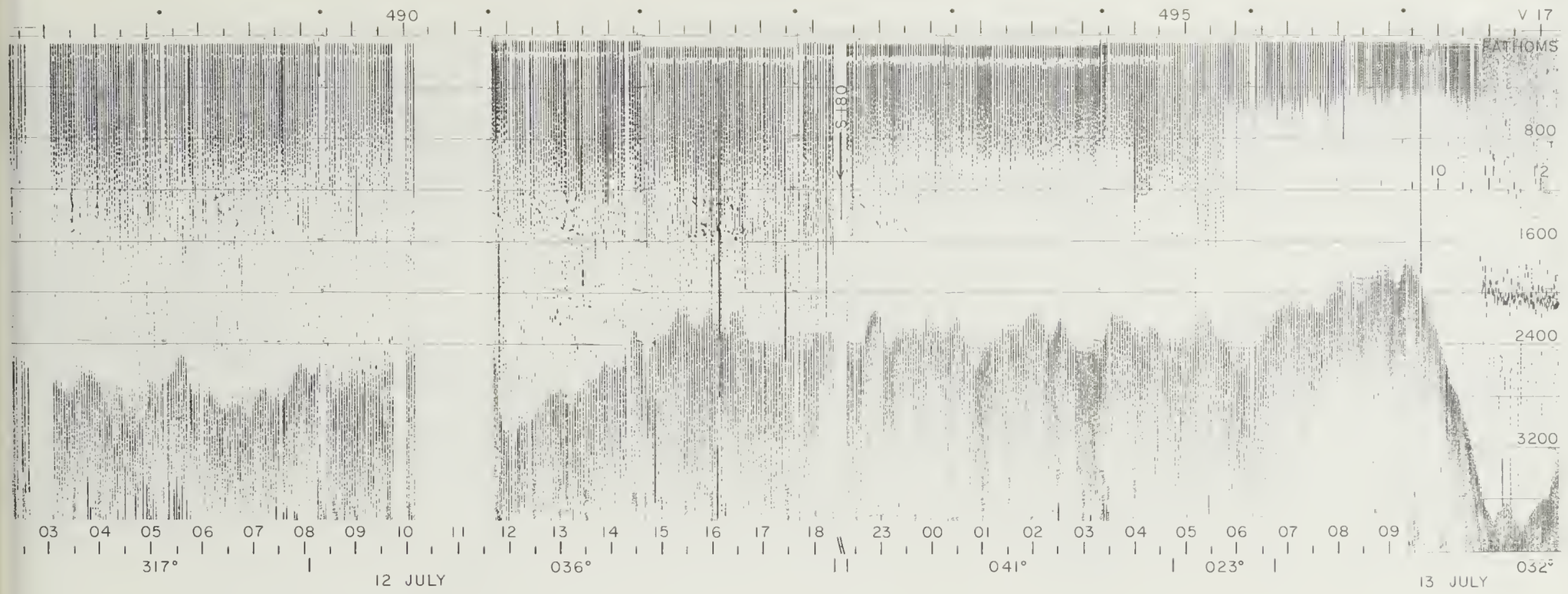

V 17
460
465
SECONDS
4
6
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00
044°
040°
8 JULY
301°
040°
309°
043°

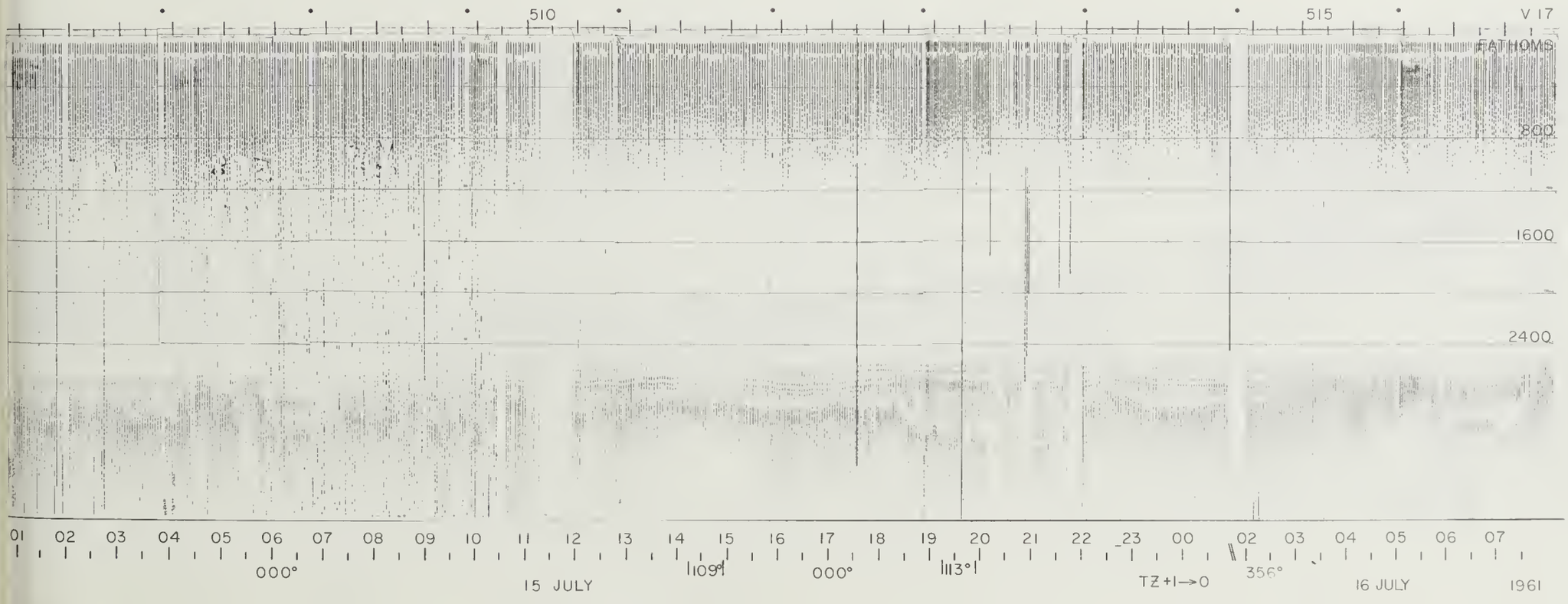

450
455
V 17
FATHOMS
1600
2400
10 11 12 13 14 15 16 17 18 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
041°
042°
6 JULY
7 JULY

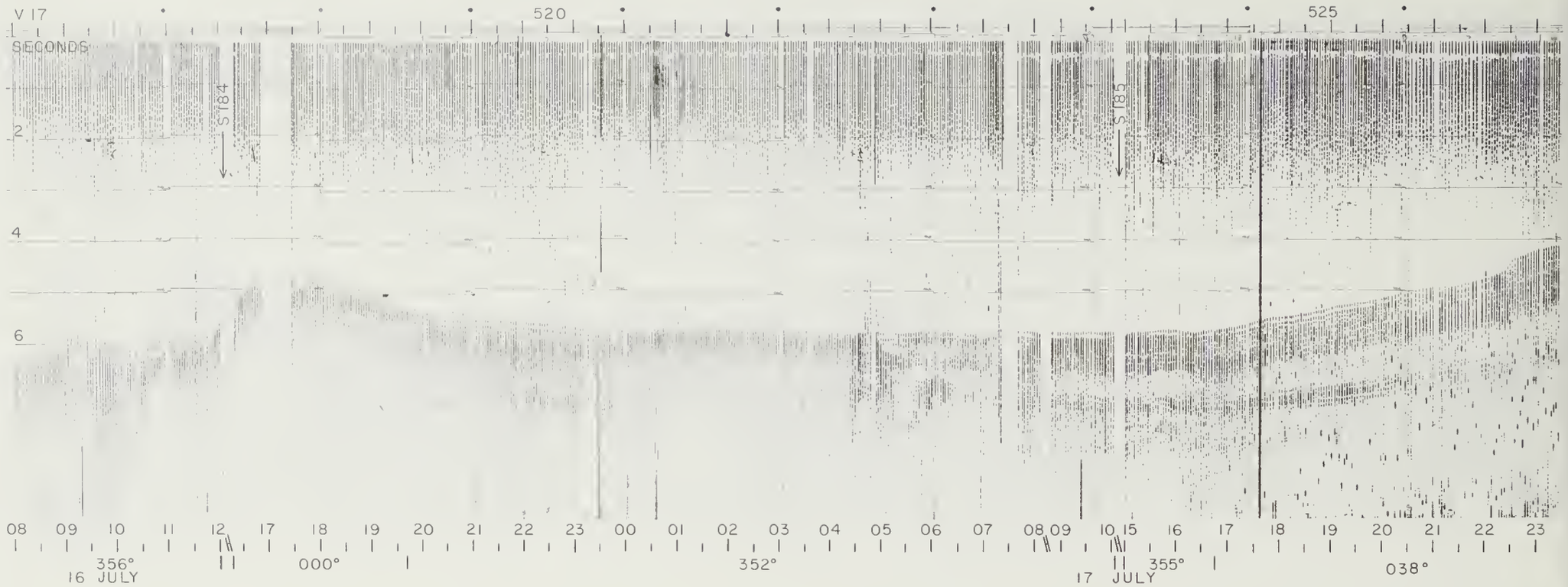

470
475
V 17
FATHOMS
1600
2400
01 02 03 04 05 06 07 08 09 10 11 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10
043°
044°
041°
039°
9 JULY
1961

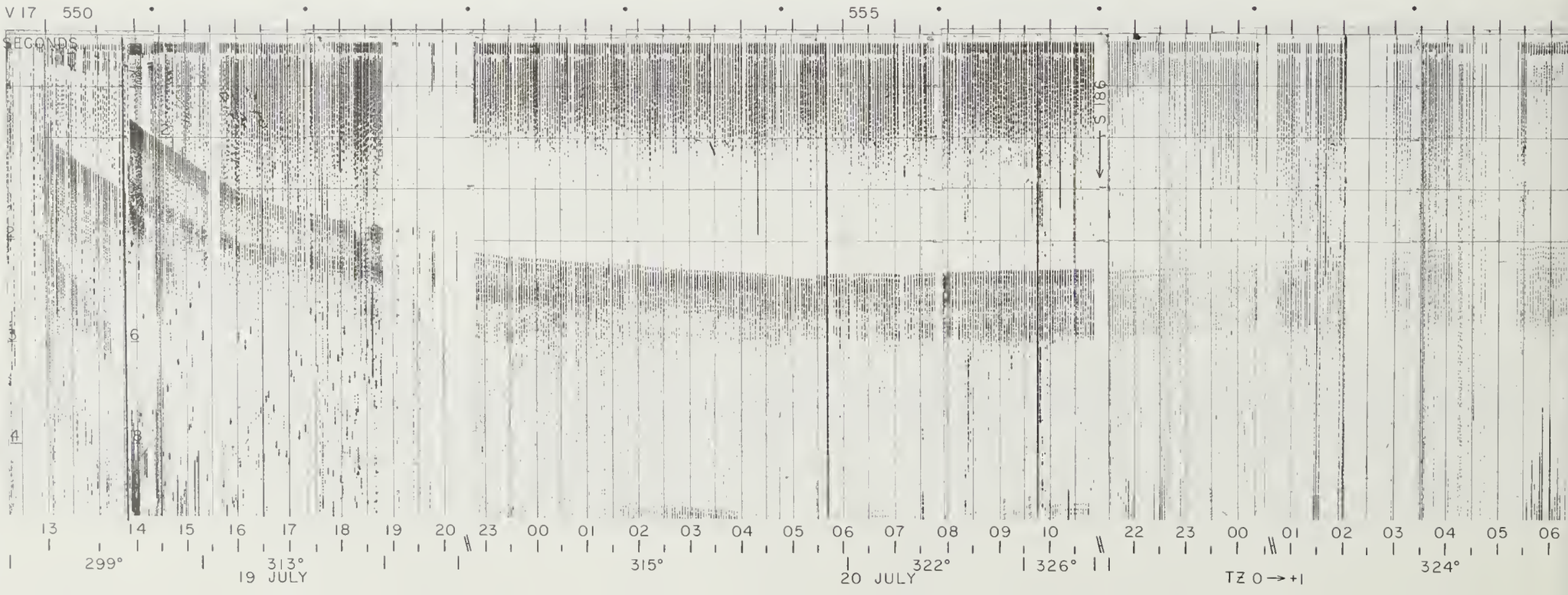

V 17
SECONDS
S178
S179
485
11 12 16 17 18 21 22 23 00 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 00 01 02
040° 048° 044° 048° 060° 070° 200° 330° 172°
10 JULY
TZ+2→+1
11 JULY

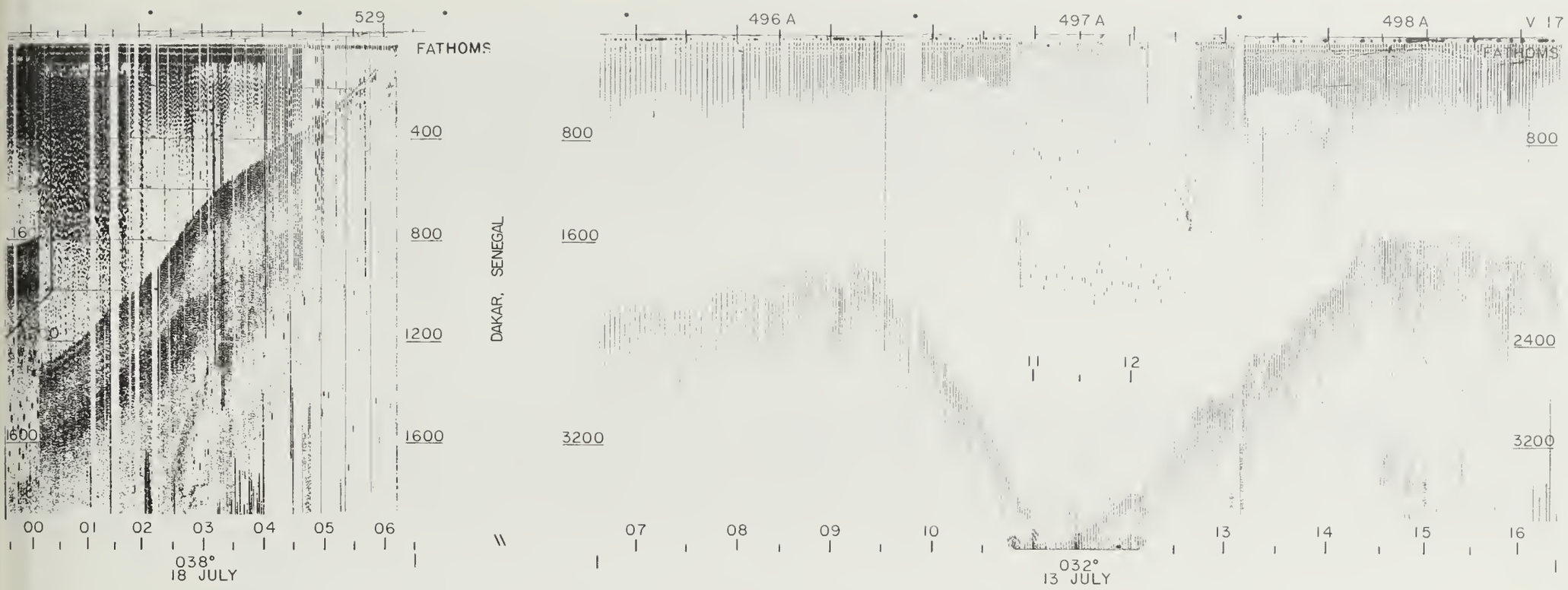

V 17
500
505
505 I
S181
S182
S183
13 14 15 16 17 18 21 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 22 23 00
220° 140° 017° 343°
14 JULY

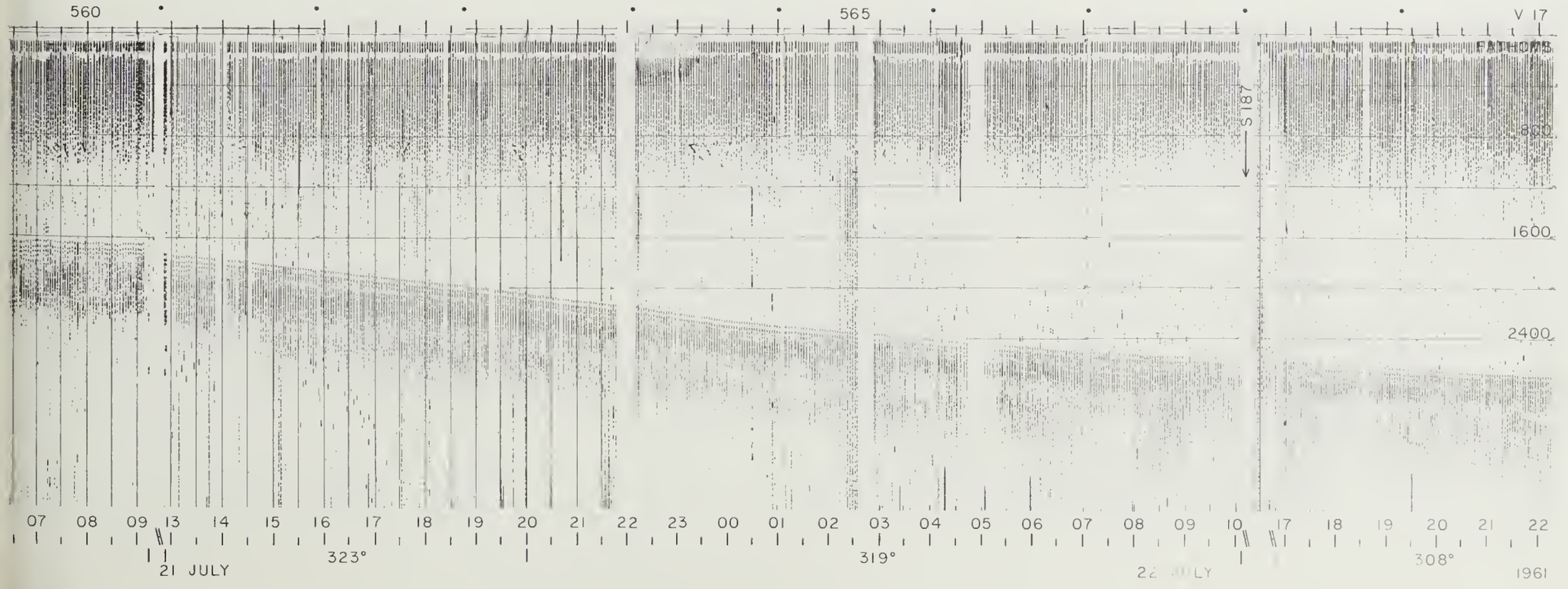

490
495
V 17
FATHOMS
800
1600
2400
3200
10
11
12
180°S
03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 23 00 01 02 03 04 05 06 07 08 09
317°
036°
041°
023°
032°
12 JULY
13 JULY

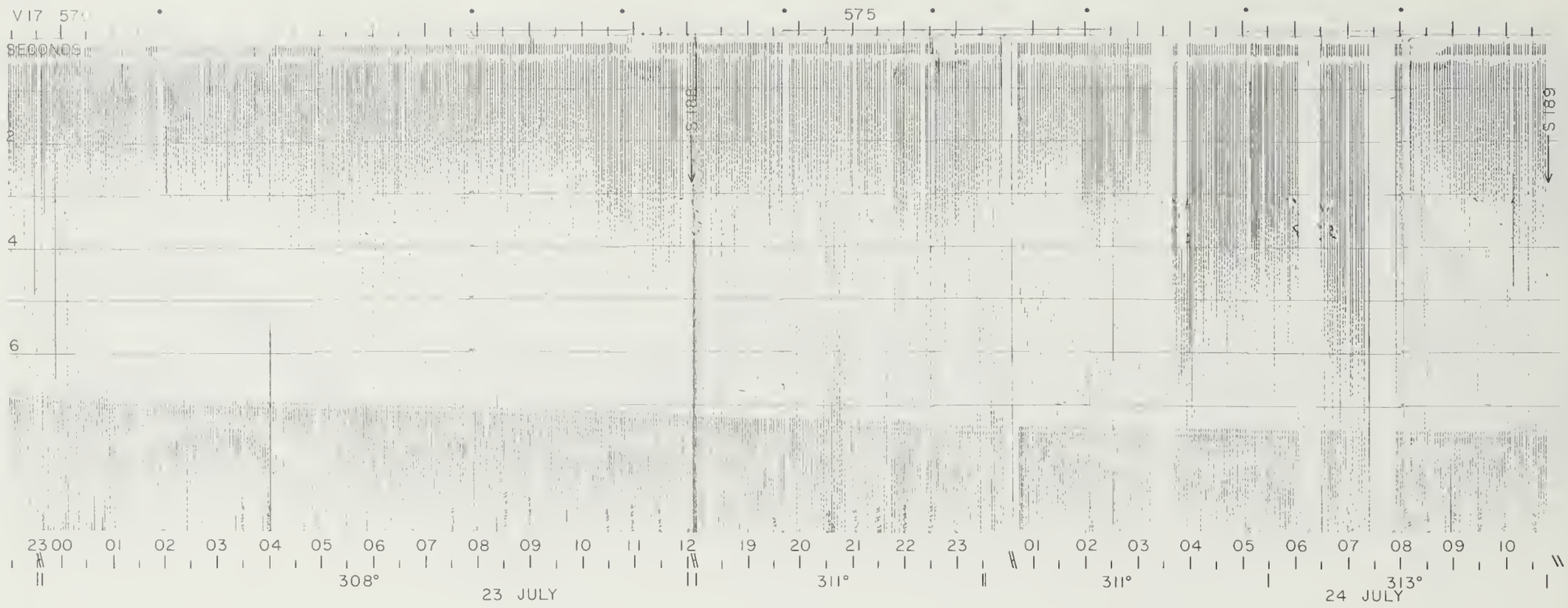

510
515
V 17
FATHOMS
800
1600
2400
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 02 03 04 05 06 07
000°
109°
000°
113°
356°
TZ+1→0
15 JULY
16 JULY
1961

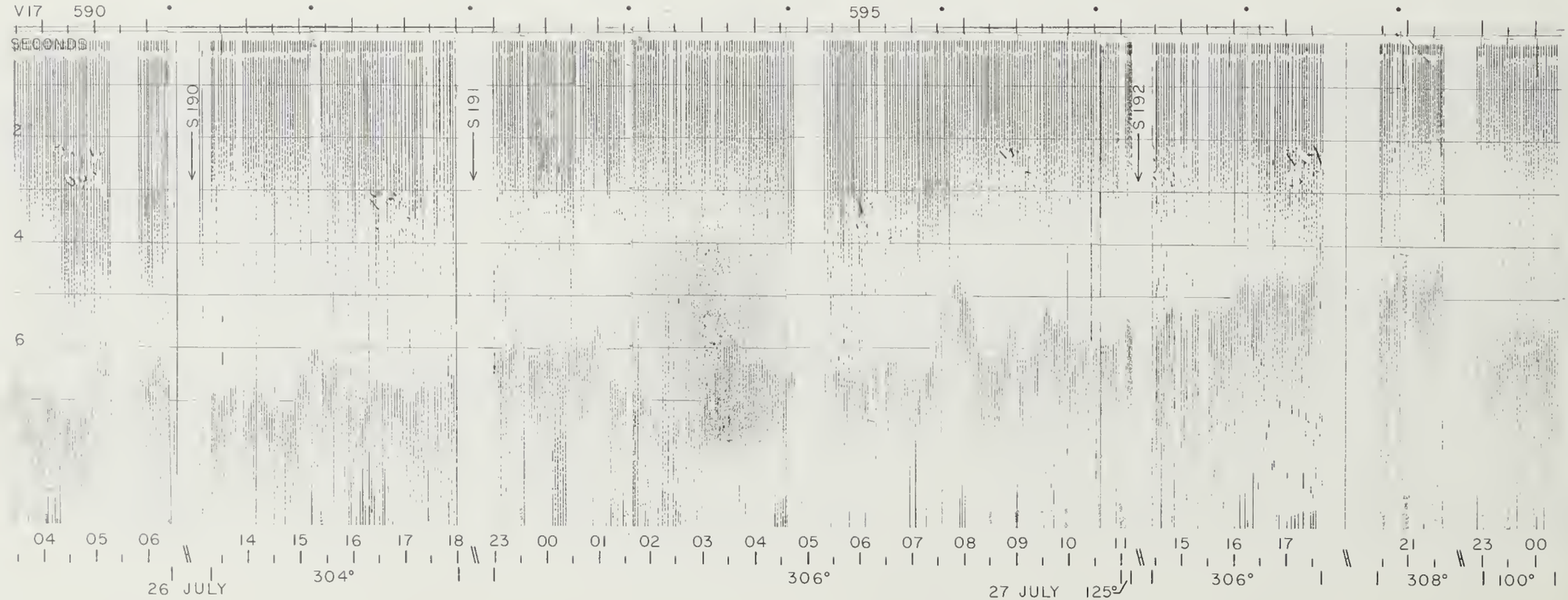

V 17
520
525
SECONDS
2
4
6
S 184
S 185
08 09 10 11 12 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 15 16 17 18 19 20 21 22 23
356°
16 JULY
000°
352°
355°
17 JULY
038°

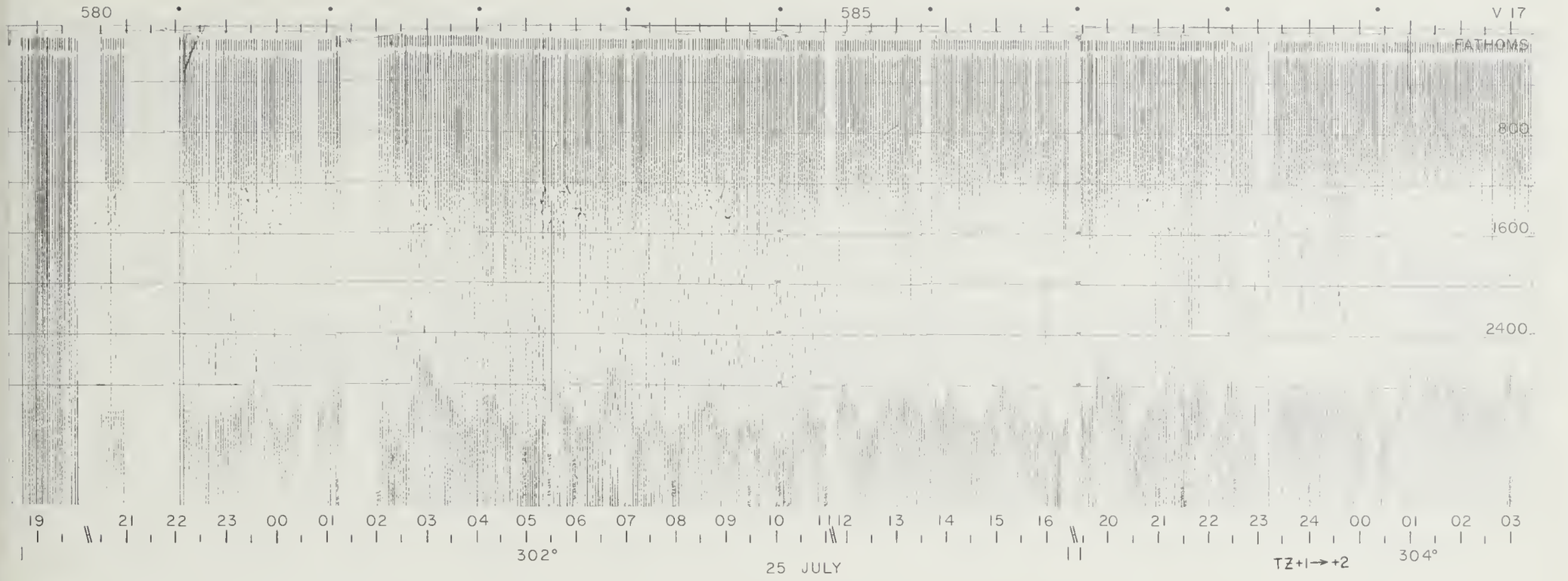

V 17
550
555
SECONDS
2
4
6
S 186
13 14 15 16 17 18 19 20 23 00 01 02 03 04 05 06 07 08 09 10 22 23 00 01 02 03 04 05 06
299°
313°
19 JULY
315°
322°
326°
20 JULY
TZ 0 → +1
324°

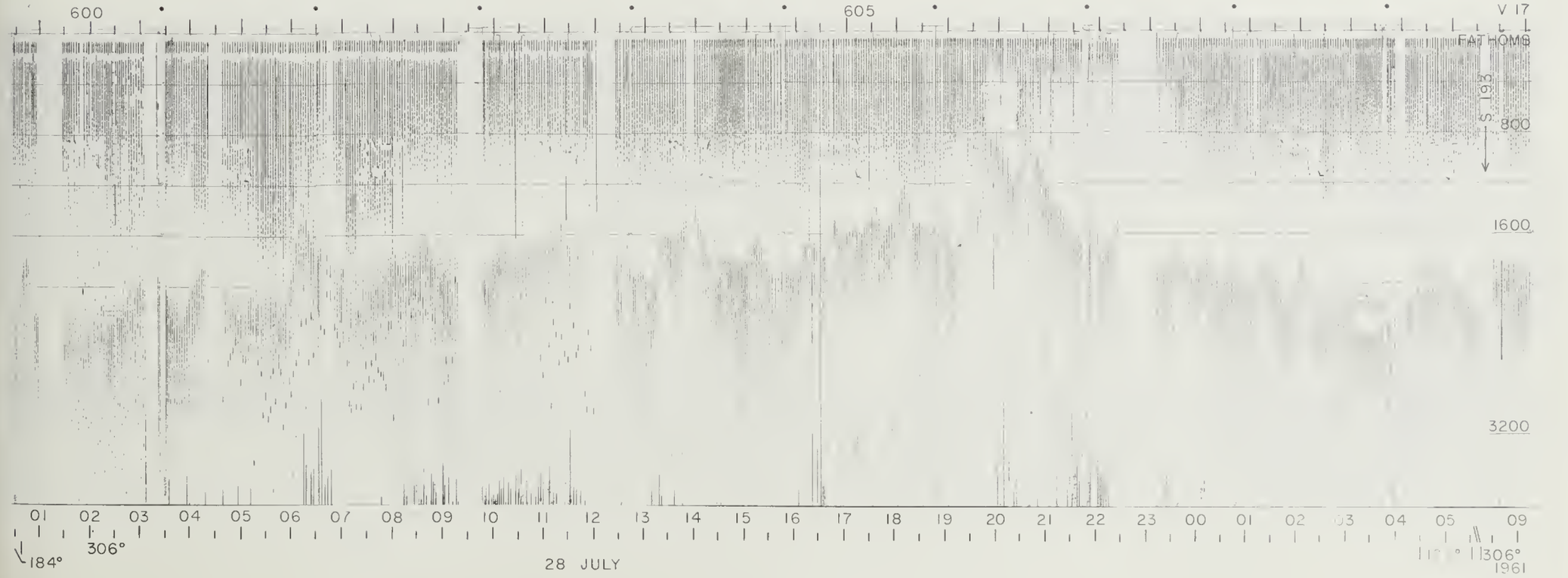

529
FATHOMS
400
800
1200
1600
16
0
1600
00 01 02 03 04 05 06
038°
18 JULY
DAKAR, SENEGAL
496 A
497 A
498 A
V 17
FATHOMS
800
1600
3200
800
2400
3200
11
12
07 08 09 10 13 14 15 16
032°
13 JULY

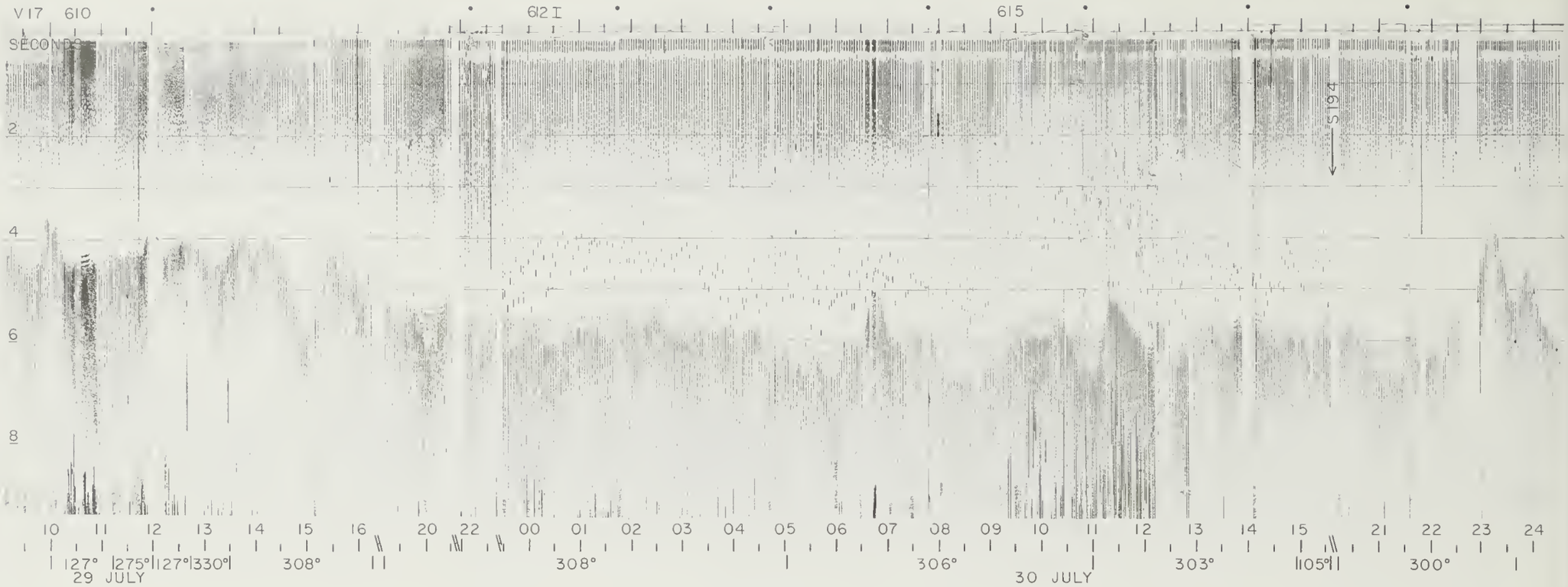

560
565
V 17
FATHOMS
781 S
800
1600
2400
07 08 09 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 17 18 19 20 21 22
21 JULY
323°
319°
308°
1961

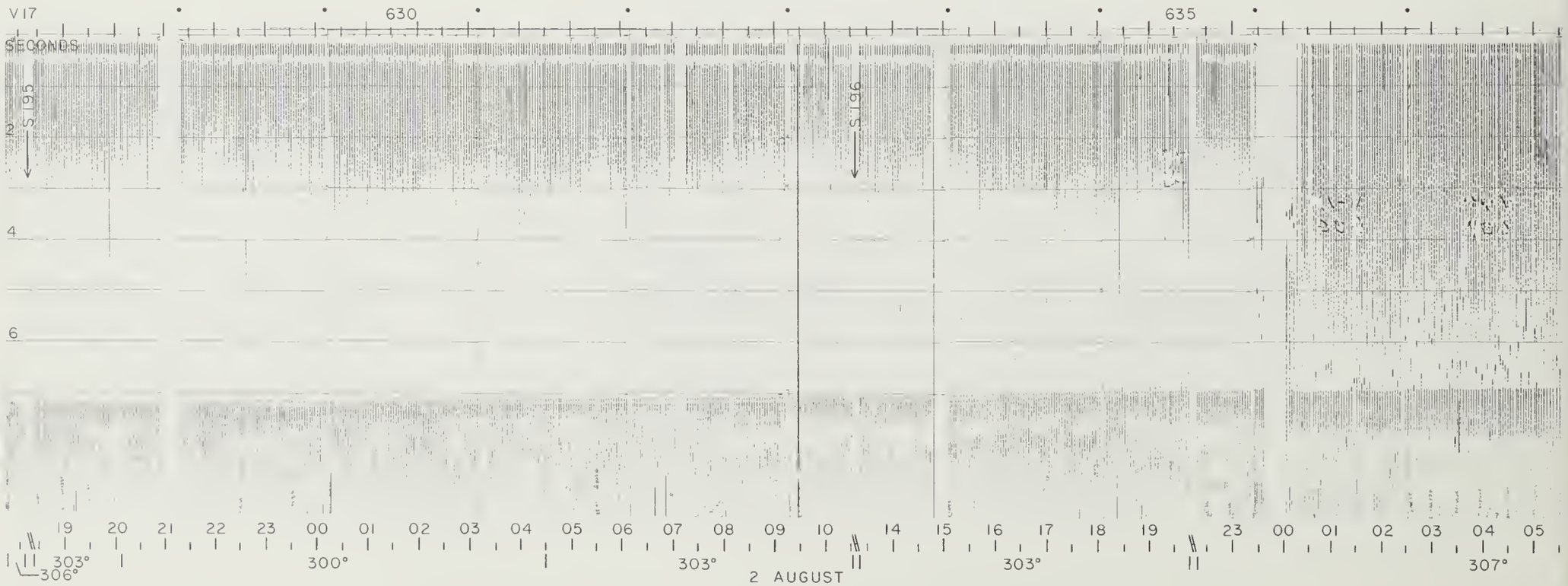

V17 575
SECONDS
2
4
6
S 188
S 189
23 00 01 02 03 04 05 06 07 08 09 10 11 12 19 20 21 22 23 01 02 03 04 05 06 07 08 09 10
308°
311°
311°
313°
23 JULY
24 JULY

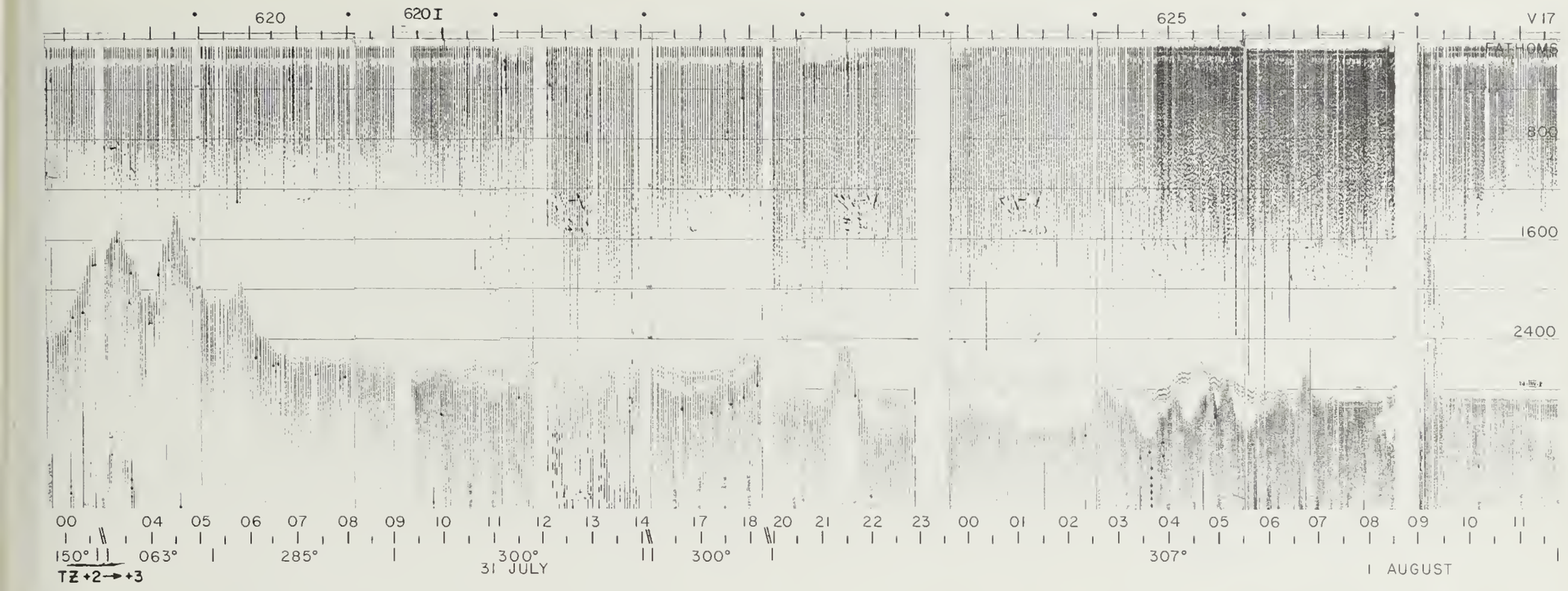

V17 590
595
SECONDS
2
4
6
S 190
S 191
S 192
04 05 06 14 15 16 17 18 23 00 01 02 03 04 05 06 07 08 09 10 11 15 16 17 21 23 00
26 JULY
304°
306°
27 JULY
125°
306°
308°
100°

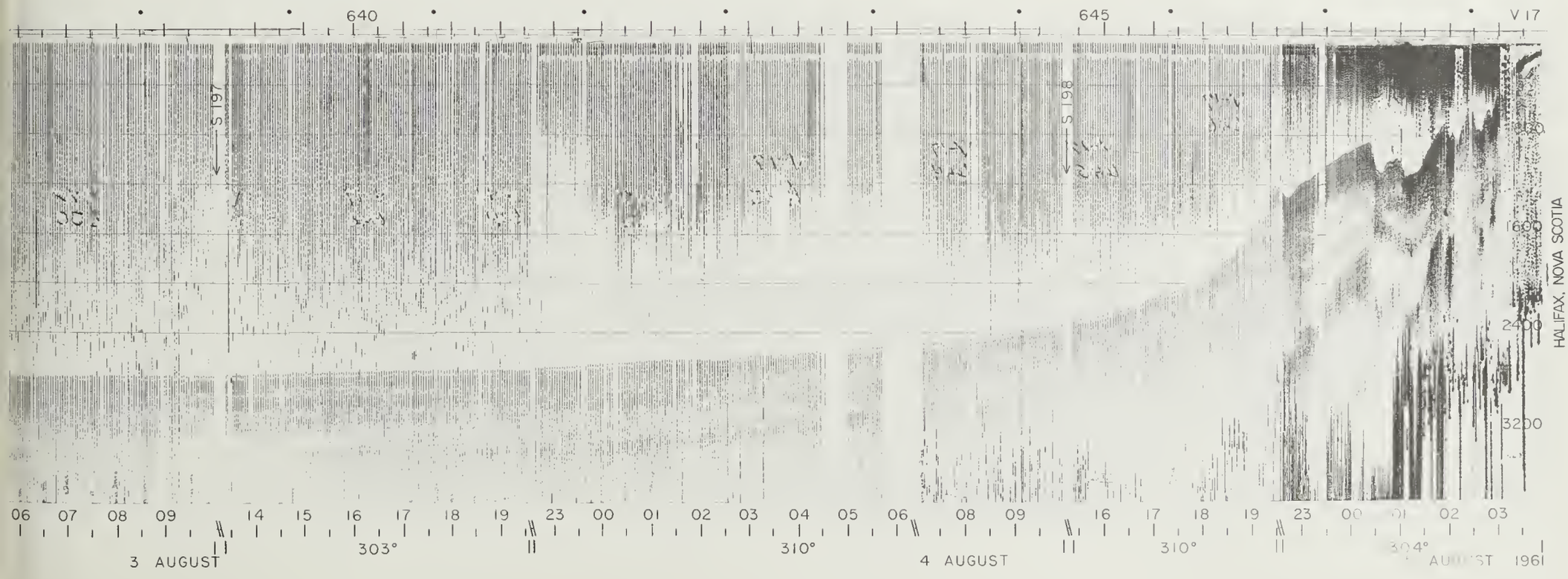

580
585
V 17
FATHOMS
800
1600
2400
19 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 20 21 22 23 24 00 01 02 03
302°
25 JULY
TZ+1→+2
304°

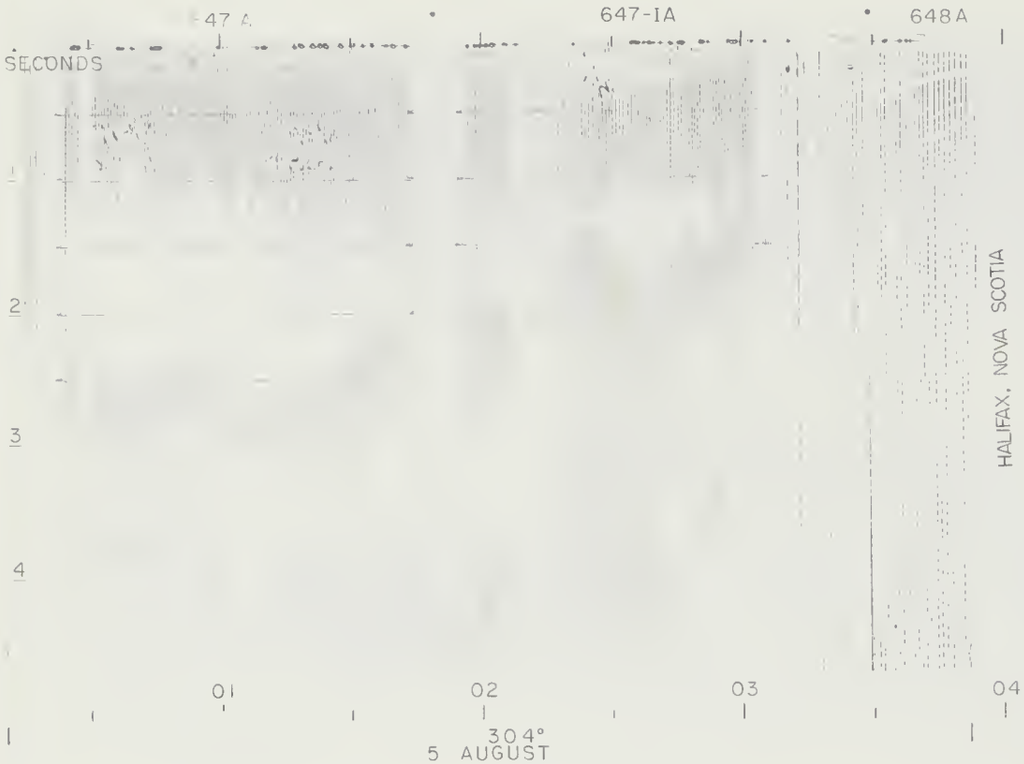

600
605
V 17
FATHOMS
S 19.3
800
1600
3200
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 09
184°
306°
28 JULY
306°
1961

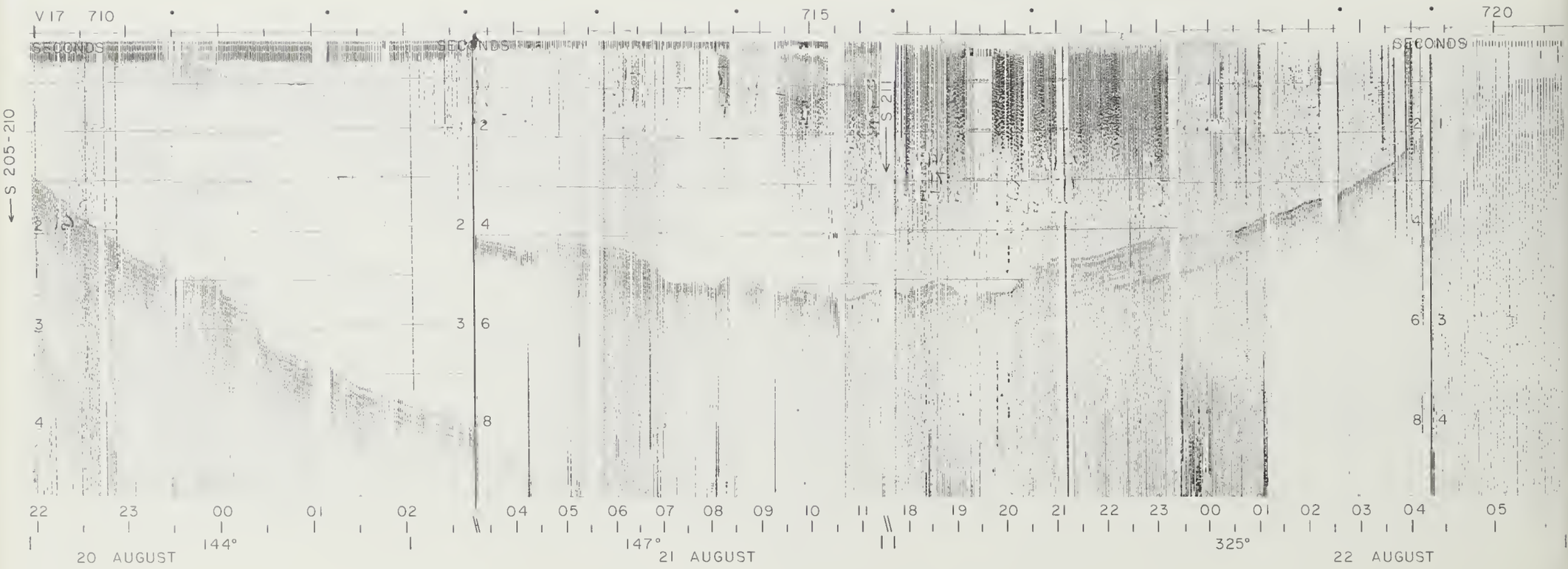

V17 610
612 I
615
SECONDS
2
4
6
8
S 194
10 11 12 13 14 15 16 20 22 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 21 22 23 24
127° 275° 127° 330° 308° 308° 306° 303° 105° 300°
29 JULY
30 JULY

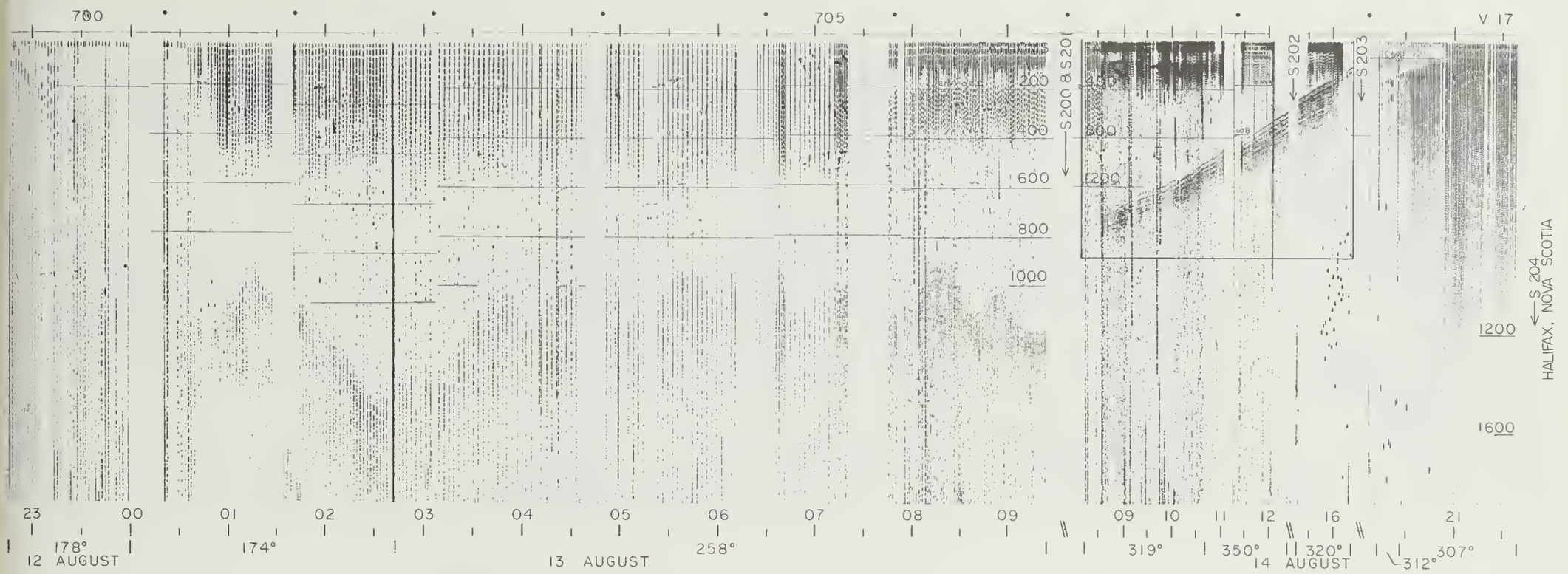

V17
630
635
SECONDS
S 195
S 196
4
6
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 14 15 16 17 18 19 23 00 01 02 03 04 05
303° 306° 300° 303° 303° 307°
2 AUGUST

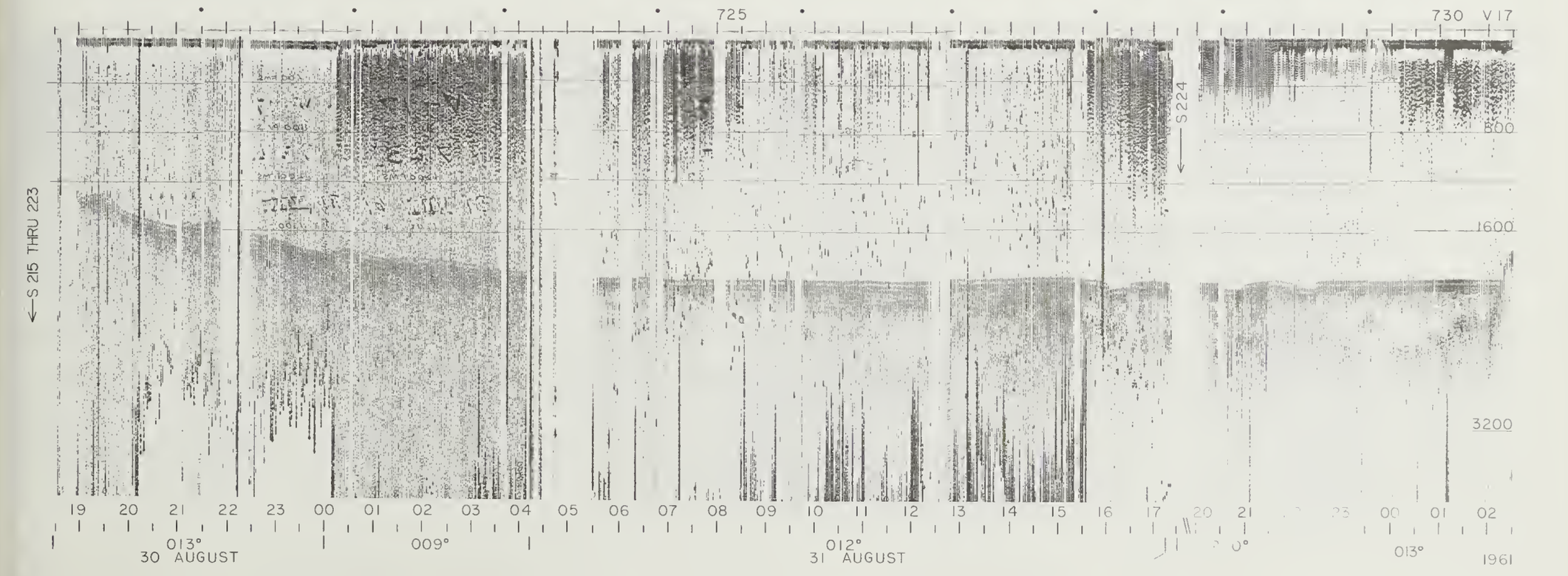

620
620I
625
V 17
FAT 10MS
800
1600
2400
00 04 05 06 07 08 09 10 11 12 13 14 17 18 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11
150°
063°
285°
300°
300°
307°
TZ +2→+3
31 JULY
1 AUGUST

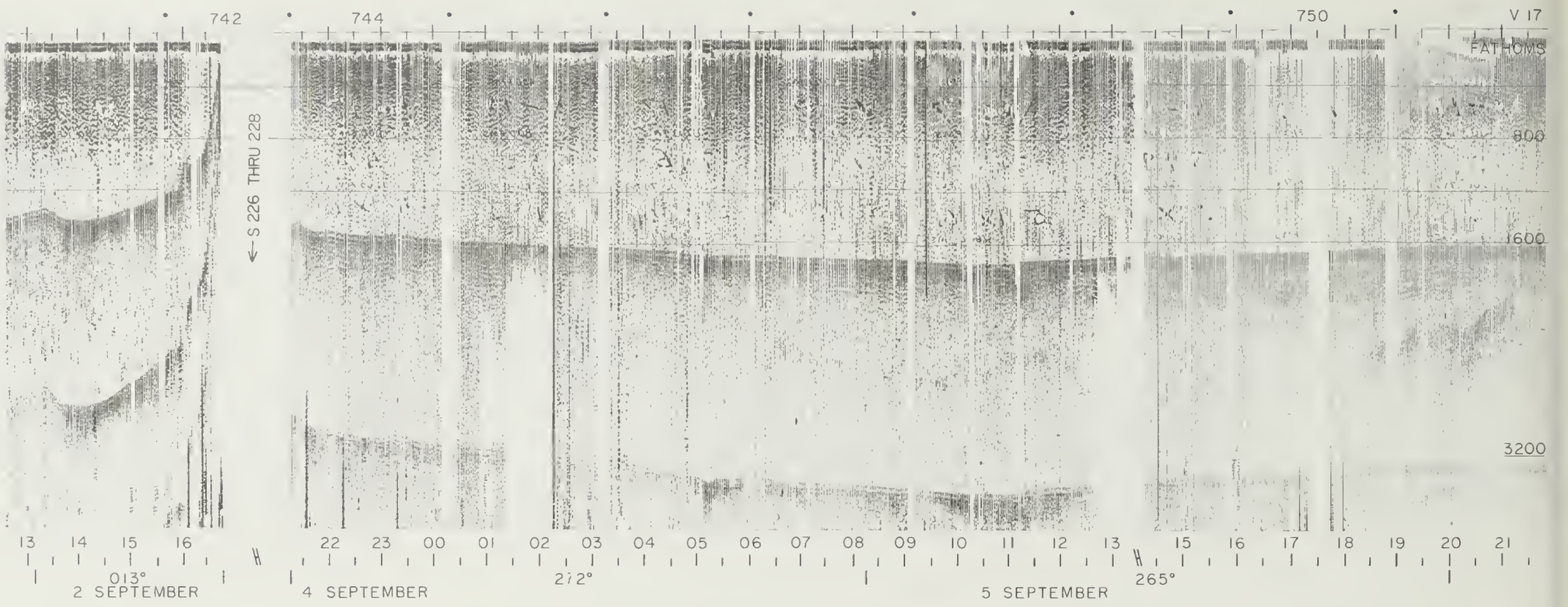

640
645
V 17
S 197
S 198
800
1600
2400
3200
06 07 08 09 14 15 16 17 18 19 23 00 01 02 03 04 05 06 08 09 16 17 18 19 23 00 01 02 03
303°
310°
310°
304°
3 AUGUST
4 AUGUST
HALIFAX, NOVA SCOTIA
AUGUST 1961

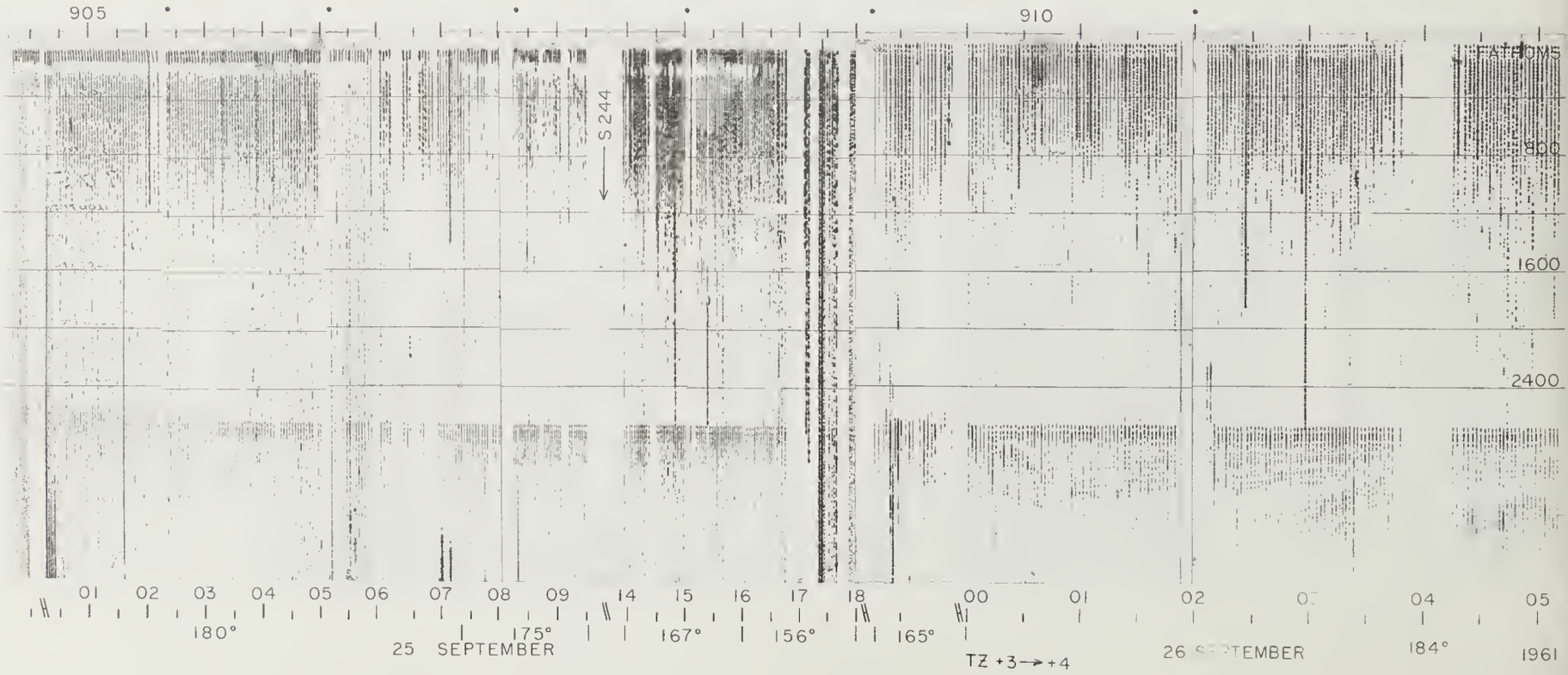

647-IA
648A
SECONDS
1
2
3
4
01
02
03
04
304°
5 AUGUST
HALIFAX, NOVA SCOTIA

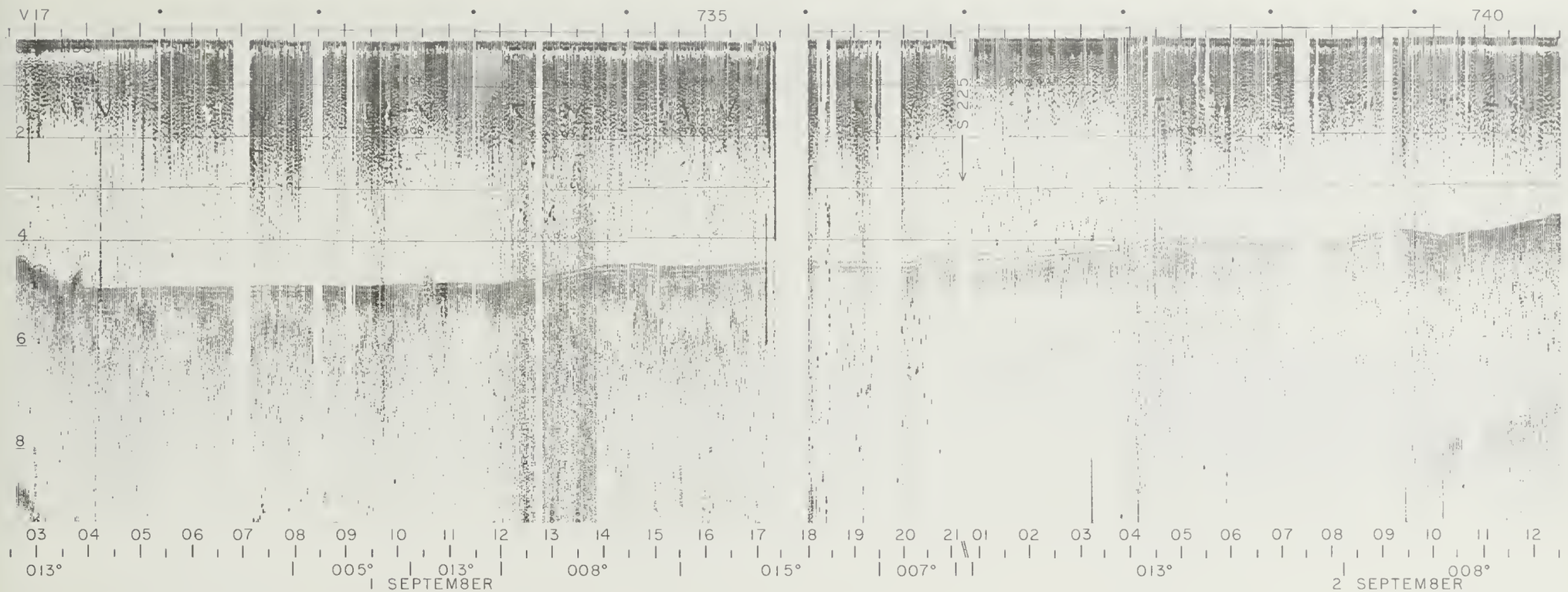

V17 710
715
720
SECONDS
S 205-210
S 211
S 212 THRU 214
22 23 00 01 02 04 05 06 07 08 09 10 11 18 19 20 21 22 23 00 01 02 03 04 05
144°
147°
325°
20 AUGUST
21 AUGUST
22 AUGUST

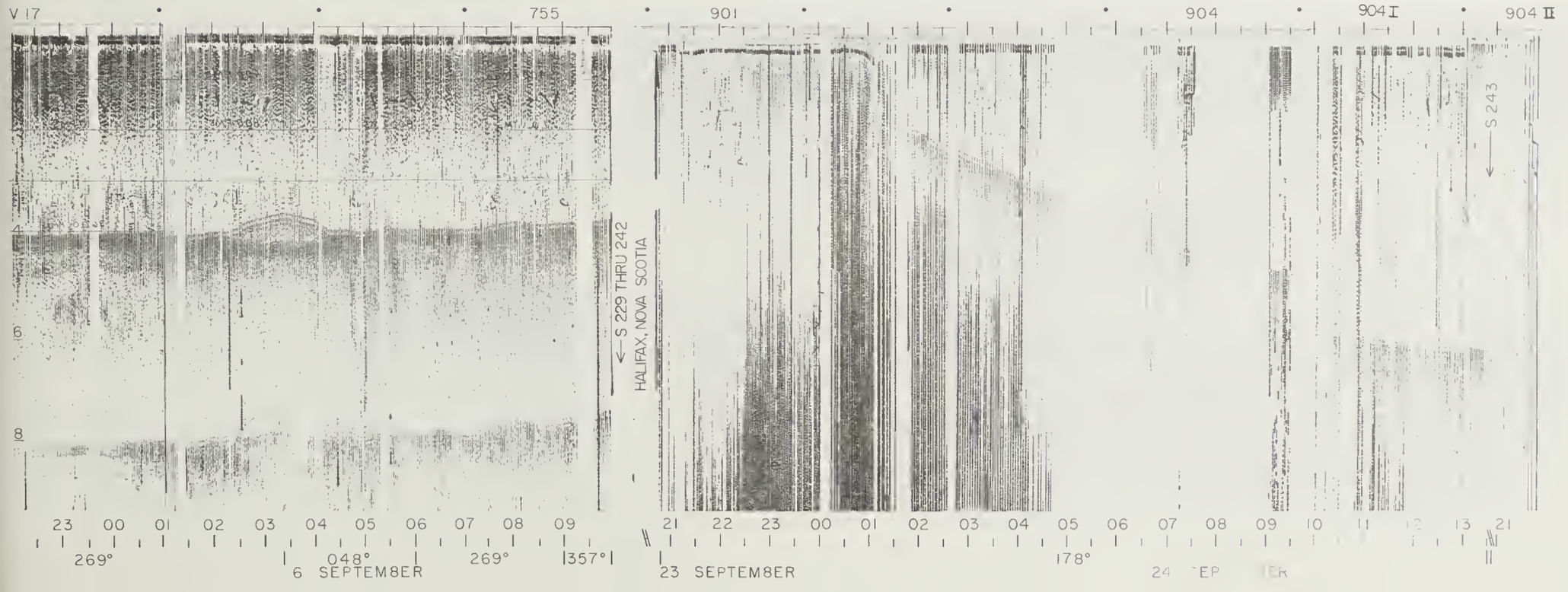

700
705
V 17
S 200 & S 201
S 202
S 203
S 204
HALIFAX, NOVA SCOTIA
200
400
600
800
1000
1200
1600
23 00 01 02 03 04 05 06 07 08 09
09 10 11 12 16 21
178°
174°
258°
319°
350°
320°
307°
312°
12 AUGUST
13 AUGUST
14 AUGUST

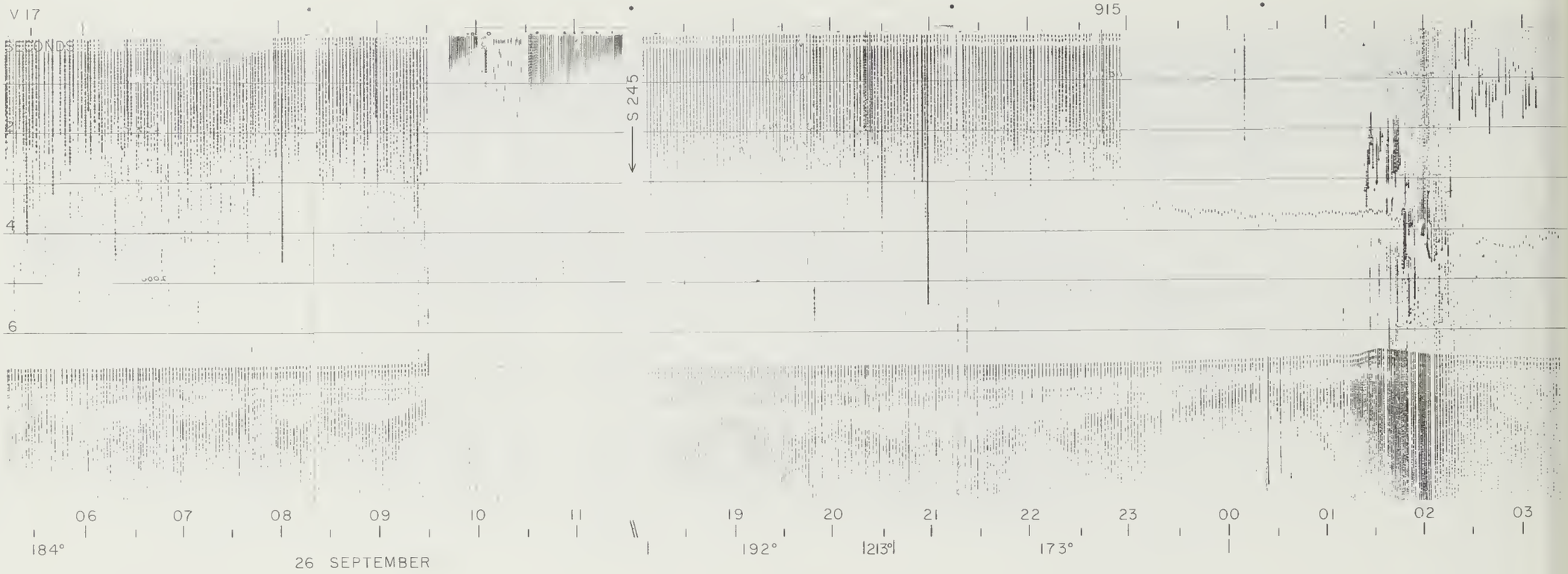

725
730
V 17
S 215 THRU 223
S 224
400
1600
3200
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 20 21 23 00 01 02
013°
009°
012°
013°
30 AUGUST
31 AUGUST
1961

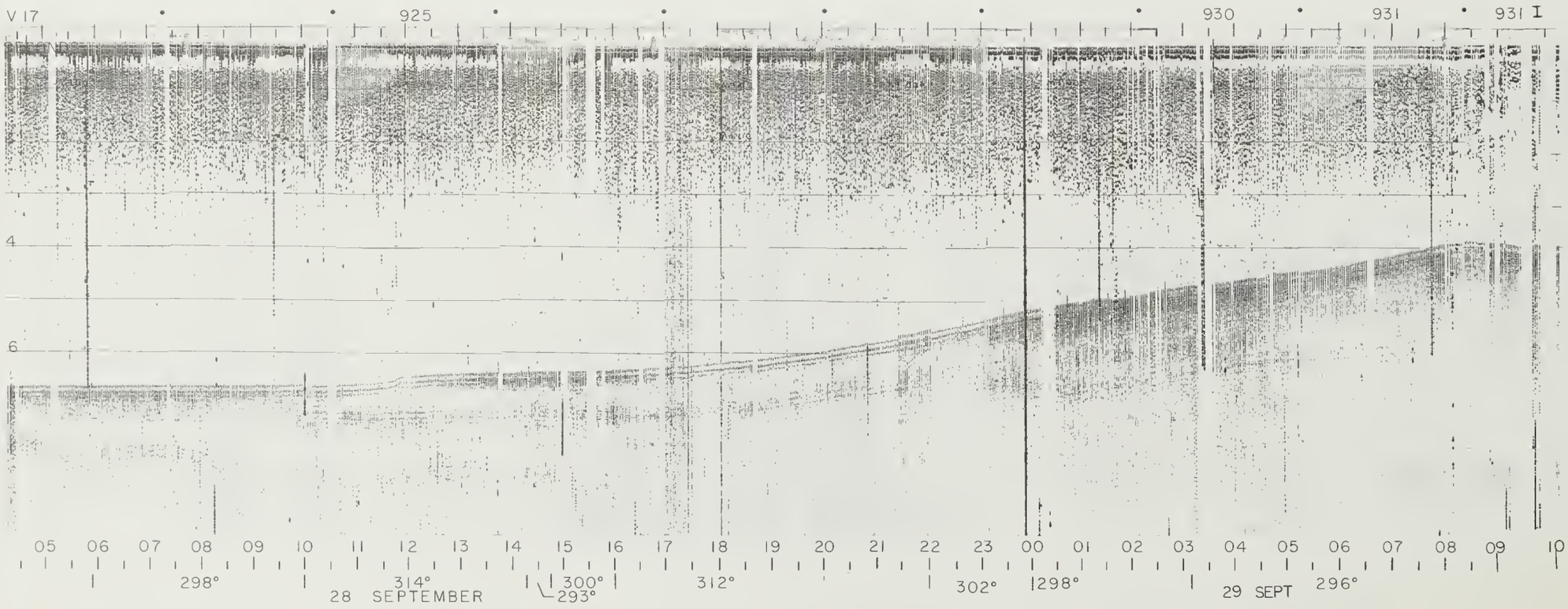

742
744
750
V 17
FATHOMS
800
1600
3200
← S 226 THRU 228
13 14 15 16
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13
15 16 17 18 19 20 21
013°
272°
265°
2 SEPTEMBER
4 SEPTEMBER
5 SEPTEMBER

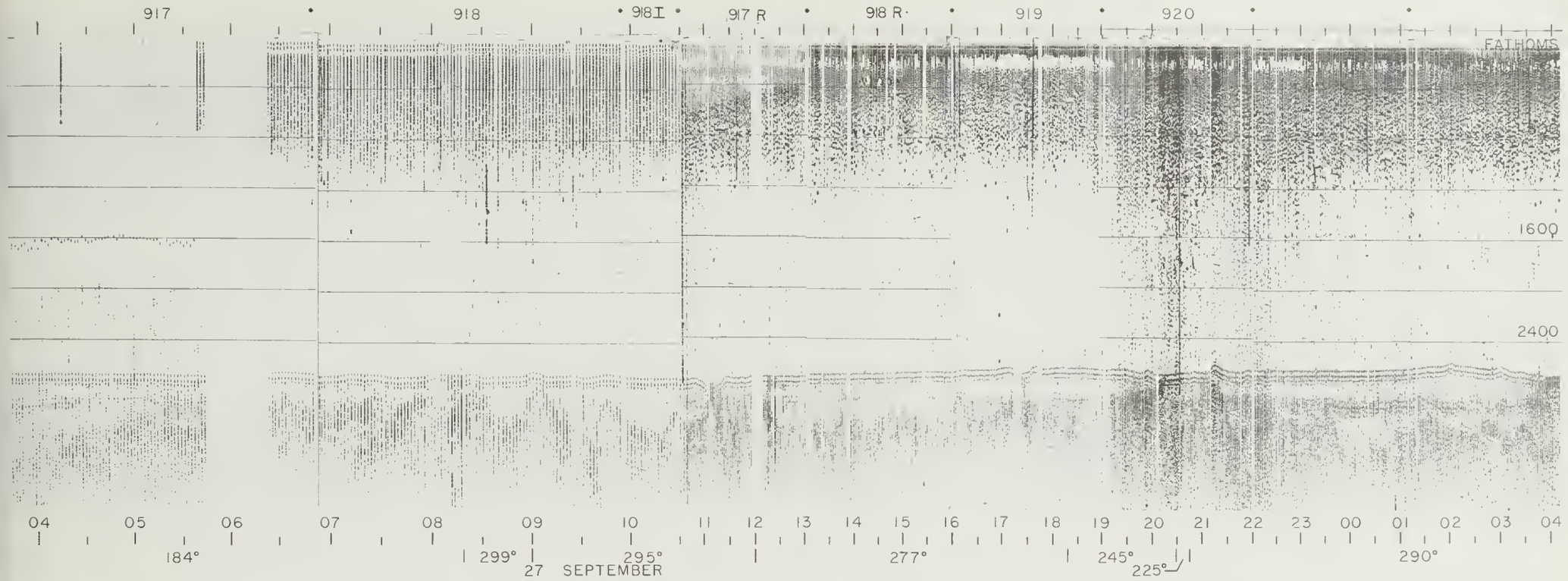

905
910
FATHOMS
800
1600
2400
← S 244
01 02 03 04 05 06 07 08 09 14 15 16 17 18 00 01 02 04 05
180°
175°
167°
156°
165°
184°
25 SEPTEMBER
TZ +3→+4
1961

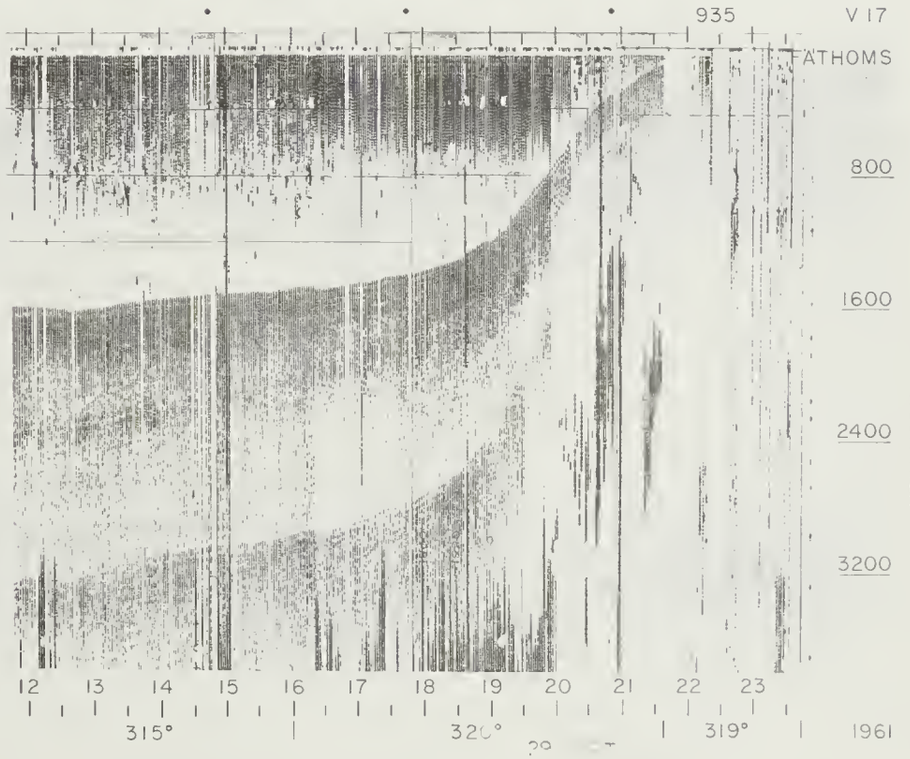

V 17
735
740
S 225
2
4
6
8
03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 01 02 03 04 05 06 07 08 09 10 11 12
013° 005° 013° 008° 015° 007° 013° 008°
1 SEPTEMBER
2 SEPTEMBER

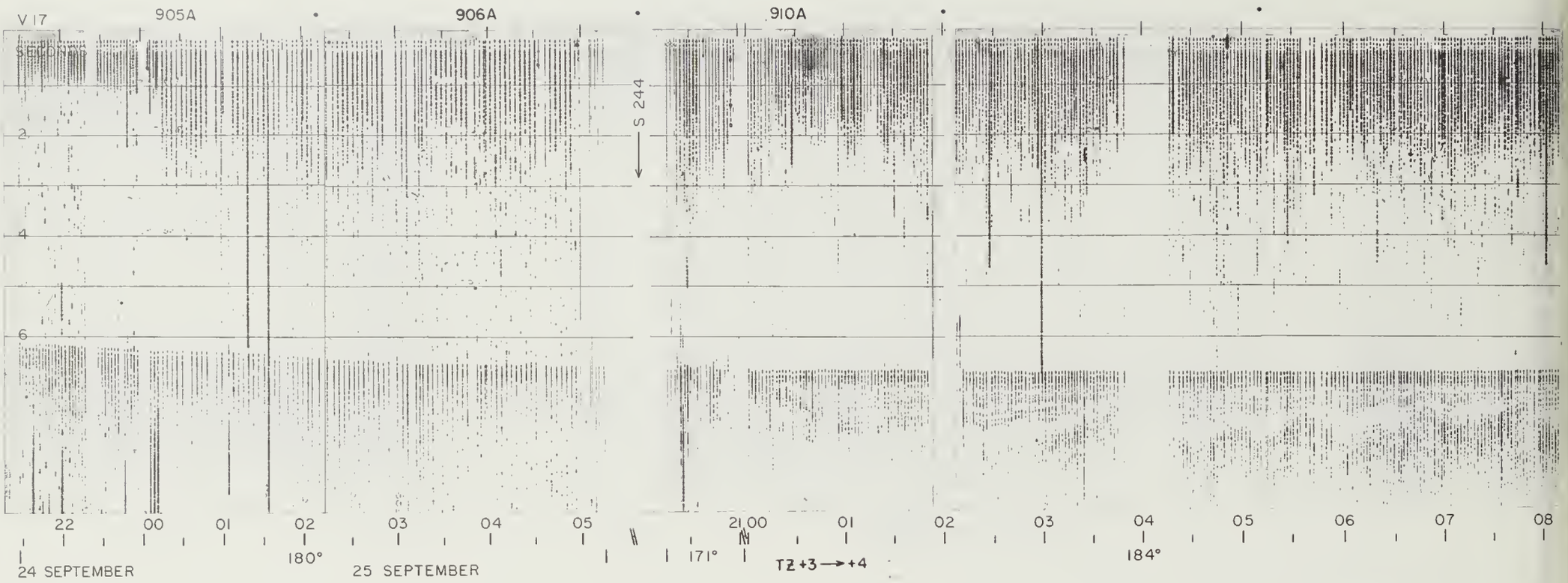

V 17
755
901
904
904 I
904 II
S 243
← S 229 THRU 242
HALIFAX, NOVA SCOTIA
4
6
8
23 00 01 02 03 04 05 06 07 08 09 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 21
269° 048° 269° 357° 178°
6 SEPTEMBER
23 SEPTEMBER
24 SEPTEMBER

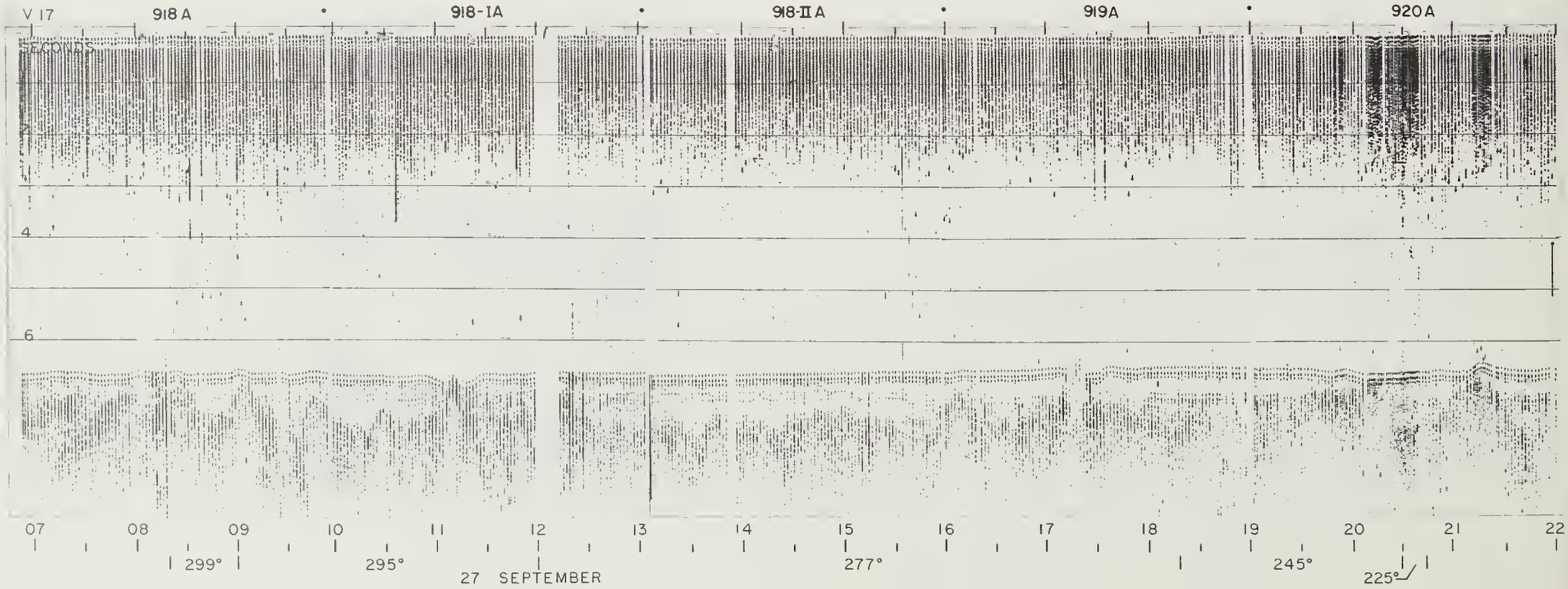

V 17
SECONDS
4
6
S 245
915
06 07 08 09 10 11
19 20 21 22 23 00 01 02 03
184°
192°
213°
173°
26 SEPTEMBER

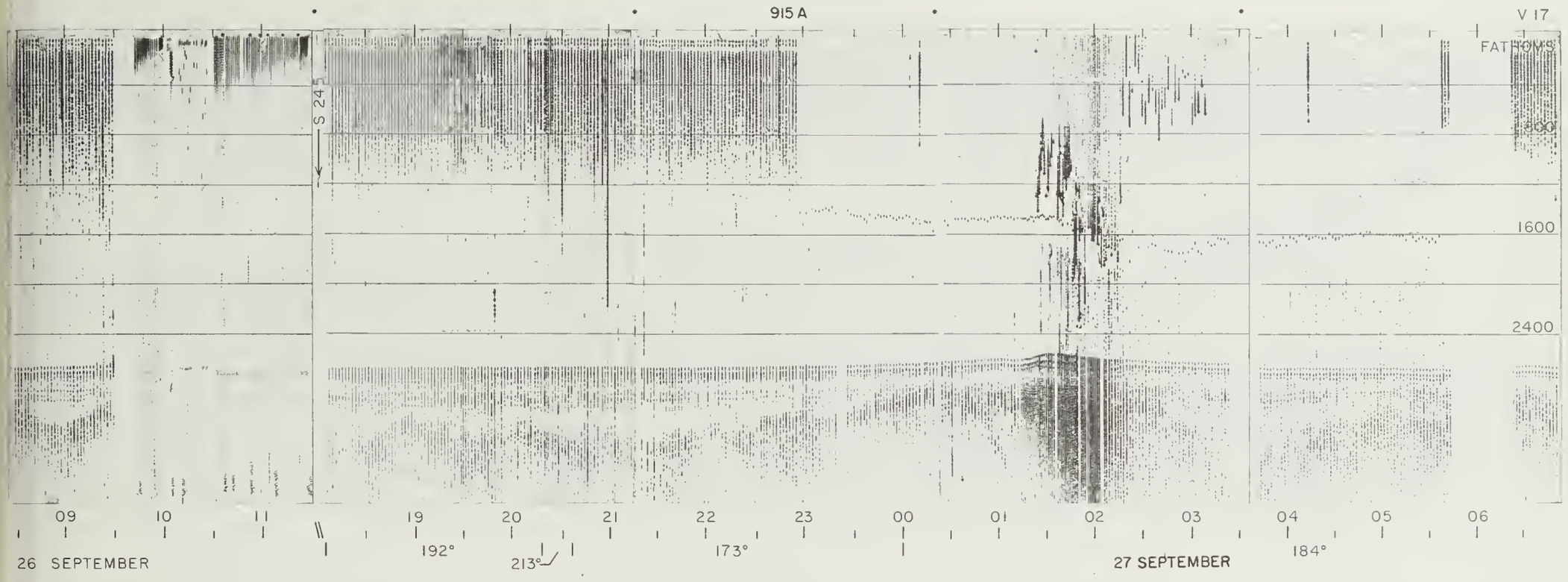

V 17
925
930
931
931 I
4
6
05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10
298°
314°
300°
293°
312°
302°
298°
296°
28 SEPTEMBER
29 SEPT

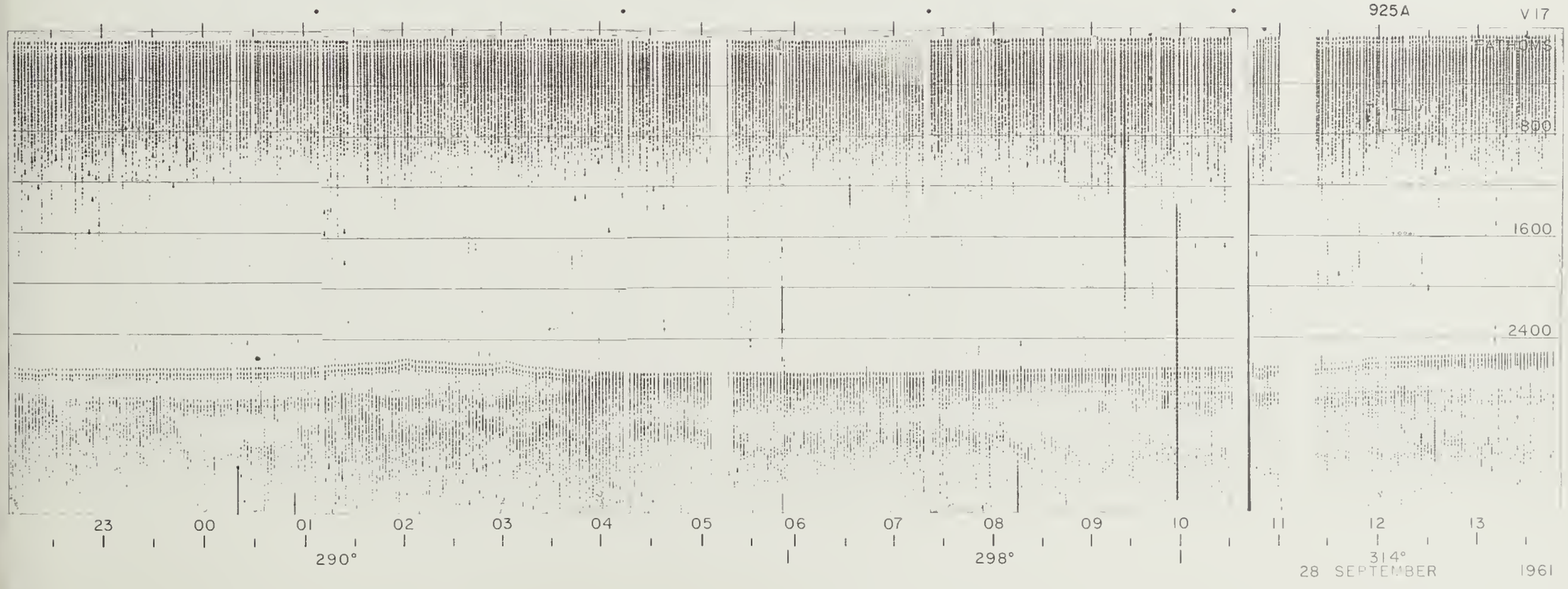

917
918
918I
917 R
918 R
919
920
FATHOMS
1600
2400
04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
184°
299°
295°
277°
245°
225°
290°
27 SEPTEMBER

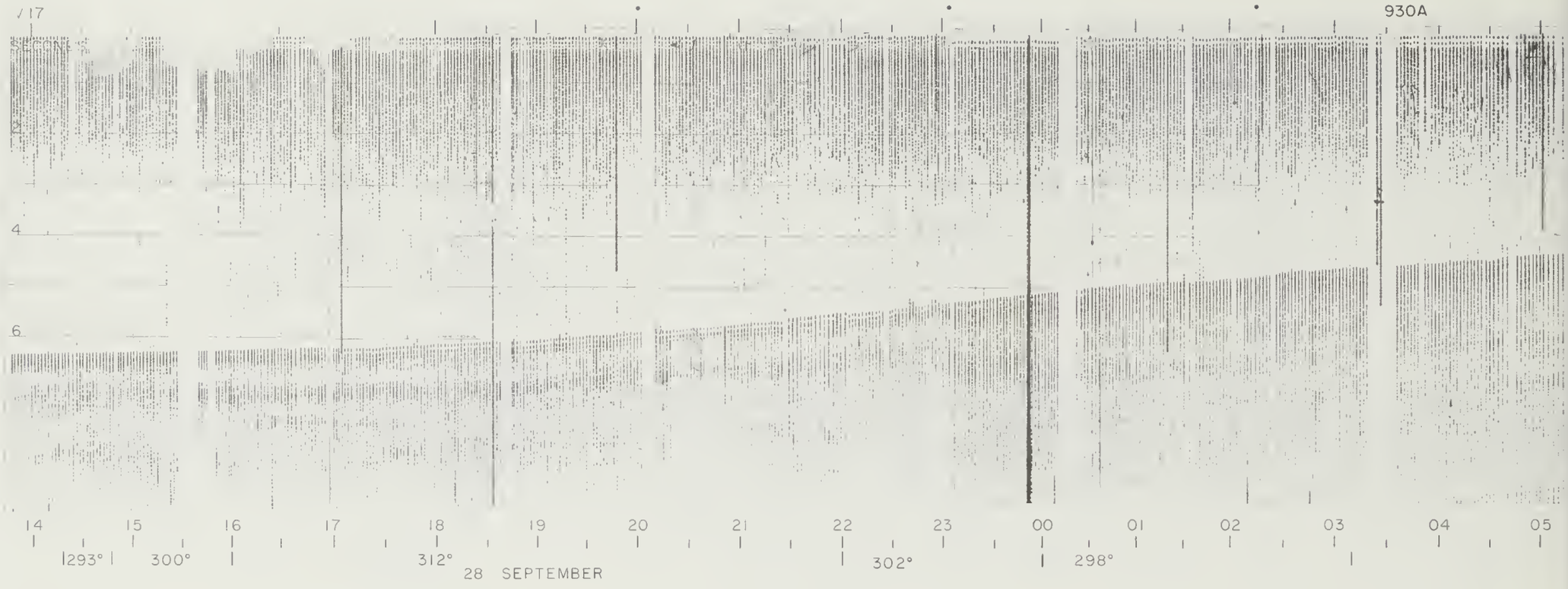

935
V 17
FATHOMS
800
1600
2400
3200
12 13 14 15 16 17 18 19 20 21 22 23
315°
320°
319°
1961
NEW YORK, NEW YORK

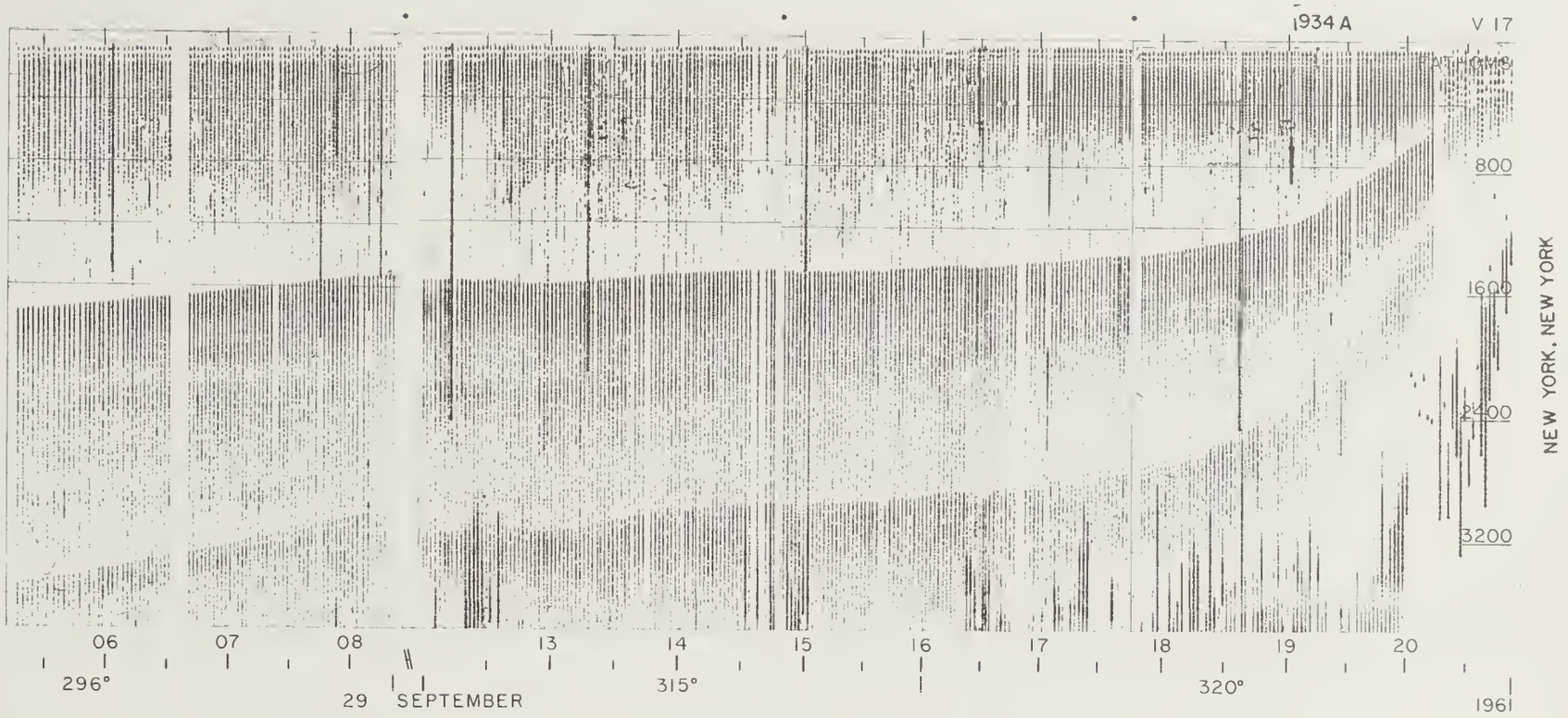

V 17
905A
906A
910A
SECONDS
2
4
6
S 244
22
00
01
02
03
04
05
21
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BIBLIOGRAPHY

609 ANTOINE, J. and J. EWING (1963 Seismic refraction measurements on the margins of the Gulf of Mexico; J. Geophys. Res., v. 68, 1975-1996.

The data from 16 seismic refraction profiles in the Gulf of Mexico are presented in the form of three cross sections. In all three sections correlations have been made between the refraction velocities and the known onshore geology. The Florida shelf and the Campeche bank are similar in structure, showing flat-lying beds over most of the sections. Identification of the strata is reasonably well established by drilling logs to the depth of the Upper Cretaceous, which is at about 0.6 to 1 km on the Florida shelf and 1 km on the Campeche bank. Section C-D, which passes through Galveston, shows a continuation seaward of the south-dipping sedimentary beds of the Gulf Coast geosyncline. This trend continues approximately 60km south of the present shoreline, where a reversal of dip is indicated. At this point, possibly the axis of the geosyncline, approximately 13 km of Cenozoic sediments are found. (from authors' abstract)

Note: VEMA 17/HIDALGO-61-H-1 seismic profiles 1 - 18.

561 BE, A.W.H. (1962) Quantitative multiple opening-and-closing plankton samplers; Deep-Sea Res., v. 9, 144-151.

Two quantitative plankton samplers, incorporating identical opening-and-closing principles, have been constructed for serial sampling of zooplankton in the upper 1000 m of water. The Multiple Plankton Sampler (MPS) is designed to tow at three depth ranges (0-100 m; 100-250 m; and 250-500 m) in the upper 500 meters, while the Bathypelagic Sampler (BPS) is intended for simultaneous hauling in the more sparsely populated 500-1000 m depths. Employment of pressure-sensitive release mechanism allows horizontal or oblique towing in pre-selected depth intervals - thus abolishing the need for messengers. (from author's abstract)

Note: Both the MPS and BPS were field-tested in the North Atlantic during July and August 1961 on VEMA-17. The shipboard operations are described as well as the instruments.

1616 BE, A.W.H., J.M. FORNS, and O.A. ROELS (1971) Plankton abundance in the North Atlantic Ocean; in "Fertility of the Sea," J.D. Costlow ed., Gordon and Breach, N.Y., 17-50.

Geographic variations in zooplankton biomass were determined from 342 plankton samples collected during 1958-1968 over wide regions of the North Atlantic. Zooplankton abundances are high in subarctic and cold-temperate systems and low in the central water-mass or Sargasso Sea, with minimun values in the southwestern sector. The regional variations in zooplankton abundance mask variations due to diurnal vertical migration, local patchiness and non-synoptic sampling. Seasonal variations in high latitudes are very large and are likely to alter significantly our summer and fall estimates of biomass. (From authors' abstract)

Note: VEMA-17 plankton samples obtained in the North Atlantic to depths of 300 m were used in this investigation.

1745 BE, A.W.H., C. MAC CLINTOCK, and D.C. CURRIE (1972) Helical shell structure and growth of the pteropod Cuvierna columnella (RANG) (Mollusca, Gastropoda); Biomineralization Research Reports, v. 4, 47-79.

Using a scanning electron microscope four aragonite shell layers are seen in recent shells of Cuvierna columnella (RANG). Growth layers that abut against the apertural margin and the arrangement of prisms in the apertural prismatic layer indicate that shell growth growth in Cuvierna is different from normal molluscan growth, occuring in two phases - phase one, in which the shell reaches its maximum length and final shape, and phase two which is characterized by sepal formation and thickening of the shell wall accompanied by an inwardly expanding apertural prismatic layer. The helical structure, unique among molluscs, indicates that the pteropods may represent evolutionary neomorphs derived from non-shelled opisthobranch ancestors and not from Pyramidellacea, which have shells of crossed-lamellar structure. (From authors' abstract)

Note: VEMA-17-Trawl 104, taken on July 1, 1961, is one of the two bottom dredges from which the C. columnella were obtained.

1526 BE, A.W.H., and D.S. TOLDERLUND (1971) Distribution and ecology of living planktonic foraminfera in surface waters of the Atlantic and Indian Oceans; from "Micropaleontolgy of Oceans," ed. B.M. Funnell and W.R. Reidel. Cambridge Univ. Press, London, 105-149.

1526 The distributional patterns and relative abundance of 27 species of living planktonic foraminifera are described, based on 703 surface plankton tows in the North and South Atlantic and Indian Oceans. The species are grouped into five faunal zones. The bipolar and antitropical nature of the species distributions are evident from the striking similarity of the foraminiferal faunas in reciprocal latitudinal zones. By comparing samples from surface waters with those from greater depths, we are able to distinguish between surface and subsurface dwellers. Correlations between surface temperatures and species abundances were made to define the maximum and optimum temperature ranges for the individual species. (From authors' abstract)

Note: Twenty-three surface plankton samples collected in 0-10 m depth on VEMA-17 were analyzed for this work.

836 BROECKER, W.S. (1965) An application of natural radon to problems in ocean circulation; Symposium on Diffusion in Oceans and Fresh Water, held in 1964 at Lamont Geological Observatory, in Palisades, N.Y., 116-145.

Large discontinuities in radon concentration have been shown to exist at the air-sea and sea-sediment interfaces such that with respect to its parent radium, measurable deficiencies of radon should exist in the surface ocean and excesses in near bottom water. Using a method allowing shipboard extraction and measurement of the small amounts of radon present in the sea, ten samples of surface water and two of near bottom water were measured, establishing the

836 existence of the predicted effects. Large excesses of radon were found in the shallow waters on the Bahama Banks. Quantitative relationships are derived which allow estimmates of both the rate of ocean-atmosphere gas exchange and the rate of turbulent mixing in the surface ocean to be computed from the results of shallow profiles. Similar relationships yielding rates of turbulence in the bottom water from deep profiles are given. (From authors' abstract)

Note: Geochemistry samples IA-N to IIA-I are analyzed. This paper includes a diagram of the 50-liter sampler, as well as the disperser adapter and portable vacuum system used in processing the samples.

970 BURCKLE, L.H. (See GROOT, GROOT, EWING, BURCLE AND CONOLLY, 1966)

863 BURCKLE, L.H. (See HEIRTZLER, BURCKLE, and PETER, 1966)

667 CAMPBELL, N.J. (See DRAKE, CAMPBELL, SANDER and NAFE, 1963)

1015 CLARKE, R.H. (1968) Burrow frequency in abyssal sediments; Deep-Sea Res., v. 15, 397-400.

Given favourable circumstances it appears possible to relate changes in burrowing activity on the ocean floor, in an empirical manner, to environmental variables other than the rate of deposition.

Note: Cores V-17-88 and 121, in which the Post-glacial section is apparently undisturbed, were among the ten which showed a very marked increase in the frequencey of burrows in the upper few decimetres of the core.

862 CONOLLY, J.R. and M. EWING (1965) Ice-rafted detritus as a climatic indicator in Antarctic deep-sea cores; Science, v. 150, 1822-1824.

Ice-rafted detritus is readily identified in sediment cores raised from the deep ocean floor around Antarctica. A few cores have reached a depth below which no ice-rafted material is found. This depth is interpreted as indicating the establishment of earliest Pleistocene glaciation in the Southern Hemisphere. It is just below a depth where there is a change in assemblages of Radiolaria which Hays associates with the Pliocene-Pleistocene boundary. The presence of ice-rafted material throughout the upper zone in cores taken south of the Polar Front indicates continuity of glaciation in Antarctica. Further north, near 45°S in the Argentine Basin, zonation of the ice-rafted detritus can be used to delineate glacial stages of the Pleistocene. (From authors' abstract)

Note: Core V-17-125 is among those whose lithology is described.

1003 CONOLLY, J.R., H.D. NEEDHAM, and B.C. HEEZEN (1967) Late Pleistocene and Holocene sedimentation in the Laurentian Channel; Jour Geology, v. 75, 131-147.

Reddish-brown glacial-marine sediment was deposited in the Laurentian Channel during the

1003 late Pleistocene. The sediment contains materials derived from Triassic (and/or Carboniferous-Permian) sediments of Appalachian Canada. Two 10-23 cm-thick brick-red tills lie within the glacial marine sediment; both tills thin and converge seaward The pebbles, granules, and sand show little evidence of glacial abrasion and may have been derived from the adjacent shallow shelf and transported by ice which advanced over the deep waters of the Laurentian Channel. If the tills were deposited at the ice front, they are time-transgressive beds within a wedge of glacial marine sediment. A strong sub-bottom reflector correlates in some areas with the upper brick-red till and in other areas with sand beneath the lower till. Brown silty clays and clayey silts and gray sediment lie above this reflector and are generally more than 20 feet thick and thin seaward and toward the channel walls. The coarse fraction of the gray sediments, consisting of rock fragments, is derived from the crystalline rocks of eastern Quebec. (From authors' abstract)

Note: Cores V-17-179, 181, 202, 203, 205, and 207 are among those studied. A map indicates locations of cores in relation to bathymetry and sediment thickness. PDR traces are shown, with core positions indicated.

970 CONOLLY, J.R. (See GROOT, GROOT, EWING, BURCKLE, and CONOLLY, 1967)

1745 CURRIE, D.C. (See BE, MAC CLINTOCK, and CURRIE, 1972)

667 DRAKE, C., N.J. CAMPBELL, G. SANDER, and J.E. NAFE (1963) A Mid-Labrador sea ridge; Nature, v. 200, no. 4911, 1085-1086.

Four seismic refraction profiles made during VEMA-16 in the deep part of the Labrador Sea indicated that the structure beneath the bottom is not that of the typical ocean basin, but more closely resembles that found along the Mid-Atlantic Ridge. On VEMA-17 PDR records, the Mid-Ocean Canyon No. 1 was traced as far north as 61°N. Also on VEMA-17, using the new seismic profiling technique, the rock surfaces buried deep beneath the sedimentary cover appear on the profiler records as the geological center of the Sea is approached. Along the northern profiler line, the rock (5.5 km/sec) is buried beneath about 1 km of sediments, while to the south it appears above the surface in several places. Taken with other data, these facts suggest that the Labrador Sea ridge developed at an early geological time and that its development ceased before it reached the mid-ocean ridge stage.

1003 DRAKE, C.L. (See HEEZEN and DRAKE, 1963)

684 DRAKE, C.L. (See HEEZEN and DRAKE, 1964)

1185 DRAKE, C.L. (See SHERIDAN and DRAKE, 1968)

999 EDGAR, N.T. (See EWING, TALWANI, EWING, and EDGAR, 1967)

549 ENGEL, L. (See EWING and ENGEL, 1962)

594 EWING, J.I. (1963) Elementary theory of seismic refraction and reflection measurements; in "The Sea," ed. M.N. Hill, Interscience Publ,, N.Y., v. 3, 3-19.

Sonic energy from explosions is received by hydrophones and geophones at various known distances, recorded on oscillograph tapes with an accurate time scale. From these data, the speed of sound propagation in sub-surface strata can be determined and an intelligent guess made about the type of material constituting each layer. This paper describes the theory and data analysis methods used for VEMA-17 reflection and refraction data.

511 EWING, J. and M. EWING (1961) A telemetering ocean bottom seismograph; J. Geophys. Res., v. 66, 3863-3878.

Two tests of the telemetering ocean-bottom seismograph made on VEMA-17 (OBS #1 Jan 26-28 and OBS #2 June 15-17) are reported. The history, instrument, design, shipboard technique and data reduction method are described. OBS #1 was in the southern part of the Sigsbee Deep in the Gulf of Mexico, and here the results indicated significant variation in the crust-mantle boundary over relatively short horizontal distance.

506 EWING, J.I. and G.B. TIREY (1961) Seismic profiler; J. Geophys, Res., v. 66, 2917-2927.

The equipment for recording and profiling seismic reflection sound transmission data, the "seismic profiler", is described in some detail - the mechanical system, electrical system, various sound sources. The shipboard operation of the new technique is also described. The results achieved - continuous mapping of strata to a total reflection time of 9 seconds, using a single detector and recording channel from a ship underway - are shown. VEMA-17 seismic profiler sheets 30-34 (from Campeche escarpment to southeast of Sigsbee Knolls) are displayed and discussed, as are sheets 56-66, in the Yucatan Basin of the Caribbean Sea from Cayman Ridge to the northwestern edge of the Basin.

Note: VEMA-17 profiler sheets 30-34 and 56-66.

895 EWING, J., M. TALWANI and M. EWING (1968) Sediment distribution in the Caribbean Sea; Fourth Caribbean Geol., Trinidad, 1965, 317-324.

The VEMA-17 seismic profiler records made on Leg 4, Galveston to Cristobal, were used in this study which showed that the Carib beds are two superposed conformable beds which tend to arch up in the central part of each basin. The Carib beds bend down forming marginal trenches against South America, the Greater Antilles, and the Isthmus of Panama, but are absent on the landward slopes of the trenches. Three phases of the sedimentary history may be distinguished; namely: I, before; II, during; and III, after the deposition of the Carib beds. Apparently coarse turbidites made a great abyssal plain of the basin floor with a thickness too great to penetrate with our reflection technique. The basin

895 was free of all deformation during the latter part of Phase I. Phase II was initiated by a change in sediment type, but without tectonic deformation. Phase III dates from the deformation that bent the Carib beds into their present configuration. The contrast between Caribbean strata and those of adjacent areas indicates that a continuous barrier sufficiently high to isolate Caribbean turbidites existed well before the end of Phase I. The trenches appear to be young, predating the young turbidites.

546 EWING, J.I., J.L. WORZEL and M. EWING (1962) Sediments and oceanic structural history of the Gulf of Mexico; J. Geophys. Res., v. 67 2509-2527.

VEMA-17 reflection profiles in the Gulf of Mexico, made in January 1961, are shown and discussed. Twenty-one buried domes, one of which emerges as one of the Sigsbee knolls, were recorded. The hypothesis that they are salt domes is put forward and discussed in detail. The authors state that it is likely that there are large petroleum accumulations associated with these structures. Five principal reflecting sedimentary horizons were detected in the Gulf. This reflection data was correlated with the VEMA-17 refraction velocities.

999 EWING, J., M. TALWANI, M. EWING, and T. EDGAR (1967) Sediments of the Caribbean; in "Studies in Tropical Oceanography," Miami, Florida, Univ. of Miami, v. 5, 88-102.

Seismic profiler surveys and sediment coring have indicated that the interior basins of the Caribbean Sea have been stable, deep water areas since middle Mesozoic and possibly earlier. The mapping of a widespread marker of late Mesozoic or earlier Cenozoic age permits inferences about the tectonics of the margins of the basins. Vertical, rather than horizontal, forces appear to have been dominant in the deformation. The small variation in the thickness of the Tertiary sediments argues against the concept that convection, producing sea-floor spreading, within the Caribbean Sea is responsible for the marginal deformation (Authors' abstract)

Note: VEMA-17 reflection profiler records were used for this work.

609 EWING, J. (See ANTOINE and EWING, 1963)

555 EWING, J. (See EWING, M. and J. EWING, 1962)

584 EWING, J. (See EWING, M. and J. EWING, 1963)

781 EWING, J. (See EWING, M. and J. EWING, 1965)

681 EWING, J. (See EWING, M., J. EWING, and TALWANI, 1964)

878 EWING, J. (See EWING, M., TALWANI, and J. EWING, 1966)

1161 EWING, J. (see EWING, M., J. EWING, HOUTZ, and LEYDEN, 1968)

632 EWING, M. (1963) Sediments of ocean basins; in "Man, Science, Learning and Education," Higginbotham, ed., William Marsh Rice Univ., Houston, Texas, 41-59.

632 The hypothesis of convection currents in the mantle extending outward across the ocean floor and sweeping the sediment and crust under the continents is much more difficult to support as the explanation of the thinness of sediments in the southern hemisphere Pacific than in the northern Pacific. The new seismic profiler method has revealed that the oceanic sedimentary layer is many times thinner than steady, very slow, accumulation would lead one to expect. Either the time of accumulation is far shorter than the age of the oceans or the mean rate is far less than the present one. Profiler records: Halifax-New York; and out of Bahia Blanca and Dakar, revealed a characteristic basin structure: a smooth ocean floor and an even smoother interface (Horizon A) overlying rough basement. Horizon A evidently records a unique event in the sedimentary history of the oceans. Sediments were observed to be sparse on the Mid-Atlantic Ridge. Two major sediment deposits were found - in the North America Basin and in the Argentine Basin, the latter being greater than that found anywhere else. The modern trench along South and Central America is trapping sediments in a way that probably represents the beginning of the next cycle of the mountain building process. Profiler studies have defined many targets for exploration by the drill and give a rapid method for selecting drilling sites.

Note: Specifically, VEMA-17 profiler records 267-270, 910-917 and 924-931 are shown and discussed.

810 EWING, M. (1965) The sediments of the Argentine Basin; Roy. Astron. Soc. Qtrly J., v. 6, 10-27.

Transport in a thick widespread, and apparently permanent layer of particle-laden water may be the mechanism by which the extensive homogenous sediments in the Argentine Basin were deposited so far from continental sources. Profiler traverses in the Argentine Basin are shown and discussed. A core from a small modern abyssal plain in the southwest part of the basin (V-17-C128) contained many layers of graded quartzose sand near the bottom of the core. Such turbidity current deposits are again demonstrated to be limited to the floors of canyons, valleys and abyssal plains. Numerous small canyons and gullies cut the Argentine continental slope, forming dendritic patterns. A "ring structure" observed on ZAPIOLA-1 profiler record 271 may well be comparable to the Blake-Bahama outer ridge. The abrupt change which resulted in Horizon A may have resulted from increased delivery of sediment to the continental slopes by glacially-controlled lowering of sea level, and might represent pre-Pleistocene sea level lowerings - possibly the earlier glaciations. The sediments of the Argentine Basin show no distortion to suggest that continental drift has occurred. Elevation of the Rio Grande Rise apparently has been contemporaneous with the deposition of the basin sediments, and that of the Scotia Arc pre-dates it.

1161 bodies of the deep-sea floor. No aspect of it marks it as having had its sediment supplied from a glaciated continent. The sediment was apparently supplied from a non-glaciated Antarctica and deposited on a crust that had essentially the same geographic and topographic relation to Antarctica as it does at present. VEMA-17 PDR records near the Antarctica peninsula were used in this work.

681 EWING, M, J.I. EWING, and M. TALWANI (1964) Sediment distribution in the oceans: the Mid-Atlantic Ridge; Geol. Soc. Amer. Bull., v. 75, 17-35.

Three crossings of the Mid-Atlantic Ridge with the seismic profiler showed (1) that the sediment accumulation is small, averaging 100-200 m, (2) on two of the three crossings the sediments were mainly in level-surfaced pockets suggesting that sediment deposited on the Ridge flows easily, (3) where impounded, ridge sediments develop cohesiveness and will not flow easily if tilted, (4) the sediments are remarkably transparent acoustically, (5) on some of the lower flanks distorted sedimentary bodies indicate post-depositional tectonic activity, (6) the basement surface is rough from the crest out to beneath the basin sediments, and (7) the upper surface of the 5 km/sec intermediate layer constitutes the upper 1-3 km of the oceanic crust. On the V-17 crossing Buenos Aires to Dakar, the sediment tends toward uniform thickness. Evidently they are mainly pelagic and that seen on the profiler records is the total deposited. Cores and photographs provide information about currents, tectonic activity, sediment composition and distribution where it is too thin to be measured by the profiler. Total accumulation appears to be small compared to that inferred from currently-accepted estimates of Cenozoic rates of deposition, but the relative amounts of carbonate and red clay conform to the accepted ratio. (From authors' abstract)

Note: VEMA-17 crossings Buenos Aires to Dakar and Dakar to Halifax form the basis of this paper. Profiler records from Buenos Aires to Halifax are shown, - and from Dakar to Halifax sub-bottom interfaces are sketched in on PDR records. VEMA-17 cores 148-157 and 162-175 are discussed.

681 EWING, M. (See EWING, J.I., M. TALWANI, and M. EWING, 1964)

862 EWING, M. (See CONOLLY and EWING, 1965)

511 EWING, M, (See EWING, J. and M. EWING, 1961)

895 EWING, M. (See EWING, J., TALWANI, and M. EWING, 1968)

546 EWING, M. (See EWING, J., WORZEL, and M. EWING, 1962)

999 EWING, M. (See EWING, J., TALWANI, M. EWING, and EDGAR, 1967)

513 EWING, M. (See GERARD and M. EWING, 1961)

970 EWING, M. (See GROOT, J.J., C.R. GROOT, EWING, BURCKLE, and CONOLLY, 1967)

887 EWING, M. (See SAITO, EWING, and BURCKLE, 1966)

771 EWING, M. (See TALWANI, LE PICHON and EWING, 1965)

549 EWING, M. and L. ENGEL (1962) Seismic shooting at sea; Scientific American, v. 206, no. 5, 116-126.

The shipboard technique used on VEMA-17 as well as on many other cruises, for two-ship refraction measurements, is described in considerable detail in this paper. Seismic reflection profiling, using explosive charges as the sound source (as was done on VEMA-17) is also described and shown in photographs. A VEMA-17 hydrophone record and a portion of profiler record are shown. Seismic reflection profiles have shown that the second layer, not always detectable by refraction shooting, lies everywhere beneath the sea. Its surface is quite rough.

555 EWING, M. and J. EWING (1962) Rate of salt-dome growth; Amer. Assoc, Petr. Geol. Bull., v. 46, 708-709.

During VEMA cruise 17, in January 1961, seismic reflection profiler records revealed, in an investigation of the Sigsbee Knolls, 20 structures, most of which crested at depths up to several hundred meters below bottom. These structures are judged to be piercement salt domes, whose rate of growth is somewhat larger than 1 mm per year.

584 EWING, M. and J. EWING (1963) Sediments at proposed LOCO drilling sites; J. Geophys. Res., v. 68, 251-256.

Several sites have been proposed for drilling into the deep sea floor with the object of obtaining long sediment cores and samples of basement rock. Seismic profiler data are presented from traverses near the proposed sites to indicate the general features of the sediment layering and of the basement surface. These data show a large degree of nonuniformity in the distribution of sediments and emphasize the necessity of seismic profiler surveys before the drilling sites are selected. (Authors' abstract)

781 EWING, M. and J. EWING (1965) The sediments of the Argentine Basin; Acad. Bras. Ciencias, v. 37, 31-61.

The seismic profiling technique, using explosives, as on VEMA-17, is described in detail. Horizon A and Horizon B, as well as the "transparent" sediments in the Argentine Basin, are discussed, based partly on the V-17 profiler records. The gully wall shown in camera station V-18-57, taken in a small canyon at about 3000 fm, demonstrates that the canyon is the result of erosion and is one of those through which sand like that in core V-17-128 was transported to the modern abyssal plain. On the basis of core V-17-121, the post-glacial sedimentation rate is believed to be 17 mm/10 yrs.

1161 EWING, M., J.I. EWING, R.E. HOUTZ, and R. LEYDEN (1968) Sediment distribution in the Bellingshausen Basin; in "Symp. Antarctic Oceanog., 1966," Scott Polar Research Institute for SCOR, W. Herrer & Sons, Ltd., Cambridge, England, 89-100.

The Bellingshausen sediment body was found to be in all respects typical of major sediment

1616 FORNS, J.M. (See BE, FORNS and ROELS, 1971)

513 GERARD, R. and M. EWING (1961) A large volume water sampler; Deep-Sea Res., v. 8, 229-301

The large-volume water sampler used on VEMA is described in detail, with diagrams, photographs, and a description of shipboard operation. The authors note that with the increase in the number of active geochemical programs, which require samples in minimum volumes of about 200 litres, it would be desirable for the various groups to standardize their equipment and techniques. The large-volume water sampler was used in the collection of the 76 water barrel samples taken on VEMA-17.

719 GROOT, C.R. (See GROOT, J.J. and C.R. GROOT, 1964)

1008 GROOT, C.R. (See GROOT, J.J. and C.R. GROOT, 1966)

970 GROOT, C.R. (See GROOT, J.J., C.R. GROOT, EWING, BURCKLE, and CONOLLY, 1967)

719 GROOT, J.J. and C.R. GROOT (1964) Quarternary stratigraphy of sediments of the Argentine Basin - a palynological investigation; Trans. New York Acad. Sci., v. 26, 881-886.

Quarternary climatic changes as recorded in the pollen record preserved in deep-sea cores containing Pleistocene and post-glacial peats and other sediments of continental facies are discussed. Samples were obtained from abyssal plain sediments at some distance off-shore where it is assumed deposition is slow and that the pollen grains represent the vegetation of a considerable region. A number of cores were examined in the Argentine Basin to determine the vegetational changes during the time represented by the length of the cores. (From authors' abstract)

Note: Cores V17-121, 126, and 127 were analyzed.

1008 GROOT, J.J. and C.R. GROOT (1966) Pollen spectra from deep-sea sediments as indicators of climatic changes in southern South America; Marine Geol., v. 4, 525-537.

Quarternary climatic changes in southern South America are interpreted mainly on the basis of pollen spectra from deep-sea sediment cores - V-17-121 from the southwest Atlantic and V-17-50 from the southeast Pacific. Carbonate content, diatom assemblages and ice-rafted material have also been utilized. The combined evidence indicates that central and southern Chile and the Andean region of Argentina have experienced alternating "warm-dry" and "cool-moist" periods throughout the Quarternary and probably the latest Tertiary as well; however, the pollen spectra from that period suggest generally milder climatic conditions. During Quarternary time the region east of the Andes remained semi-arid. (From authors' abstract)

970 GROOT, J.J., C.R. GROOT, M. EWING, L. BURCKLE, and J.R. CONOLLY (1967) Spores, pollen, diatoms and provenance of the Argentine Basin sediments; in "Progress in Oceanography",

970 v. 4, Pergamon Press, 179-217.

The Argentine Basin contains the largest abyssal sediment deposit in the world with a mean sediment thickness of about 2 km. In order to investigate the stratigraphy and rate of deposition of the sediments within reach by present coring techniques, pollen, spores, and diatoms were studied. The pollen stratigraphy is characterized by the occurrence of three types of pollen spectra, two of which indicate the alternation of glacial and interglacial stages and a third one representing the postglacial stage. Postglacial sedimentation rates and provenance are discussed. (From author's abstract)

Note: Detailed description of the following cores is given: V-17-107,121, 123, 124, 126, 127, and 128.

596 HARRISON, J.C. (See WORZEL and HARRISON, 1960)

968 HAYES, D.E. (1966) A geophysical investigation of the Peru-Chile Trench; Marine Geol., v. 4, 309-351.

Twenty-six profiles of topography, free-air anomaly, and total intensity magnetic anomaly across the Peru-Chile Trench are presented and discussed. Much of the data was obtained during the V-17 Cruise. The Trench can be broadly divided into two main provinces; the main sediment-free province which extends from 8°S to 32°S and the sedimentary province which extends from 33°S to 57°S. Three other minor provinces are also defined. Studies incorporating seismic refraction and reflection measurements and gravity measurements indicate a pronounced crustal thinning beneath the offshore flank of the trench. It is suggested that the trench may originate by high angle, normal faulting near the base of the continental slope accompanied by a downward flexure of the crust further offshore. Gravity data indicate that there are no radical variations in the crustal structure along the entire length of the western continental margin of South America. The magnetic anomalies along the coast are also discussed. (Author's abstract)

973 HAYES, D.E. (1966) The Peru-Chile Trench; Geol. Survey Canada Paper 66-15, 238-243.

Twenty-six profiles of topography, free-air gravity anomaly and total intensity magnetic anomaly across the Peru-Chile Trench are presented. The trench extends as a continuous topographic deep approximately from latitude 4°N to 40°S. Seismic reflection profiles and a well-defined negative gravity belt indicate that the trench structure continues at least as far south as the Drake Passage near latitude 70°W. East of this area the trench structure is terminated or interrupted by a northerly trending topographic ridge. Magnetic anomalies cannot be correlated over large distances.

Note: Seismic refraction and reflection measurements and gravity measurements taken aboard VEMA Cruise 17 were used in this investigation.

680 HAYES, D.E., J.L. WORZEL, and H. KARNICK (1964) Tests on the 1962 model of the Anschutz Gyrotable; Jour. Geophys. Res., v. 69, 749-757.

The Anschutz gyrotable is a stabilization device built for use at sea in maintaining measuring equipment level independent of the movements of the vessel. It was developed especially for purposes of stabilization of the Askania sea gravimeter. Tests and results are discussed for laboratory-simulated sea conditions and actual ship motion aboard the R.V. VEMA.

1075 HAYES, D.E. (See HEIRTZLER and HAYES, 1967)

813 HAYS, J.D. (1965) Radiolaria and late Tertiary and Quaternary history of the Antarctic seas; in "Biology of the Antarctic Seas II" Antarctic Res. Series 5, Amer. Geophys. Union, 125-184.

The Antarctic Polar Front exerts a powerful influence on the distribution of Radiolaria in the southern seas. This influence is seen in the sediments somewhat north of the mean position of the Front, as a mixed zone which forms a transition from Antarctic species confined to the cold waters south of the Front to warm-water species north of the Front, most of which are cosmopolitan. The mixed zone may be caused by mixing of Antarctic and sub-Antarctic surface waters or by the northward transport of the tests of dead Antarctic species in the intermediate or bottom waters. The contrast between the

813 fauna north and south of the mixed zone is great. Due to hiatuses, 19 cores reach sediments containing specimens living in Antarctic waters today. On the basis of these species, four faunal zones are recognized. In cores south of the Polar Front, the boundary between the lower two faunal zones is marked not only by a striking faunal change but also by a change from red clay to overlying diatom ooze. This boundary is correlated with a boundary labeled Pliocene-Pleistocene in other parts of the ocean by previous workers. It is believed that the lithologic change in Antarctic sediments was caused by the deterioration of climatic conditions that eventually produced glaciation on Antarctica. (Author's abstract)

Note: Specimens from cores V-17-88, 91, 92, 93, 121, 122, 123, 124, and 127 were used.

673 HEEZEN, B.C. and C.L. DRAKE (1963) Gravity tectonics, turbidity currents and geosynclinal accumulations in the continental margin of eastern North America; Univ. Tasmania Symp., p. D1-10.

Geophysical and geological investigations on the continental margins have allowed the delineation of sedimentary accumulations of geosynclinal magnitude. An attempt to understand the processes of sedimentation in geosynclines is made by an investigation and analysis of the processes active today in areas of present undeformed geosynclinal accumulations. The effects of turbidity currents and gravity tectonics are

673 discussed. Seismic reflection profiles from the Grand Banks region made on VEMA-17 were used extensively in the study of sedimentary features at the base of the continental slope. (From authors' abstract)

684 HEEZEN, B.C. and C.L. DRAKE (1964) Grand Banks slump; Amer. Assoc. Petr. Geol., v. 48, 221-233.

The Heezen and Ewing (1952) hypothesis that the many submarine cable failures which occurred during and for 13 hours after the major earthquake-triggered turbidity currents, did not explain why within the epicentral area all cables failed at the instant of the earthquake. Unexplained was the fact that the southernmost cable which broke at the instant of the earthquake lay but 10 miles from the cable which broke 59 minutes later. VEMA-17 seismic profiles through the epicentral area gave evidence of a large gravity slump. Apparently two gravitational phenomena were initiated by the earthquake (1) the Grand Bahamas slump which is shown in V-17 seismic profiler records and (2) the Grand Banks turbidity current which flowed downslope following several channels. The turbidity currents were probably generated by slumps of a different character. A tracing of the seismic reflection profile made on the continental slope southeast of the Laurentian Channel is shown.

700 HEEZEN, B.C. and C. HOLLISTER (1963) Deep-sea current evidence from abyssal sediments; Marine Geol., v. 1, 141-174.

Relatively strong bottom currents in the deep sea can be inferred from sedimentary structures observed in bottom photographs and cores. The three types of deep sea sands and silts are turbidite, accretionary and residual. The latter two types are always associated with currents and in some areas turbidites are reworked by bottom currents. Traction velocities necessary for the transport of deep-sea sediment particles probably range from 4-60 cm/sec, velocities similar to those found through dynamic computations of geostrophic currents and observed by recent deep-sea direct current measurements. (Authors' abstract)

Note: Core V-17-198 from Labrador Sea showed cross-stratification.

1109 HEEZEN, B.C. (See RUDDIMAN and HEEZEN, 1967)

1003 HEEZEN, B.C. (See CONOLLY, NEEDHAM, and HEEZEN, 1967)

825 HEIRTZLER, J.R. (1965) Marine geomagnetic anomalies; Jour. Geomagnetism and Geoelectricity, v. 17, 227-236.

The criterion for separating the earth's main field from magnetic anomalies of crustal origin is reviewed. A concise resume of the nature of magnetic anomalies over the Mid-Atlantic Ridge, the anomalies caused by great elongated but unidentified bodies and the magnetic anomalies over seamounts is presented. (Author's abstract)

Note: Magnetic profiles from VEMA-17 are used.

863 HEIRTZLER, J.R., L.H. BURCKLE, and G. PETER (1966) Magnetic anomalies in the Gulf of Mexico; Jour. Geophys. Res., v. 71, 519-526.

A magnetic anomaly map of the Gulf of Mexico is presented in three parts. The patterns and possible geologic significance of the anomalies are discussed.

Note: Magnetic profiles from VEMA-17 are used.

1075 HEIRTZLER, J.R. and D.E. HAYES (1967) Magnetic boundaries in the North Altantic Ocean; Science, v. 157, 185-187.

Magnetic boundaries parallel the continental slope and separate undisturbed from disturbed magnetic regions on both sides of the North Atlantic. The boundaries lie 2000-2500 km from the axis of the Mid-Atlantic Ridge and roughly equidistant from it. The undisturbed zone, lying on the continental side of the boundaries, may reflect the long period of no reversals in magnetic polarity that occurred during the late Paleozoic. (Authors' abstract)

Note: VEMA-17 profiles of topography and magnetic anomaly between Dakar and Halifax were utilized.

815 HEIRTZLER, H.R. and X. LE PICHON (1965) Crustal structures of the mid-ocean ridges: Magnetic anomalies over the Mid-Atlantic Ridge; Jour. Geophys. Res., v. 70, 4013-4033.

Fifty-eight magnetic profiles of varying length were used in a study of the magnetic anomaly pattern over the Mid-Atlantic Ridge between 60°N and 42°S. It was found that there was a basic pattern to the magnetic anomalies. A large anomaly is everywhere associated with the axis of the ridge and is caused by a volcanic body of limited width and depth which has an upper surface at or very near to the sea floor. It is shown that the high heat flow over the Mid-Atlantic Ridge elevates the Curie-point isotherm to such an extent that an observable magnetic effect is produced. (Authors' abstract)

Note: Two profiles taken during the V-17 Cruise were used in this investigation.

1115 HEIRTZLER, J.R. (See HERRON and HEIRTZLER, 1967)

1115 HERRON, E.M. and J.R. HEIRTZLER (1967) Sea-floor spreading near the Galapagos; Science, v. 158, 775-780.

Seismicity, volcanism and a linear pattern of very large magnetic anomalies that show symmetry about a broad negative anomaly suggest that a type of sea-floor spreading occurs near the Galapagos Islands in the east-equatorial Pacific. This spreading results from the tensile stresses generated by different spreading directions of two adjacent segments of the East Pacific Rise, and it is suggested that the area be called the Galapagos Rift Zone.

Note: Topographic and magnetic profiles taken aboard VEMA-17 were used.

700 HOLLISTER, C. (See HEEZEN and HOLLISTER, 1963)

1161 HOUTZ, R.E. (See EWING, M., J. EWING, HOUTZ and LEYDEN, 1968)

680 KARNICK, H. (See HAYES, WORZEL, and KARNICK, 1964)

806 LANGSETH, M.G. (1965) Techniques of measuring heat flow through the ocean floor; in "Terrestrial Heal Flow", Geophysical Monograph No. 8, Amer. Geophys. Union, 58-77.

Heat flow through the ocean floor is determined by measuring the temperature gradient and thermal conductivity in ocean sediment. Techniques for these measurements are reviewed here, and some comments are made on procedure. Thermal conditions of the ocean bottom are also briefly examined. (Author's abstract)

Note: Diagrams show apparatus and methods as used on VEMA-17. (1) the outrigged temperature gradient probe attached to a Ewing piston corer, (2) schematic diagram of sensor and detecting circuit of the Ewing thermograd, (3) typical record of the outrigged probe apparatus, and (4) temperature vs depth graph derived from the record shown.

782 LE PICHON, X. and M. TALWANI (1964) Gravity survey of a seamount near 35°N 46°W in the North Atlantic; Marine Geol., v. 2, 262-277.

Continuous gravity profiles were obtained during VEMA Cruise 17 over a seamount near 35°N 46°W in the North Atlantic Ocean. The seamount consists of two peaks but there are

782 no individual Bouguer minima over each peak. Rather, a Bouguer minimum is centered over a saddle between the two peaks and cannot be attributed to a wrong choice of density in the Bouguer reductions. This minimum is interpreted as due to a secondary magma chamber. (From authors' abstract)

815 LE PICHON, X. (See HEIRTZLER and LE PICHON, 1965)

771 LE PICHON, X. (See TALWANI, LE PICHON and EWING, 1965)

1161 LEYDEN, R. (See EWING, M., J. EWING, HOUTZ, and LEYDEN, 1968)

1745 MAC CLINTOCK, C. (See BE, MAC CLINTOCK, and CURRIE, 1972)

1096 MC INTYRE, A. and A.W.H. BE (1967) Modern coccolithophoridae of the Atlantic Ocean: I. Placoliths and Cyrtoliths; Deep-Sea Res., v. 14, 561-597.

Although there are more than 70 species of coccolithophoridae living in the Atlantic, only about 15 of these have adequate fossil records, mainly placoliths and to a lesser extent cyrtoliths. Biogeographic ranges determined from surface sediment and plankton samples show that living species have slightly broader distributional ranges than those preserved in oceanic sediments. This is attributed to rapid warming of the Atlantic since the last glacial age. Species distributions have been delineated by maximum position poleward of the limiting isotherm

1096 for cold water species. Dispersion beyond their present boundaries by ocean currents after death is negligible. The species are grouped into five climatic assemblages: tropical, subtropical, transitional, subarctic, and subantarctic. (Authors' abstract)

Note: Cores VEMA-17-154, 155, 165, and 198 were used in this study.

667 NAFE, J.E. (See DRAKE, CAMPBELL, SANDER, and NAFE, 1963)

1003 NEEDHAM, H.D. (See CONOLLY, NEEDHAM and HEEZEN, 1967)

552 OLIVER, J. (1962) A worldwide storm of microseisms with periods of about 27 seconds; Bull. Seismol. Soc. Amer., v. 52, 507-517.

Ultra-sensitive seismographs at Palisades detected a storm of microseisms with periods of about 28-20 seconds and a duration of about 2 days in June 1961. The seismic waves appear to be largely of the Rayleigh type and seem to originate in the southern or equatorial Atlantic Ocean. The favored hypothesis on the nature of the source mechanism suggests that the seismic waves were generated by dispersed ocean waves striking the coast of the Gulf of Guinea. A second hypothesis suggests that they are a form of harmonic tremor associated with magmatic activity beneath the South Atlantic Ocean. (From author's abstract)

Note: VEMA-17 encountered a storm at a time such that the storm-generated waves would reach the coast of the Gulf of Guinea at the time of the microseism storm. The Chief Scientist on VEMA suggested this storm as the cause of the microseisms and provided meteorolgical data.

863 PETER, G. (See HEIRTZLER, BURCKLE, and PETER, 1966)

1616 ROELS, O.A. (See BE, FORNS and ROELS, 1971)

1164 RUDDIMAN, W.F. (1968) Historical stability of the Gulf Stream meander belt: foraminferal evidence; Deep-Sea Res., v. 15, 137-148.

The tests of four equatorial species of planktonic Foraminfera found in surface sediments delineate by percentage abundance contours the meander belt of the late Holocene Gulf Stream eastward from Cape Hatteras to 40°W. This band of faunal influence is only slightly wider than the meander belt observed over the past two decades, and it terminates in the same area where the surface expression of the Gulf Steam markedly weakens. Three resistant Gulf Stream indicator species are apparently transported to the south along the continental margin and selectively concentrated by a near-bottom contour current (the Western Boundary undercurrent). (Author's abstract)

Note: VEMA 17 cores 1, 164, 165, 167, 209, and 211 were used.

1109 RUDDIMAN, W.F. and B.C. HEEZEN (1967) Differential solution of planktonic foraminifera; Deep-Sea Res., v. 14, 801-808.

Variations of foraminiferal abundance in

1109 sediments deposited in shallow oceanic depths may give relatively accurate indications of the surface ecolgy at the time of deposition. In deeper realms such variations are largely a product of differential solution among species. This leads to preferential enrichment of resistant, deep-dwelling species and to selective elimination of fragile surface-inhabiting individuals. The shallowest depth at which differential solution is effective in Equatorial Atlantic sediments is at present 4000 m. Most faunal assemblages in depths greater than 4500 m are differentially dissolved, and in depths greater than 5000 m all show severe effects. (Authors' abstract)

Note: Core V17-157 was used to study abundances of foraminifera.

765 SACKETT, W.M. (1964) The depositional history and isotopic organic carbon composition of marine sediments; Marine Geol., v. 2, 173-185.

The total organic carbon in cores of Recent marine sediments has a great range due to the variation in the relative amounts of land and marine synthesized organic carbon. Sediments from the Gulf of Mexico abyssal plain as well as nearshore sediments show this extreme variability. Evidence is presented indicating that the C-13 content of the total organic carbon does not change after deposition and that the same variations as observed in the Recent should also be observed in the sediments back through Upper Paleozoic age. (Author's summary)

765 Note: The isotopic organic carbon composition from V17-127 (Argentine Basin) was determined and used in this investigation.

887 SAITO, T., M. EWING, and L.H. BURCKLE (1966) Tertiary sediment from the Mid-Atlantic Ridge; Science, v. 151, 1075-1079,

Lower Miocene microfossils occur in basaltic glass in two dredge hauls from the crestal area of the Mid-Atlantic Ridge near 30°N. From the ridge and adjoining hills 43 pre-Pleistocene cores were identified, including one Cretaceous and four Eocene. Dredgings and cores suggest that the upper layer of the crust of the ridge is constructed of layers of interbedded sediments and basalt flows. The data rule out the possibility of large-scale continental drifting or spreading of the ocean floor since lower Miocene. (Authors' abstract)

Note: Cores V-17-162, 163, and 166 were examined for this study.

667 SANDER, G. (See DRAKE, CAMPBELL, SANDER, and NAFE, 1963)

1185 SHERIDAN, R.E. and C.L. DRAKE (1968) Seaward extension of the Canadian Appalachians; Canadian Jour. Earth Sci., v. 5., 331-373.

The subsurface geology of the Gulf of St. Lawrence and of the continental shelf off Nova Scotia and Newfoundland is interpreted primarily from the results of 37 seismic profiles. Seismic-refraction profiles show no indication of rifting

1185 or the rotation of Newfoundland away from Quebec. The seaward extension of the zone affected by the Acadian orogeny is characterized by highly metamorphosed basement with higher seismic velocities than the surrounding areas. Limited data indicates that the influence of the Acadian orogeny dies away about halfway across the shelf. The seaward extension of the Taconic orogenic zone is characterized by an intermediate crustal layer, at depths 3-12 km. This layer continues intact all the way to the continental slope of northeast Newfoundland. It was not observed on the Labrador shelf suggesting that the Appalachians continued straight rather than remaining marginal to North America. It is postulated that the Devonian (Acadian) orogenic belt was not continuous with a corresponding European orogen, but that the Ordovician (Taconic) orogeny may have persisted across into Europe. If this is correct, it implies the existence of a major rift at the Newfoundland slope during middle and late Paleozoic times. (From authors' abstract)

Note: VEMA-17/SACKVILLE profiles 100-200 were used in this study.

522 SQUIRES, D.F. (1962) Deep sea corals collected by the Lamont Geological Observatory. 3. Larvae of the Argentine scleractinian coral Flabellum curvatum Moseley; Amer. Mus. Novitates, No. 2078.

Considerable numbers of Flabellum curvatum were dredged on the continental shelf off Bahia Blanca, Argentina, during VEMA Cruise 17, Leg 11. Three specimens from Trawl V-17-74 were maintained alive aboard ship to study their reproductive behavior and development of larvae. The larvae of F. curvatum are compared with other described scleractinian larvae. (From author's abstract)

771 TALWANI, M., X. LE PICHON and M. EWING (1965) Crustal structure of the mid-ocean ridges: 2. Computed model from gravity and seismic data; Jour. Geophys. Res., v. 70, 314-352.

Seismic results have demonstrated that the crust under the mid-ocean ridges is not thicker than under the ocean basins. Seismic results also show that the velocity in the mantle immediately under the ridge flanks is normal, but that it is low under axial zones, indicating an anomalous mantle. In order for gravity and seismic results to agree, the anomalous mantle is postulated to extend to the flanks below the normal mantle observed by seismic refraction measurements. A model computed on the basis of continuous gravity measurements over the Mid-Atlantic Ridge and the seismic refraction results is presented. (From authors' abstract)

Note: Continuous gravity measurements were made across the north Mid-Atlantic Ridge on VEMA Cruise 17.

782 TALWANI, M. (See LE PICHON and TALWANI, 1964)

681 TALWANI, M. (See EWING, J., M. EWING, and TALWANI, 1964)

999 TALWANI, M. (See EWING, J., TALWANI, and EDGAR, 1967)

895 TALWANI, M. (See EWING, J., TALWANI and M. EWING, 1968)

506 TIREY, G.B. (See EWING, J. and TIREY, 1961)

1526 TOLDERLUND, D.S. (See BE and TOLDERLUND, 1971)

1766 VERVOORT, W. (1972) Hydroids from the THETA, VEMA, and YELCHO cruises of the Lamont-Doherty Geological Observatory; No. 120, Brill, Leiden Netherlands, 247 p.

Fifty-one specimens of hydroids collected on VEMA-17 are among the 104 described in this study. The majority of these specimens originated on the continental shelf bordering Argentina, the Estrecho de Magellanes and Tierra del Fuego. This area is of great zoogeographical interest with a richly developed hydroid fauna which until recently has been little investigated. Trawl and dredge depths ranged from 25 - 3300 m. (From author's abstract)

Note: Used in these study were VEMA-17 standard bottom trawls 12, 13, 18-22, 24, 25, 29, 30, 32, 33, 38, 45, 47, 48, 57, 59, 62, 63, 66, 67, 69, 72, 75, 76, 78, 79, 88, 89, 91, 92, 100, 102, 107, 118, and 119, and rock dredges 12, 18, and 29.

596 WORZEL, J.L. and J.C. HARRISON (1960) Gravity at sea; in "The Sea". ed. M.N. Hill, Interscience Publ., New York, v. 3, 742-775.

The methods and theory of gravity surveying at sea are dsicussed. The gravitational method

596 is based on measuring the variation in the acceleratin due to gravity at the sea-level surface. This variation is caused by changes in the distribution of mass beneath the ship. Changes caused by variations in the depth of water can be corrected for, provided that precision depth soundings are taken during the gravity measurements. The variations in the corrected gravity anomaly are caused by density variations beneath the sea-bed. Gravity observations and their geological interpretations are discussed. (From authors' text)

546 WORZEL, J.L. (See EWING, J.I., WORZEL, and M. EWING, 1962)

680 WORZEL, J.L. (See HAYES, WORZEL, and KARNICK, 1964)

Bibliography (continued)

BOOK

The first six chapters of the book, PHYSICS AND CHEMISTRY OF THE EARTH, Vol. 8 (Ahrens, Press, Runcorn and Urey, Editors) constitute the series: "Sediment transport and distribution in the Argentine Basin." The contribution which the joint Argentine-Columbia University expedition VEMA 17-CAPITAN CANEPA 2 made to this study is summarized by Lonardi and Ewing, in Chapter 6, p. 255-256.

"... VEMA 17 - CAPITAN CANEPA 2 (1961). VEMA 17 was the first expedition on which Lamont's reflection profiler technique was used. The profiler work done on VEMA 17 in the Gulf of Mexico gave such promising results that a second set of equipment was made ready and installed on CAPITAN CANEPA for the cooperative program. During this campaign, horizon A was identified for the first time in the southern hemisphere. This also marked the first crossing of the 'ring structure', which was not, of course, completely delineated at that time. However, the profiler section of VEMA 17 showed that basement structure was continuous across the ring, proving that this feature resulted from controlled sediment deposition rather than from crustal deformation, meteor impact or explosion of any sort. Reflection profiling was done across the Scotia Arc. This VEMA-CANEPA expedition was not without suspense, for during a close range approach of the two vessels to exchange equipment, one of the ships drifted with the wind and they collided, fortunately with no serious consequences. After VEMA had departed for Dakar, CANEPA ran lines of soundings parallel to the continental margin in search of new canyons. A core taken by VEMA from a canyon wall was found to contain Cretaceous sediments and to be one of the oldest collected up to that time."

AHRENS, L. H., F. PRESS, S. I. RUNCORN and H. C. UREY, Editors (1971) Physics and Chemistry of the Earth, Vol. 8. Pergamon Press Ltd., Oxford.

1425 LE PICHON, X., S. L. EITTREIM, and W. J. LUDWIG (1971) Sediment transport and distribution in the Argentine Basin. 1. Antarctic bottom current passage through the Falkland fracture zone; in Physics and Chemistry of the Earth, v. 8, 1-28.

1426 LE PICHON, X. M. EWING and M. TRUCHAN (1971) Sediment transport and distribution in the Argentine Basin. 2.Antarctic bottom current passage into the Brazil Basin; in Physics and Chemistry of the Earth, v. 8, 29-48.

1427 EWING, M. S. L. EITTRIEM, J. I. EWING and X. LE PICHON (1971) Sediment transport and distribution in the Argentine Basin. 3. Nepheloid layer and processes of sedimentation; in Physics and Chemistry of the Earth, v.8, 49-77.

1428 LONARDI, A. G. and M. EWING (1971) Sediment transport and distribution in the Argentine Basin. 4. Bathymetry of the continental margin, Argentine Basin and other related provinces, canyons and sources of sediments; in Physics and Chemistry of the Earth, v. 8, 79-121.

1429 EWING, M., and A. G. LONARDI (1971) Sediment transport and distribution in the Argentine Basin. 5. Sedimentary structure of the Argentine margin, basin and related provinces;in Physics and Chemistry of the Earth. v. 8, 123-251.

1430 LONARDI, A.G. and M. EWING (1971) Sediment transport and distribution in the Argentine Basin. 6. Exploration and study of the Argentine Basin; in Physics and Chemistry of the Earth, v.8, 253-263.

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13. ABSTRACT

This technical report is a compilation of the data collected during Cruise 17 of the Research Vessel VEMA from December 1960 to September 1961 in the following disciplines: cores; heat flow-thermograd; bottom photography; geological sampling (dredge); trawl, water barrel; geochemistry-Strontium 90; hydrography; seismic refraction; and plankton.

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LAMONT-DOHERTY SURVEY OF THE WORLD OCEAN

General Editor, Manik Talwani

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Palisades, New York 10964

Underway Marine Geophysical Data in the North Atlantic June 1961 - January 1971

PART F: SEISMIC REFLECTION PROFILES

VEMA 27 Legs 01,02,03,04,05,06,07,08,09,12,13 and 14
VEMA 28 Legs 01,02,03,04,05,06,07 and 08
CONRAD 8 Legs 01,07 and 12
CONRAD 9 Legs 01,02,03,B11,12 and 13
CONRAD 10 Legs 01,03 and 12
CONRAD 11 Legs 01 and 12
CONRAD 12 Leg 01
CONRAD 13 Legs 09,10,11 and 12

by

John Ewing, Maurice Ewing, Charles Windisch, and Thomas Aitken

April 1974

Technical Report No. 9-CU-9-74
ONR Contract N00014-67-A-0108-0004

and

Technical Report No. 3-CU-3-74
National Science Foundation Grant GA 27281

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General Editor, Manik Talwani

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
PALISADES, NEW YORK 10964

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INTRODUCTION

This six-part report describes the underway marine geophysical data acquired by the Lamont-Doherty Geological Observatory during the period 1961-1971 in the North Atlantic aboard the Research Vessels VEMA and ROBERT D. CONRAD. The development of the seismic reflection profiler, the surface ship gravimeter, and the proton precision magnetometer gave an enormous impetus to marine geophysical work. Under the vigorous leadership of Maurice Ewing, the past director of this observatory, these instruments, together with the precision depth recorder, were used nearly continuously on VEMA since 1961 and on ROBERT D. CONRAD since 1963 to help provide the framework for an understanding of the geophysics of the world oceans. The study of the data that were acquired played a basic role in the development of the theories of sea floor spreading, of plate tectonics, and of sediment accumulation and transport which have revolutionized geological thinking.

This report presents the data obtained along about 350,000 n. miles of track. Copies of the seismic reflection profiler records, digitized gravity values, total magnetic intensity values, and soundings are available from the Marine Geology and Geophysics Group, Environmental Data Service - NGSDC, Washington, D. C. 20235.

ACKNOWLEDGMENTS

In addition to contracts Nonr 266(48), Nonr 266(65), Nonr 266(79), NObsr 85077, N00014-67-A-0108-0004, N00024-67-C-1186 and N00024-69-C-1184 with the Office of Naval Research,

the acquisition of data described in this report was supported by grants GA 444, GA 550, GA 580, GA 728, GA 774, GA 1299, GA 1415, GA 1434, GA 1615, GA 10728, GA 17644, GA 17761, GA 19030, GA 27281, GP 4896, GP 5392 and GP 5536 with the National Science Foundation, and grant SSF-8 with the New York State Science and Technology Foundation.

CRUISE INDEX

VEMA

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
1712	Buenos Aires, Argentina	26 Jun 61	Dakar, Senegal	18 Jul 61	4247.1	M. Talwani
1713	Dakar, Senegal	19 Jul 61	Halifax, Nova Scotia	06 Aug 61	3168.4	M. Talwani
1714*	Halifax, Nova Scotia	11 Aug 61	Halifax, Nova Scotia	15 Aug 61	0593.5	C. Drake
1715*	Halifax, Nova Scotia	18 Aug 61	Argentia, Newfoundland	25 Aug 61	1157.9	C. Drake
1716*	Argentia, Newfoundland	25 Aug 61	Halifax, Nova Scotia	17 Sep 61	3819.3	C. Drake
1717	Halifax, Nova Scotia	23 Sep 61	New York, New York	29 Sep 61	1090.3	J. Worzel
1801*	New York, New York	01 Dec 61	St. George, Bermuda	05 Dec 61	0800.8	J. Ewing
1802	St. George, Bermuda	06 Dec 61	San Juan, Puerto Rico	24 Dec 61	3604.3	J. Ewing
1803	San Juan, Puerto Rico	27 Dec 61	Recife, Brazil	19 Jan 62	4018.7	M. Langseth
1817	Cristobal, Panama C.Z.	28 Oct 62	Nassau, Bahamas	11 Nov 62	3057.3	C. Drake
1818	Nassau, Bahamas	14 Nov 62	St. George, Bermuda	25 Nov 62	1963.5	C. Drake
1819	St. George, Bermuda	25 Nov 62	New York, New York	07 Dec 62	2213.6	C. Drake
1901* **	New York, New York	21 Feb 63	St. George, Bermuda	26 Feb 63	0778.7	G. Bryan
1902*	St. George, Bermuda	28 Feb 63	St. Thomas, Virgin Is.	13 Mar 63	2136.1	G. Bryan
1903	St. Thomas, Virgin Is.	15 Mar 63	Cristobal, Panama C.Z.	25 Mar 63	1965.4	M. Talwani
1912	Cape Town, S. Africa	20 Sep 63	Abidjan, Ivory Coast	24 Oct 63	5333.0	M. Ewing
1913	Abidjan, Ivory Coast	15 Nov 63	New York, New York	11 Dec 63	5226.9	C. Drake
2001*	New York, New York	13 Feb 64	San Juan, Puerto Rico	24 Feb 63	2324.8	C. Windisch
2002	San Juan, Puerto Rico	02 Mar 64	Cristobal, Panama C.Z.	16 Mar 64	2960.0	M. Talwani
2012	Recife, Brazil	11 Nov 64	St. George, Bermuda	03 Dec 64	4126.3	C. Drake
2013	St. George, Bermuda	05 Dec 64	New York, New York	10 Dec 64	0841.2	C. Drake
2101	New York, New York	11 Feb 65	Miami, Florida	25 Feb 65	2303.2	J. Worzel
2103	Miami, Florida	28 Feb 65	Cristobal, Panama C.Z.	12 Mar 65	2290.3	J. Worzel
2114	Cristobal, Panama C.Z.	14 Nov 65	New York, New York	10 Dec 65	5005.7	J. Ewing
2201	New York, New York	10 Jan 66	San Juan, Puerto Rico	27 Jan 66	3044.3	C. Windisch
2202	San Juan, Puerto Rico	30 Jan 66	Recife, Brazil	16 Feb 66	3600.4	M. Talwani
2206	Cape Town, S. Africa	26 Apr 66	Dakar, Senegal	23 May 66	4922.1	M. Ewing
2207	Dakar, Senegal	25 May 66	New York, New York	13 Jun 66	3865.7	T. Aitken
2301	New York, New York	27 Jul 66	Halifax, Nova Scotia	05 Aug 66	1711.2	C. Windisch
2302	Halifax, Nova Scotia	08 Aug 66	Reykjavik, Iceland	25 Aug 66	3520.5	C. Windisch
2303	Reykjavik, Iceland	27 Aug 66	Reykjavik, Iceland	15 Sep 66	4212.0	M. Talwani
2304	Reykjavik, Iceland	17 Sep 66	Glasgow, Scotland	11 Oct 66	5180.7	C. Windisch
2305	Glasgow, Scotland	15 Oct 66	Las Palmas, Canary Is.	03 Nov 66	3963.5	T. Aitken
2306	Las Palmas, Canary Is.	06 Nov 66	St. George, Bermuda	05 Dec 66	5711.7	J. Ewing
2307	St. George, Bermuda	08 Dec 66	New York, New York	15 Dec 66	1326.9	J. Ewing
2401	New York, New York	16 Jan 67	Miami, Florida	30 Jan 67	2717.4	J. Worzel
2402	Miami, Florida	31 Jan 67	Cristobal, Panama C.Z.	19 Feb 67	3904.2	J. Worzel
2413	Rio De Janeiro, Brazil	17 Nov 67	Miami, Florida	15 Dec 67	5664.9	R. Gerard
2501	Miami, Florida	05 Jan 68	Bridgetown, Barbados	05 Feb 68	5569.6	M. Langseth

* No Gravity
** No Magnetics

CRUISE INDEX (Continued)

VEMA (Continued)

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
2502	Bridgetown, Barbados	08 Feb 68	Paramaribo, Surinam	08 Mar 68	5197.9	D. Hayes
2503	Paramaribo, Surinam	11 Mar 68	New York, New York	02 Apr 68	3963.6	W. Pitman
2504	New York, New York	05 Apr 68	New York, New York	10 Apr 68	0977.5	S. Eittreim
2601*	New York, New York	24 Jul 68	St. George, Bermuda	16 Aug 68	4747.3	D. Epp
2602*	St. George, Bermuda	24 Aug 68	St. George, Bermuda	21 Sep 68	5559.3	T. Aitken
2603*	St. George, Bermuda	26 Sep 68	Dakar, Senegal	21 Oct 68	4799.6	T. Aitken
2604	Dakar, Senegal	26 Oct 68	Rio De Janeiro, Brazil	25 Nov 68	6237.3	M. Talwani
2607	Recife, Brazil	03 Feb 69	San Juan, Puerto Rico	28 Feb 69	5285.1	D. Hayes
2608	San Juan, Puerto Rico	05 Mar 69	Miami, Florida	05 Apr 69	5914.1	J. Worzel
2609	Miami, Florida	11 Apr 69	St. George, Bermuda	09 May 69	5209.6	T. Aitken
2610	St. George, Bermuda	12 May 69	Staten Island, N.Y.	18 May 69	1085.8	J. Ewing
2701	New York, New York	29 May 69	Halifax, Nova Scotia	15 Jun 69	2923.1	T. Aitken
2702	Halifax, Nova Scotia	20 Jun 69	Reykjavik, Iceland	16 Jul 69	4503.2	P. Rabinowitz
2703	Reykjavik, Iceland	19 Jul 69	Tromsø, Norway	06 Aug 69	3355.1	P. Rabinowitz
2704	Tromsø, Norway	10 Aug 69	Bergen, Norway	08 Sep 69	5436.0	M. Talwani
2705	Bergen, Norway	12 Sep 69	Bergen, Norway	19 Sep 69	1440.1	M. Talwani
2706	Bergen, Norway	20 Sep 69	Brest, France	16 Oct 69	4397.9	H. Poppe
2707	Brest, France	19 Oct 69	Lisbon, Portugal	18 Nov 69	5146.2	J. Worzel
2708	Lisbon, Portugal	21 Nov 69	Funchal, Madeira	02 Dec 69	1825.0	P. Fox
2709	Funchal, Madeira	03 Dec 69	Recife, Brazil	30 Dec 69	5180.3	J. Bonnin
2712**	Cape Town, S. Africa	13 Feb 70	Abidjan, Ivory Coast	12 Mar 70	5172.2	G. Bryan
2713	Abidjan, Ivory Coast	15 Mar 70	St. Vincent, C.Verde Is.	10 Apr 70	5211.5	W. Pitman
2714	St. Vincent, C.Verde Is.	13 Apr 70	New York, New York	10 May 70	5573.4	W. Pitman
2801	New York, New York	25 Jun 70	Reykjavik, Iceland	16 Jul 70	3825.2	C. Windisch
2802	Reykjavik, Iceland	18 Jul 70	Aalesund, Norway	03 Aug 70	2985.6	C. Windisch
2803	Aalesund, Norway	06 Aug 70	Trondheim, Norway	04 Sep 70	5760.6	M. Talwani
2804	Trondheim, Norway	10 Sep 70	Cork, Ireland	08 Oct 70	5114.7	J. Jones
2805	Cork, Ireland	11 Oct 70	St. George, Bermuda	02 Nov 70	4240.0	K. Hunkins
2806	St. George, Bermuda	06 Nov 70	St. George, Bermuda	21 Nov 70	2406.4	S. Lieber
2807	St. George, Bermuda	24 Nov 70	Kingston, Jamaica	23 Dec 70	5227.8	V. Renard
2808	Kingston, Jamaica	28 Dec 70	Cristobal, Panama C.Z.	08 Jan 71	1596.9	T. Aitken & M. Truchan

* No Gravity
** No Magnetics

CRUISE INDEX (Continued)

ROBERT D. CONRAD

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
0801	San Juan, Puerto Rico	26 Nov 63	Cape Town, S. Africa	29 Dec 63	6569.7	R. Wall
0807	Cristobal, Panama C.Z.	21 Apr 64	San Juan, Puerto Rico	02 May 64	1974.1	J. Ewing
0812	San Juan, Puerto Rico	05 Aug 64	New York, New York	22 Aug 64	2964.9	C. Fray
0901	New York, New York	17 Oct 64	Galveston, Texas	10 Nov 64	4379.8	J. Heirtzler
0902	Galveston, Texas	12 Nov 64	Kingston, Jamaica	08 Dec 64	5348.1	M. Ewing
0903	Kingston, Jamaica	10 Dec 64	Colon, Panama C.Z.	16 Jan 65	6762.6	M. Talwani
9B11	Port Said, Egypt	14 Jul 65	Naples, Italy	26 Jul 65	2302.9	M. Ewing
0912	Naples, Italy	29 Jul 65	Plymouth, England	23 Aug 65	4749.8	M. Ewing
0913	Plymouth, England	27 Aug 65	New York, New York	21 Sep 65	5514.8	R. Houtz
1001	New York, New York	01 Dec 65	Kingston, Jamaica	24 Dec 65	4196.9	J. Heirtzler
1003	Kingston, Jamaica	28 Dec 65	Cristobal, Panama C.Z.	25 Jan 66	5707.1	R. Wall
1012	Cristobal, Panama C.Z.	13 Sep 66	New York, New York	15 Oct 66	6329.4	R. Leyden
1101*	New York, New York	01 Dec 66	Recife, Brazil	22 Dec 66	4257.3	D. Hayes
1112	Cristobal, Panama C.Z.	21 Oct 67	New York, New York	12 Nov 67	3543.1	S. Eittreim & W. Ryan
1201	New York, New York	03 Jan 68	Cristobal, Panama C.Z.	04 Feb 68	5534.6	C. Windisch
1309	Cristobal, Panama C.Z.	20 Jun 70	Cartagena, Colombia	23 Jun 70	0417.1	W. Ludwig
1310	Cartagena, Colombia	26 Jun 70	Port-of-Spain, Trinidad	26 Jul 70	4546.3	W. Ludwig
1311	Port-of-Spain, Trinidad	31 Jul 70	Abidjan, Ivory Coast	31 Aug 70	5461.6	R. Markl
1312	Abidjan, Ivory Coast	02 Sep 70	Mossamedes, Angola	01 Oct 70	5131.5	R. Leyden

* No Gravity

SEISMIC REFLECTION PROFILING INSTRUMENTATION

Continuous seismic reflection profiling was initiated during VEMA Cruise 17. The first generation of equipment and techniques was described by Ewing and Tirey (1961). The acoustic pulses were generated by firing small explosive charges (usually 1/2# TNT) every 2-3 minutes, and the reflections were received by a single hydrophone, whose cable was payed out for each shot to achieve a satisfactory signal/noise ratio. Normally the charges were fired at a depth of about 10 meters and produced a signal that was prolonged by oscillations of the explosion gas bubble. When optimum resolution was required, the charges were floated at approximately 0.5 meters depth to eliminate this effect. Careful examination of the echo patterns will usually indicate to the practiced reader which method of shooting was employed.

The explosive technique was discontinued after cruises VEMA 20 and CONRAD 8, following the development of a pneumatic sound source (Ewing and Zaunere, 1964). The lower power of the air gun was, to a large extent, offset by greater data density (pulse interval approximately 10 sec), and in most deep sea regions this technique produced a record with better detail than had been possible with explosive sources. However recording very thick sediment sections with the air gun requires reducing the ship speed substantially below normal cruising speed in order to improve signal/noise ratio, and, with a few exceptions, this was not done. The standard air gun used for most of these measurements produces a broadband sound pressure level of about +124 db with the principal spectral peak near 18-20 Hz.

The single hydrophone, cable-slacking technique was discontinued as soon as towed hydrophone array development had met with some degree of success (Windisch and Ewing, 1967). The transition to towed arrays occurred at Singapore during VEMA Cruise 19 and at the beginning of CONRAD Cruise 7. Hydrophone array development has continued throughout the period covered by this report. Variable-reluctance or moving-coil hydrophones were used in the early arrays; a conversion to bimorph, or "bender," ceramic units was made approximately at the same time that the air gun sound source was developed. For the most part, array length (active) has been 50 or 100 feet, with an operating sensitivity of -80 to -70 db re. 1v/μbar. At normal cruising speed the optimum signal/noise ratio was found to be in the octave between 60 and 120 Hz, and most of the records presented were made using filter pass-bands in this range.

The shipboard seismic recording equipment has consisted of solid state preamplifiers made at LDGO, Kronhite band pass filters, and modified Times Facsimile Corp. variable density drum recorders. Standard practice has been to split the seismic input into four channels, which permits recording a variety of frequency pass-bands. The channel reproduced in this report was selected for optimum overall data content. Modifications of the recording equipment have tended to be in the direction of circumventing the relatively low dynamic range of the dry electro-sensitive recording paper by the utilization of non-linear circuits in the print amplifiers. Hence, the later records are usually superior to the earlier ones in displaying weakly-reflecting interfaces without overprinting the more prominent reflectors.

References

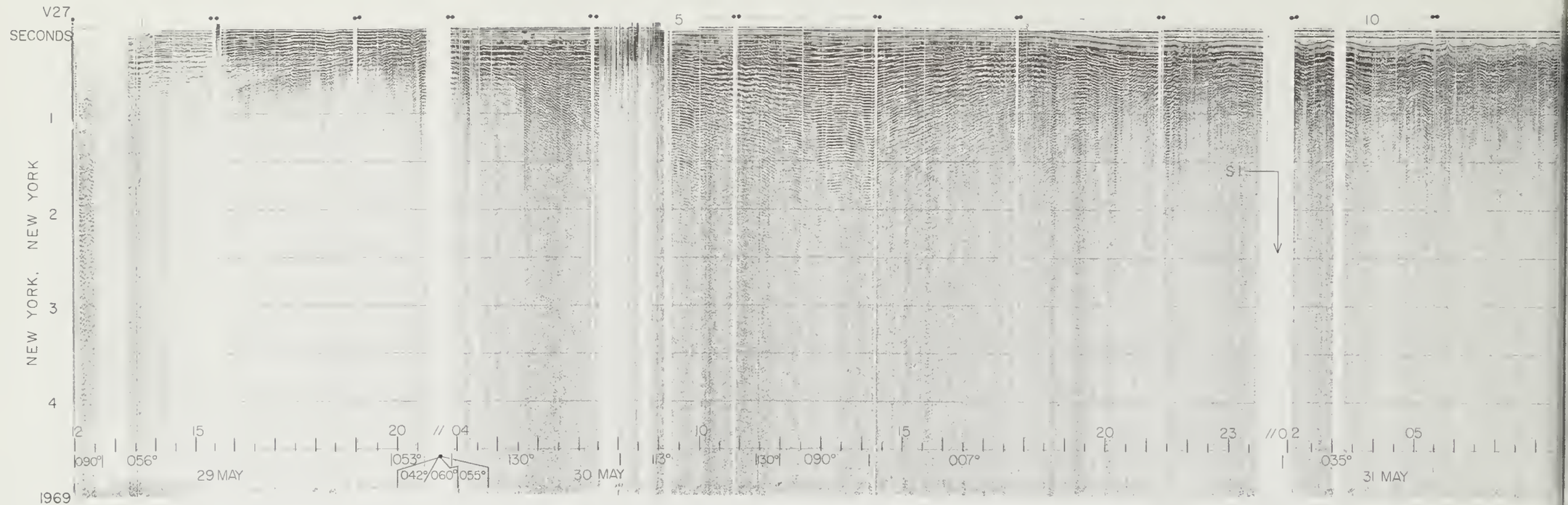
Ewing, J.I. and G.B. Tirey (1961) Seismic profiler; Jour. Geophys. Res., v. 66, no. 9, p. 2917-2927.

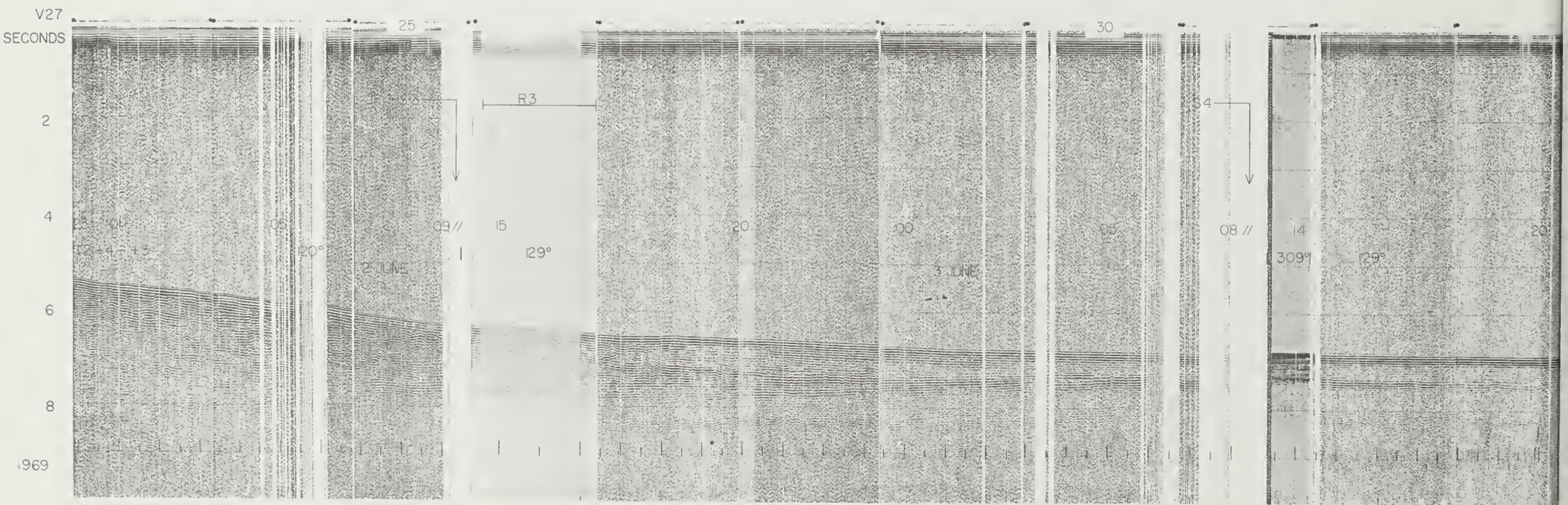
Ewing, J.I. and R. Zaunere (1964) Seismic profiling with a pneumatic sound source; Jour. Geophys. Res., v. 69, no. 22, p. 4913-4915.

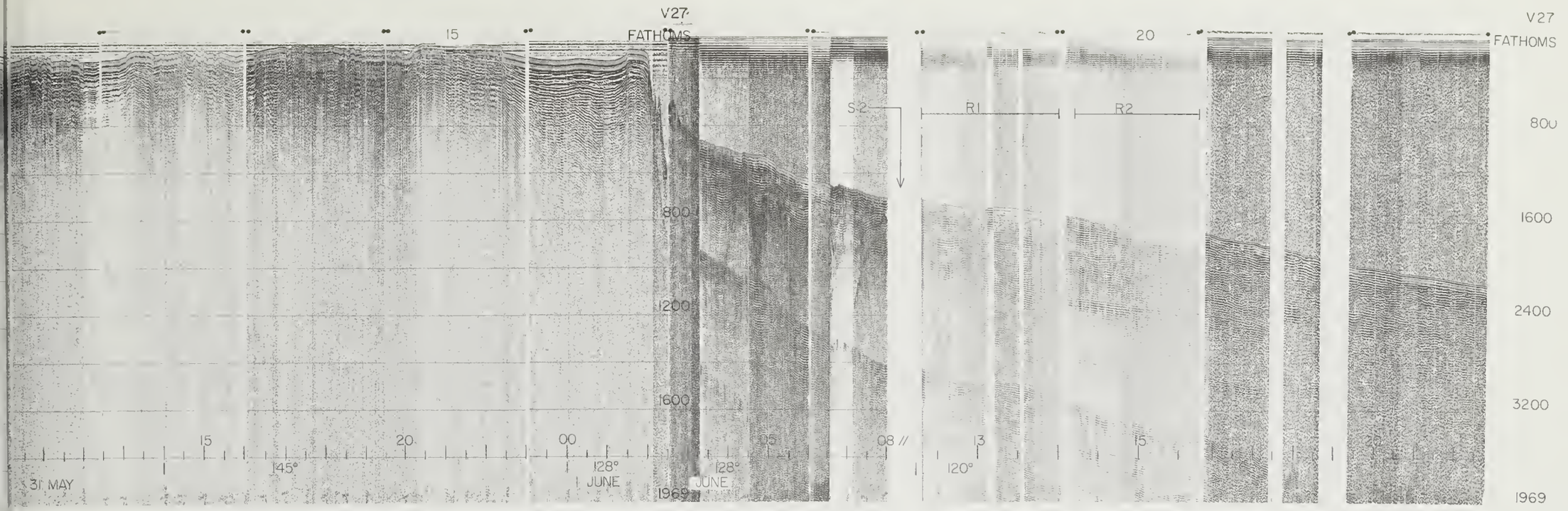
Windisch, C.C. and J.I. Ewing (1967) Some towed line hydrophone arrays for seismic profiling; Tech. Rept. no. 2, CU-2-67 Nonr 266(79), Tech. Rept. no. 9, CU-9-67 NObsr 85077, Tech. Rept. no. 1, CU-1-67, NAVSHIPS N000-24-67-C1186.

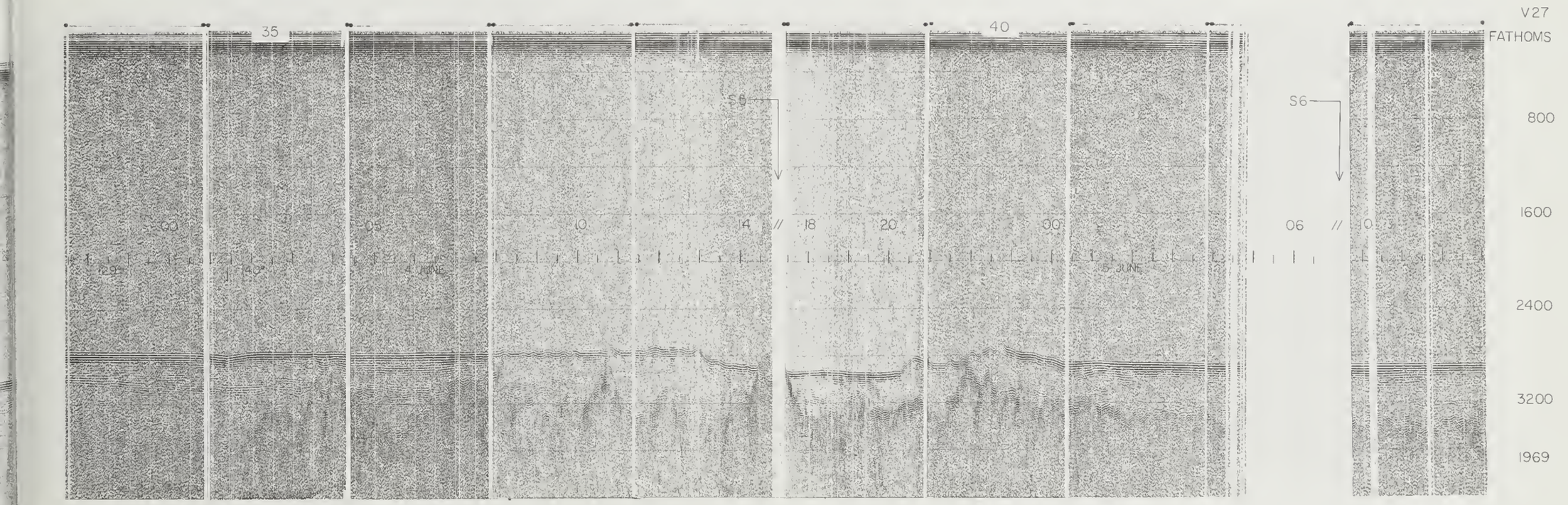
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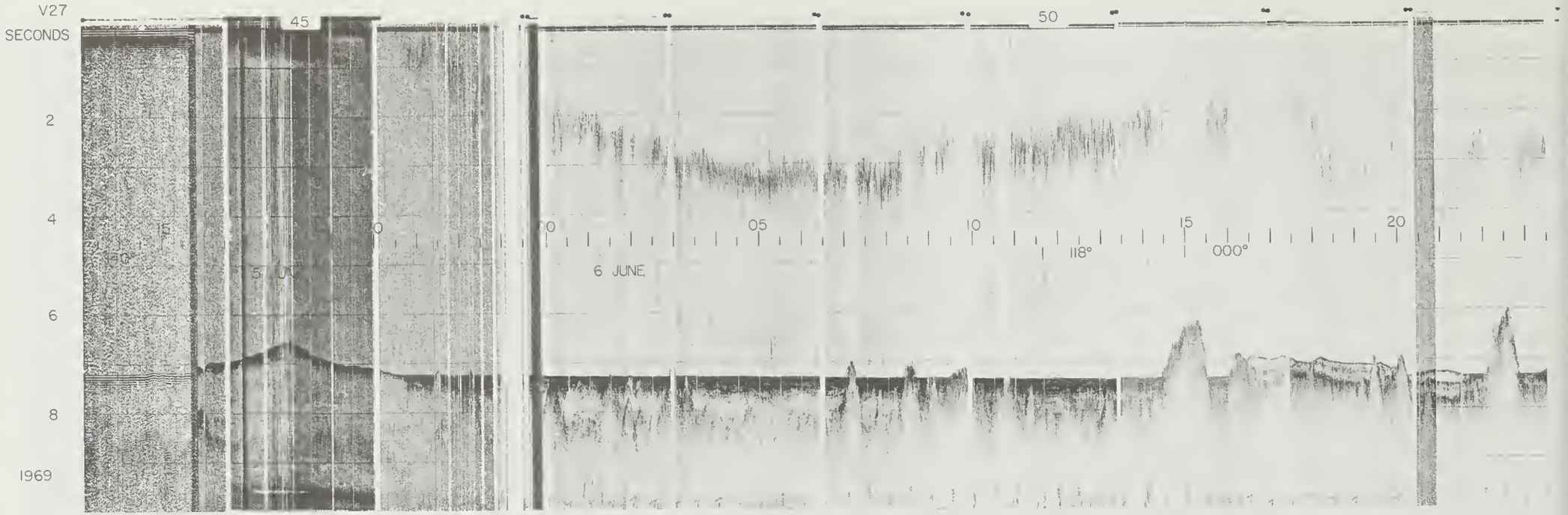
The profiler records are laid out across two facing pages so that the records start from the top left hand corner of the left page, go across the two pages to the top right hand corner of the right page. From there the record continues to the bottom left hand corner of the left page and then again across the two pages to the bottom right hand corner of the right page. The profiler record numbers are annotated at the top for every fifth record or so. Station numbers are annotated with an S and an arrow. Sonobuoy runs are indicated with an R. The left hand side of the left page is marked in seconds (two-way reflection time) and the right hand side of the right page is marked in nominal fathoms (assuming a speed of sound of 800 fathoms per second). The longer lines along the bottom of the page indicate hour marks and the shorter lines, half-hour marks. The course steered (which is in general slightly different from the adjusted course given in the navigation listings in Part A of this report) is also annotated next to vertical lines indicating changes of course. Dates and time zone changes are indicated at the bottom. The profiler records are plots with respect to time and therefore the vertical exaggeration is only constant as long as the ship's speed is constant. A further exception to this occurs when sonobuoys are shot and the profiler stylus traverses usually at twice the normal speed. Thus the time scale for the duration of the sonobuoy runs is multiplied by a factor of two and consequently the vertical exaggeration is reduced by the same factor. Two diagonal lines // at the bottom of the record indicate an interruption in the record.

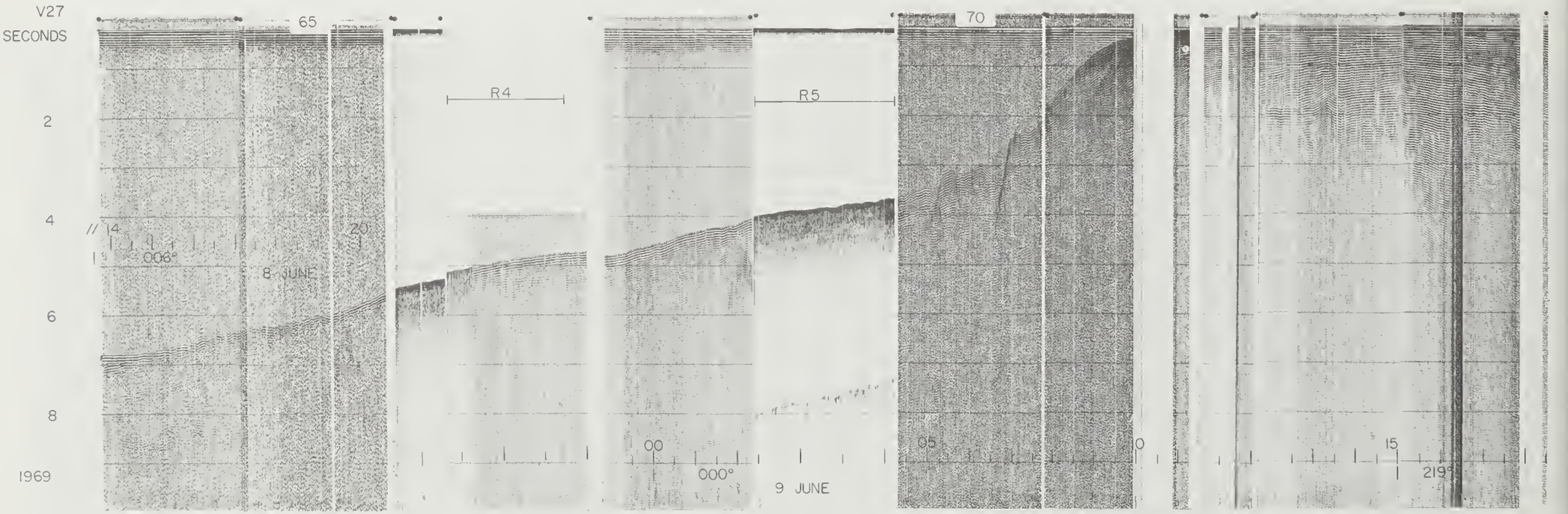

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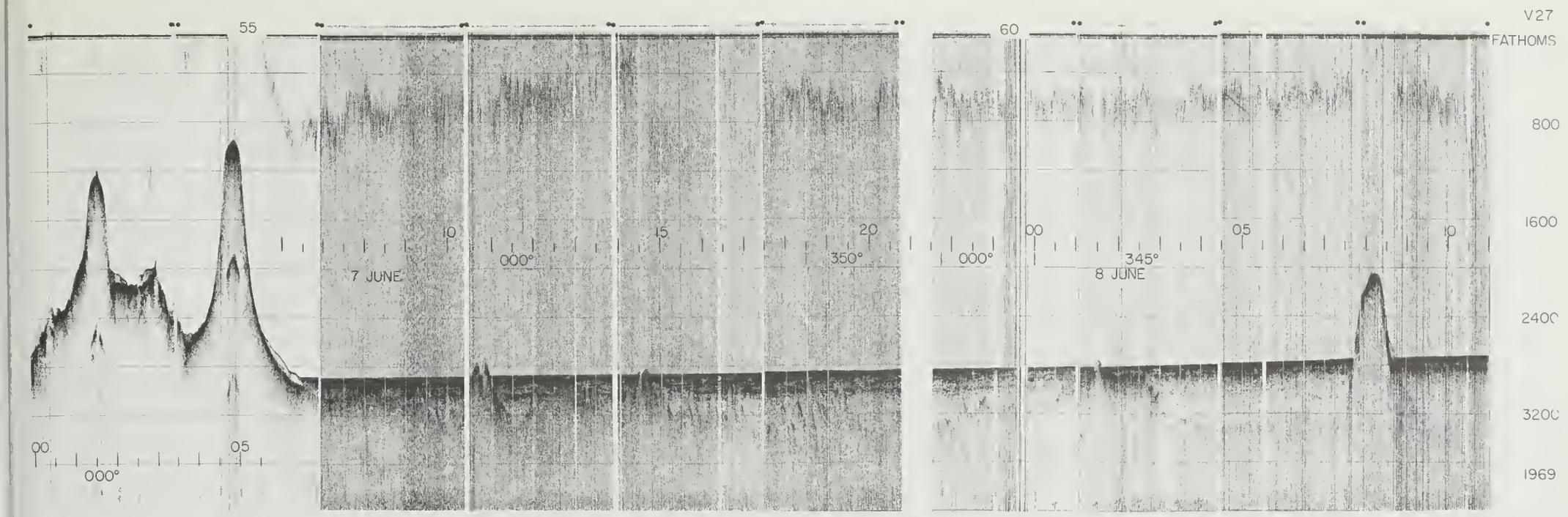

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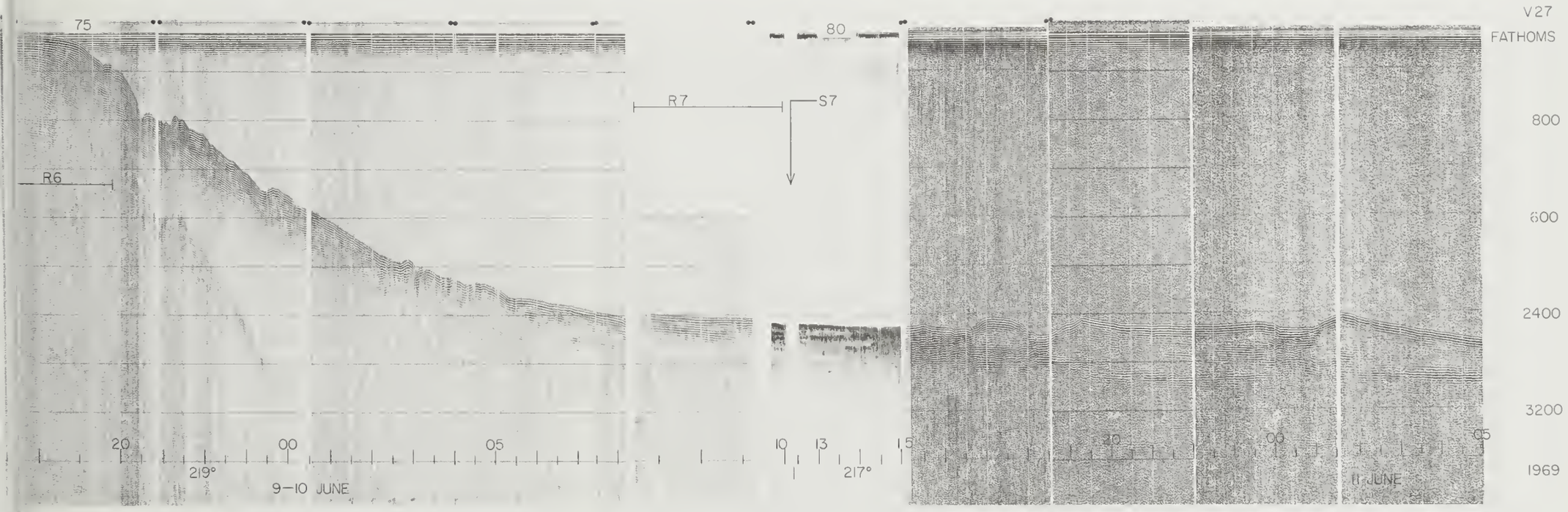

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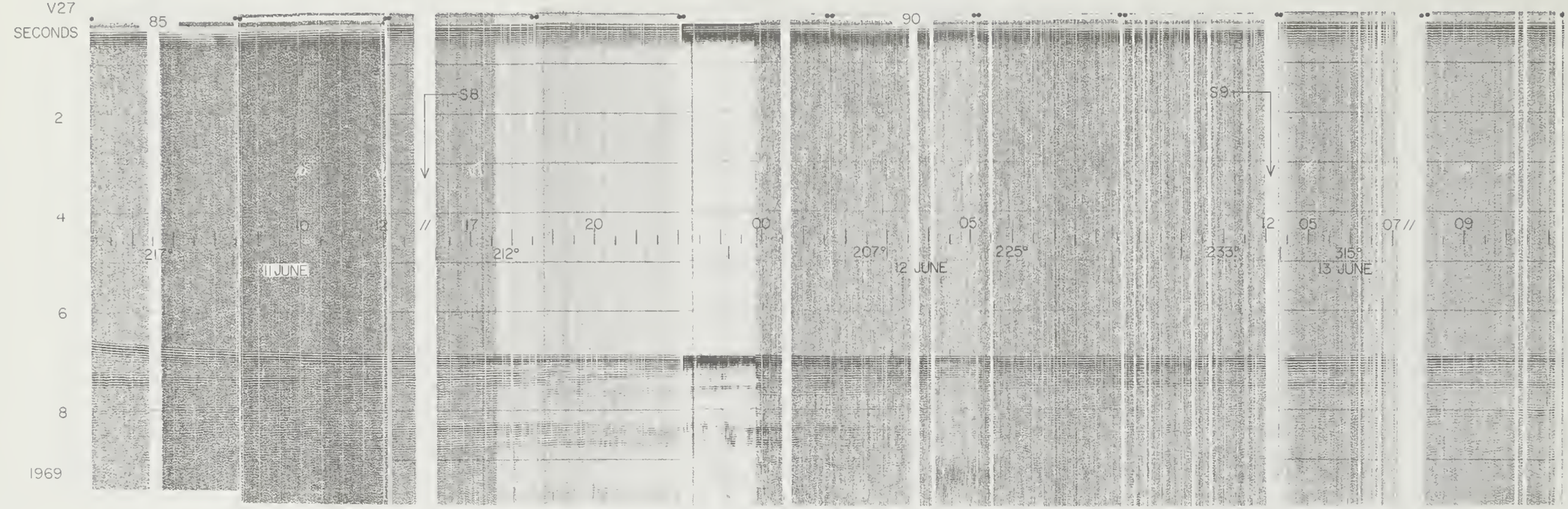

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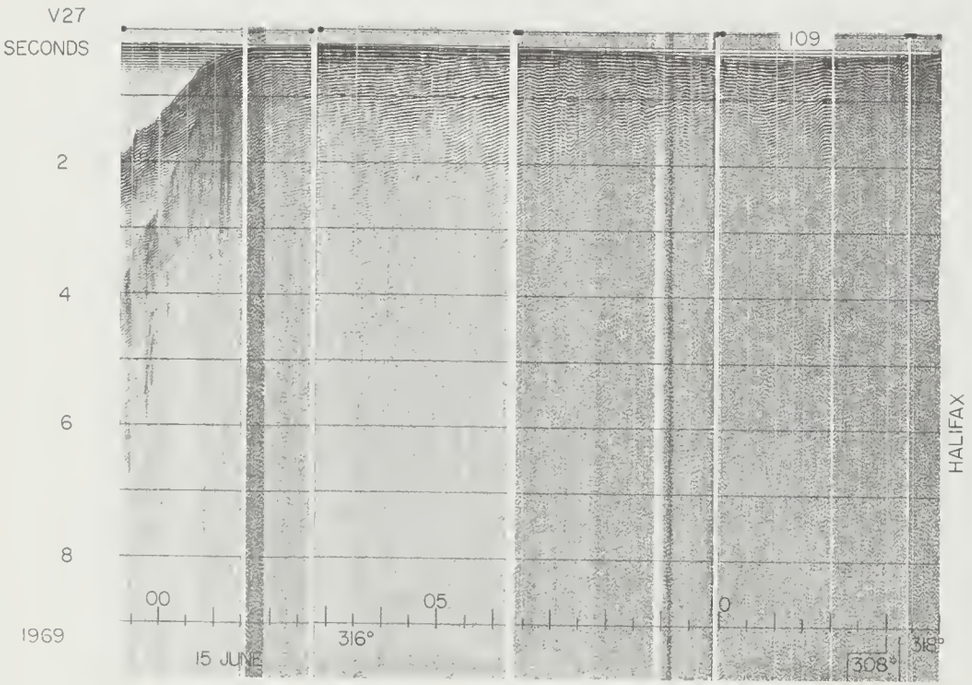

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6 JUNE

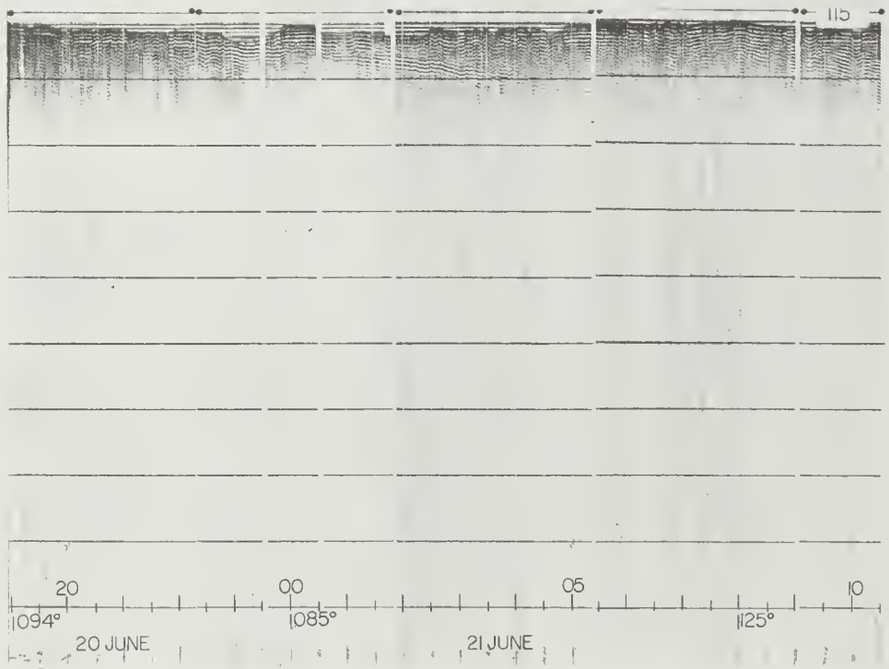

V27
SECONDS
2
4
6
8
1969
65
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R4
R5
14
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006°
8 JUNE
00
000°
9 JUNE
05
0
15
219°

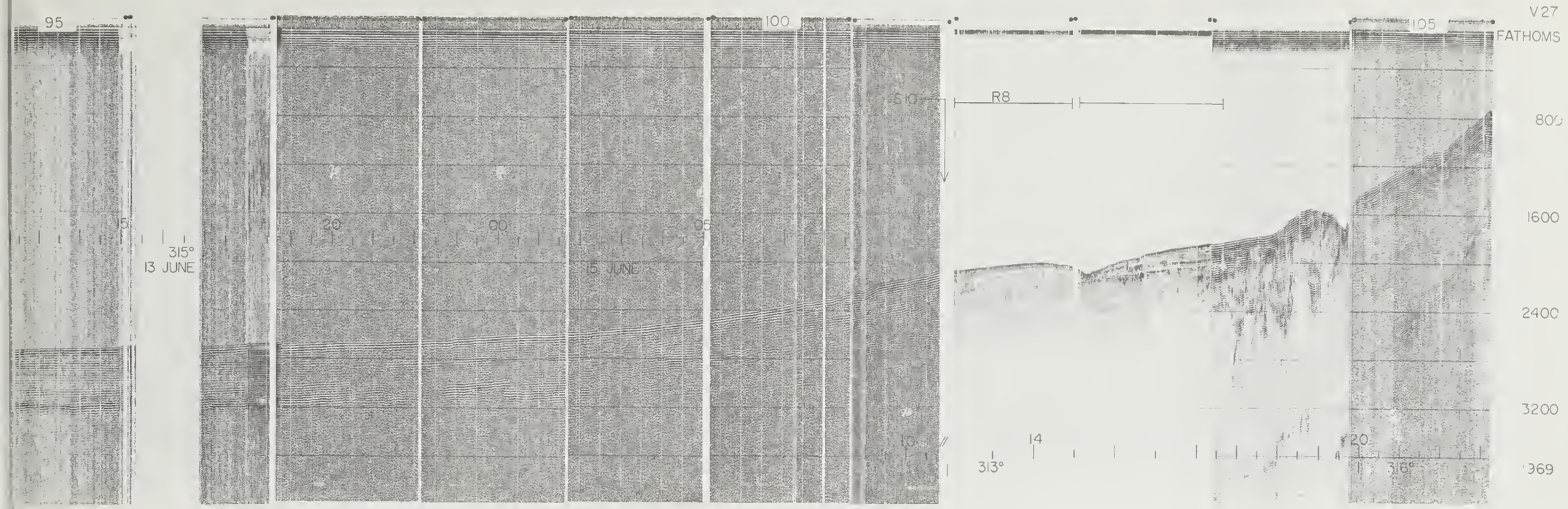

55
10
15
20
7 JUNE
000°
350°
00
05
000°
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00
05
10
000°
345°
8 JUNE
V27
FATHOMS
800
1600
2400
3200
1969

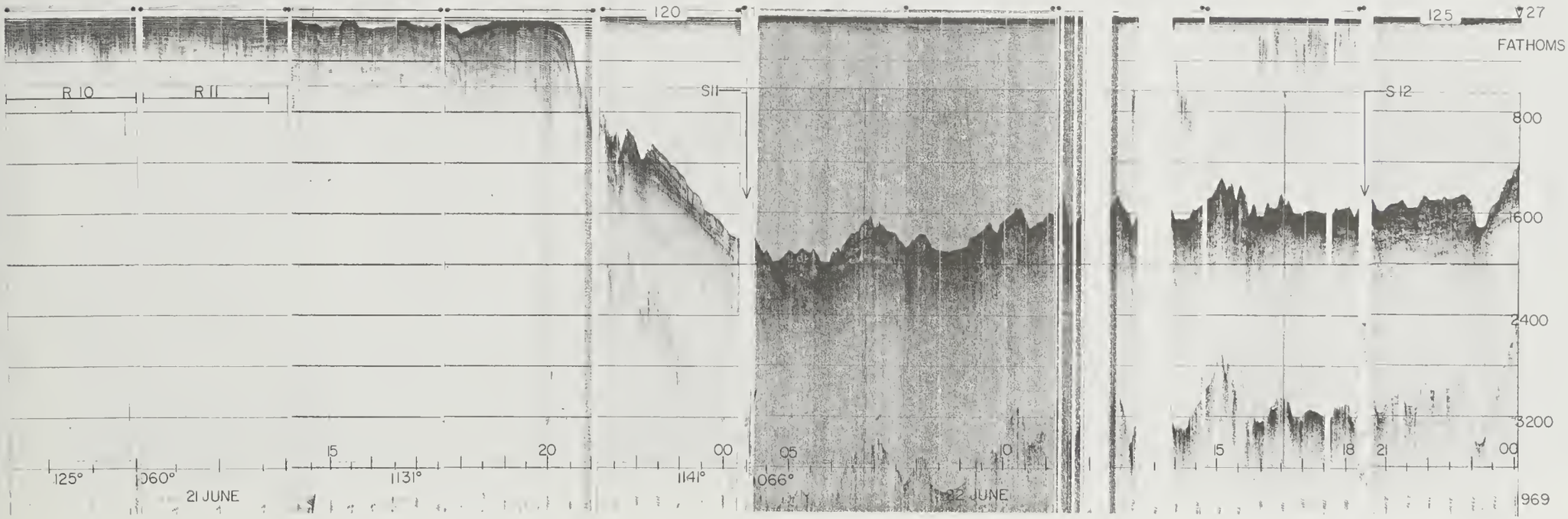

75
80
R6
R7
S7
20
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05
10
13
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219°
217°
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00
05
11 JUNE
V27
FATHOMS
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600
2400
3200
1969

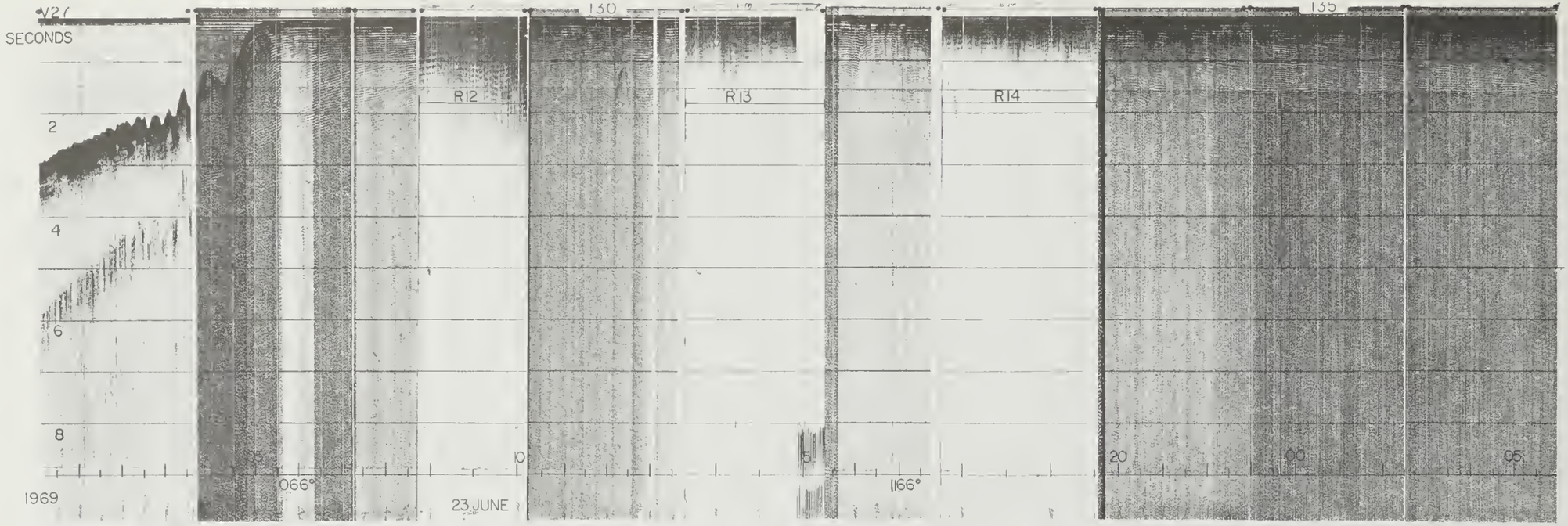

V27
SECONDS
2
4
6
8
1969
85
S8
90
S9
10
12
17
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00
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07
09
217°
11 JUNE
212°
207°
12 JUNE
225°
233°
315°
13 JUNE

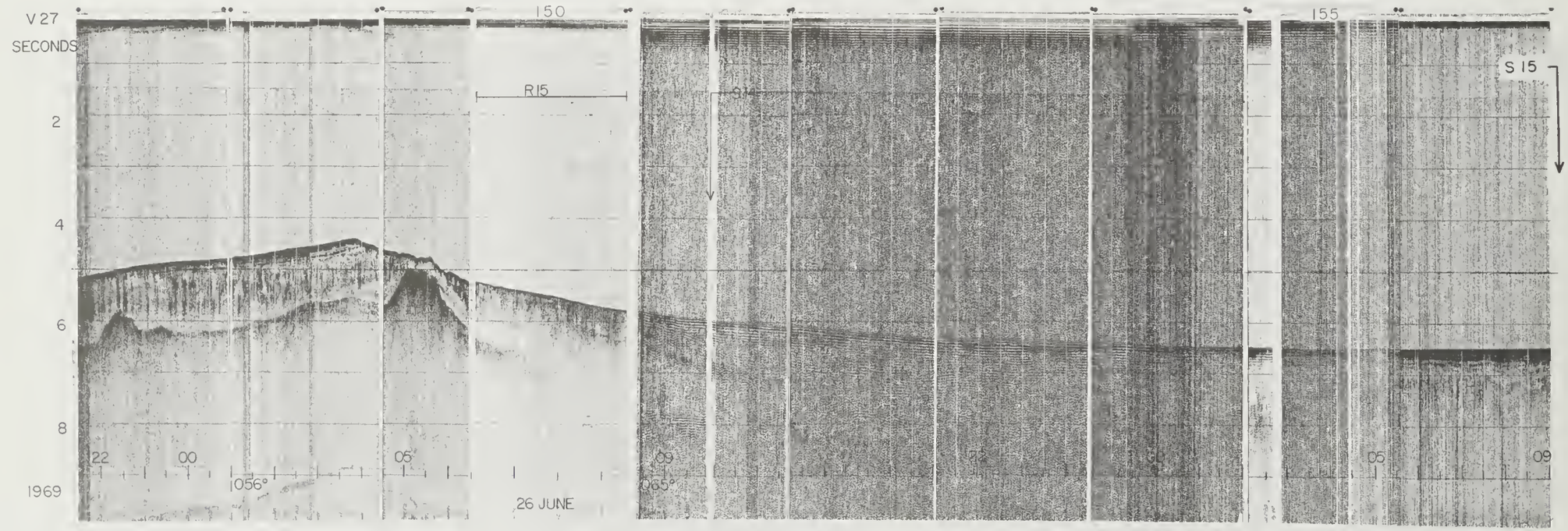

V27
SECONDS
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6
8
1969
109
HALIFAX
00
05
0
316°
15 JUNE
308°
318°

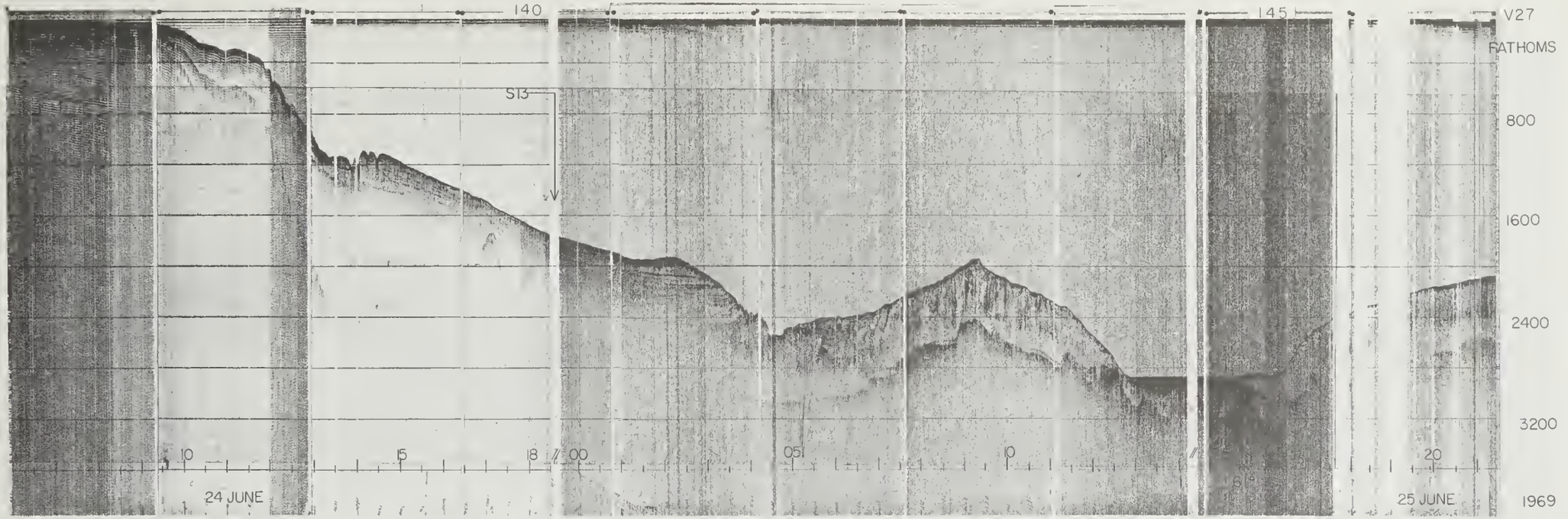

115
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00
05
10
1094°
1085°
1125°
20 JUNE
21 JUNE

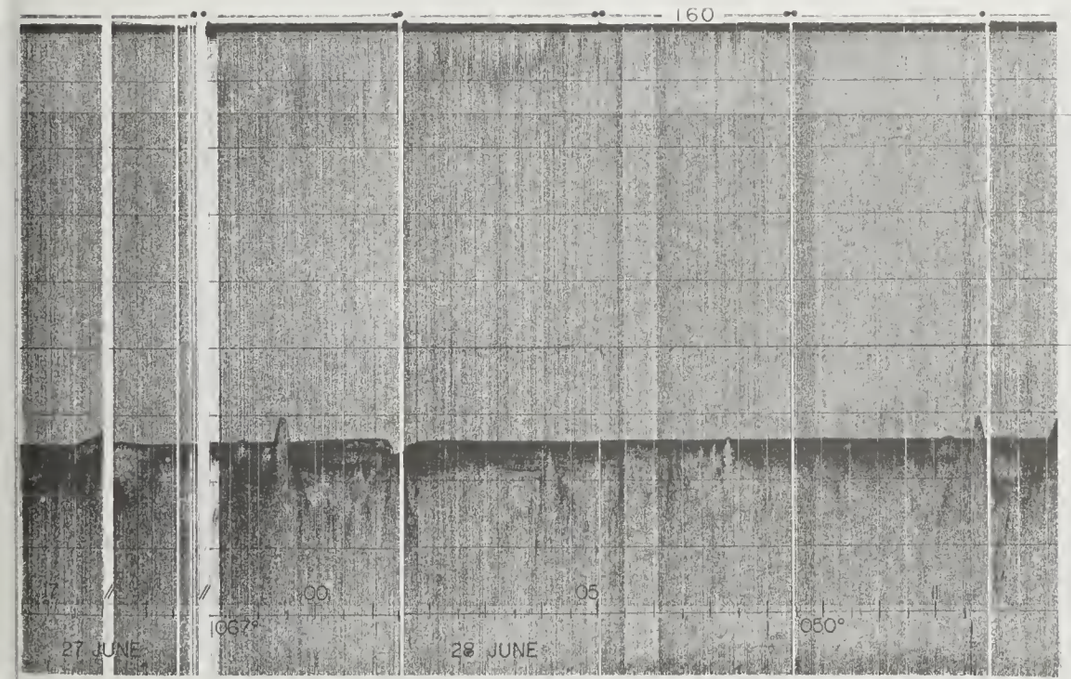

95
100
105
V27
FATHOMS
S10
R8
800
1600
2400
3200
969
15
20
00
05
10
14
20
315°
13 JUNE
15 JUNE
313°
316°

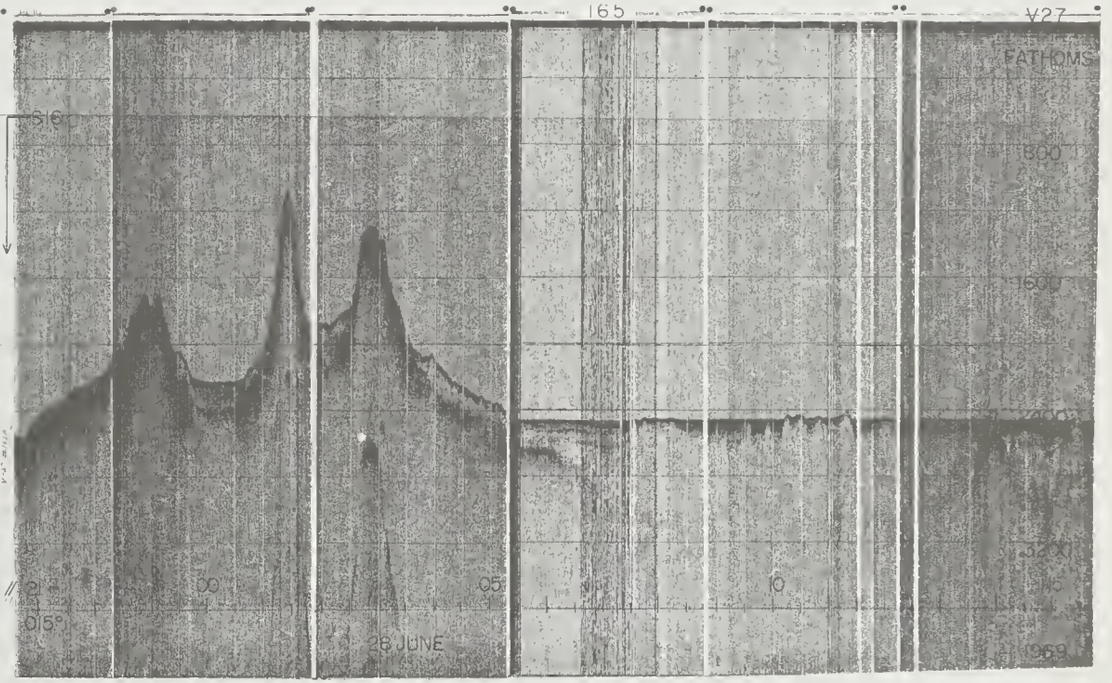

120
125
V27
FATHOMS
R 10
R 11
S11
S12
800
1600
2400
3200
969
15
20
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05
10
15
18
21
00
125°
060°
1131°
1141°
066°
21 JUNE
22 JUNE

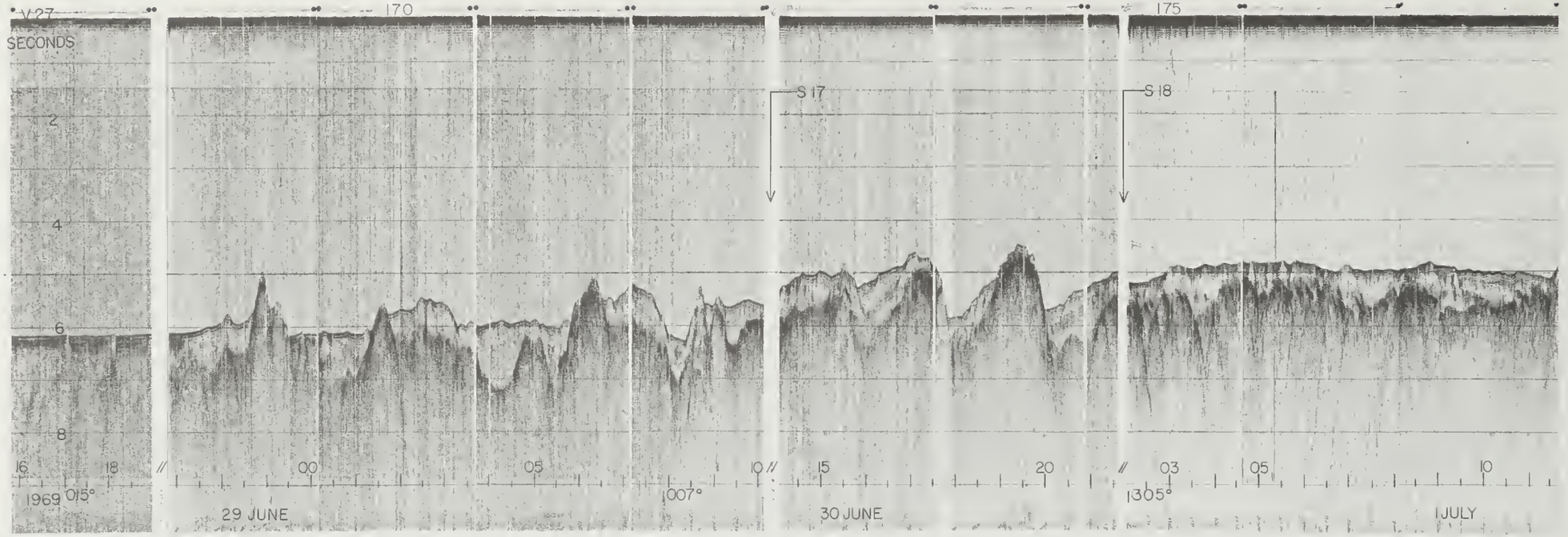

V27
SECONDS
2
4
6
8
130
135
R12
R13
R14
10
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20
00
05
066°
166°
1969
23 JUNE

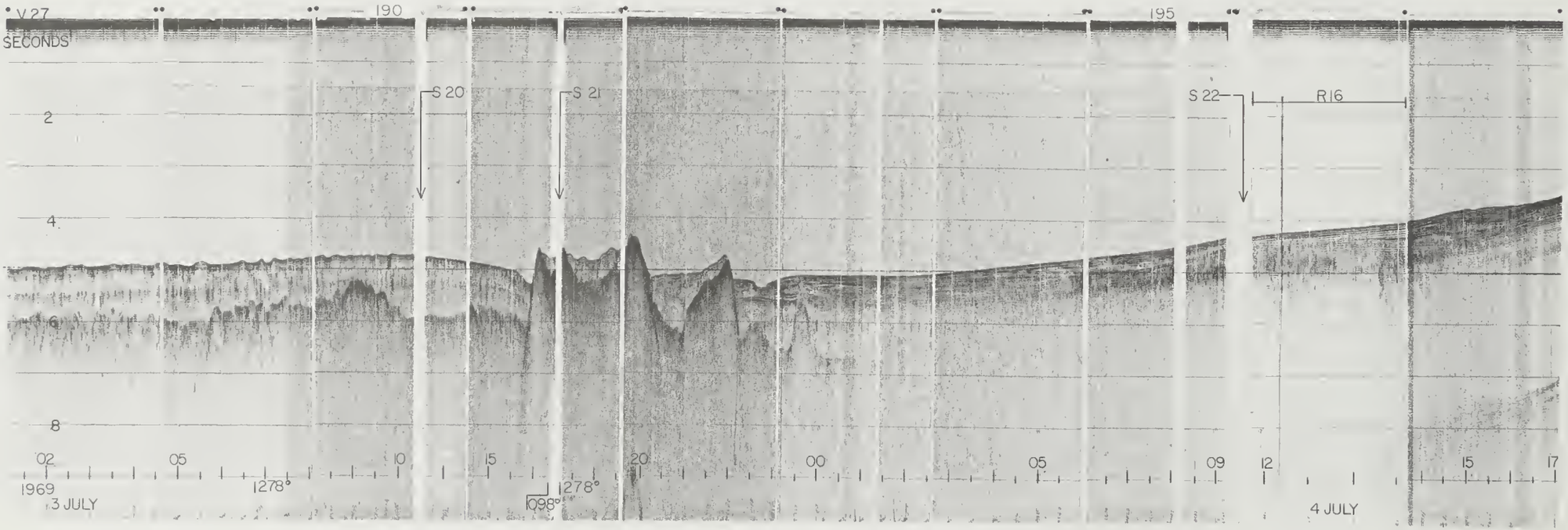

V 27
SECONDS
2
4
6
8
150
155
R15
S 15
22
00
05
09
056°
065°
1969
26 JUNE

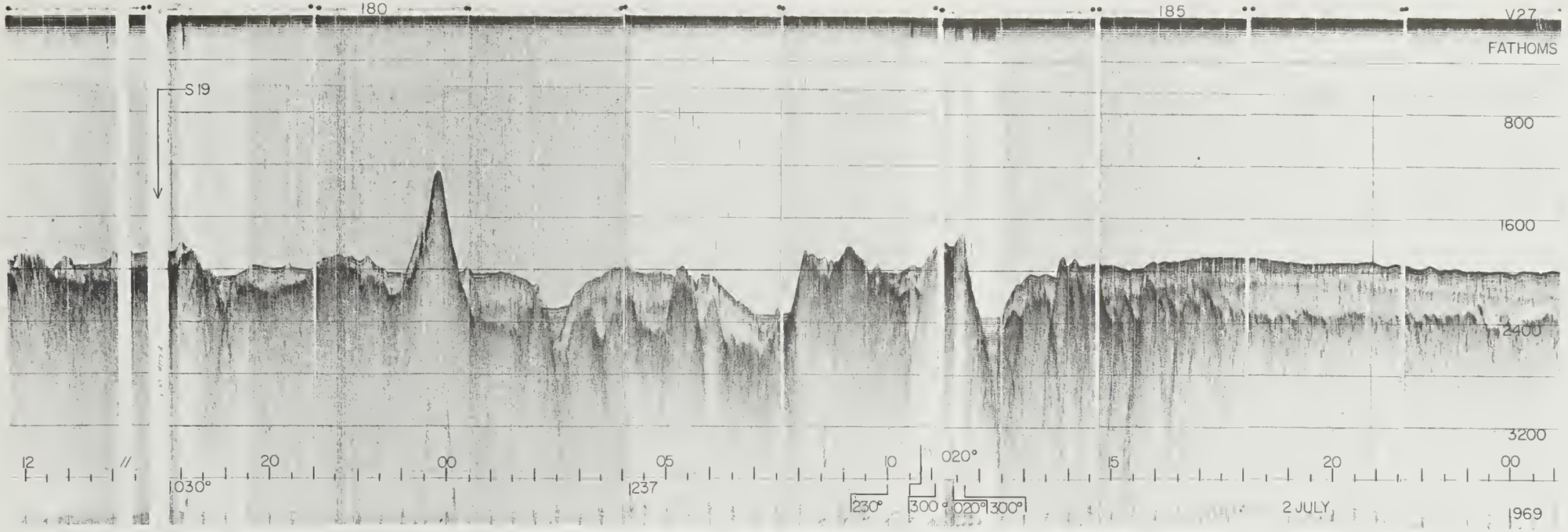

140
145
V27
FATHOMS
800
1600
2400
3200
1969
S13
10
15
18
00
05
10
20
24 JUNE
25 JUNE

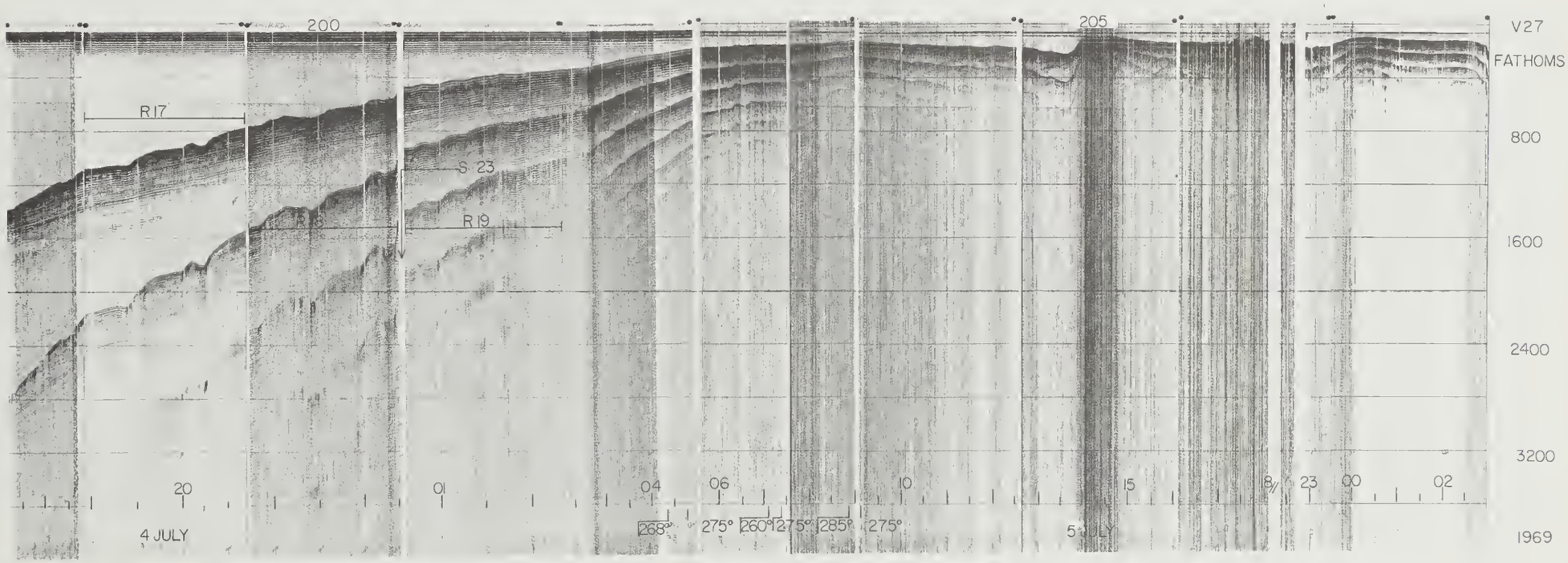

160
00
05
106?°
050°
27 JUNE
28 JUNE

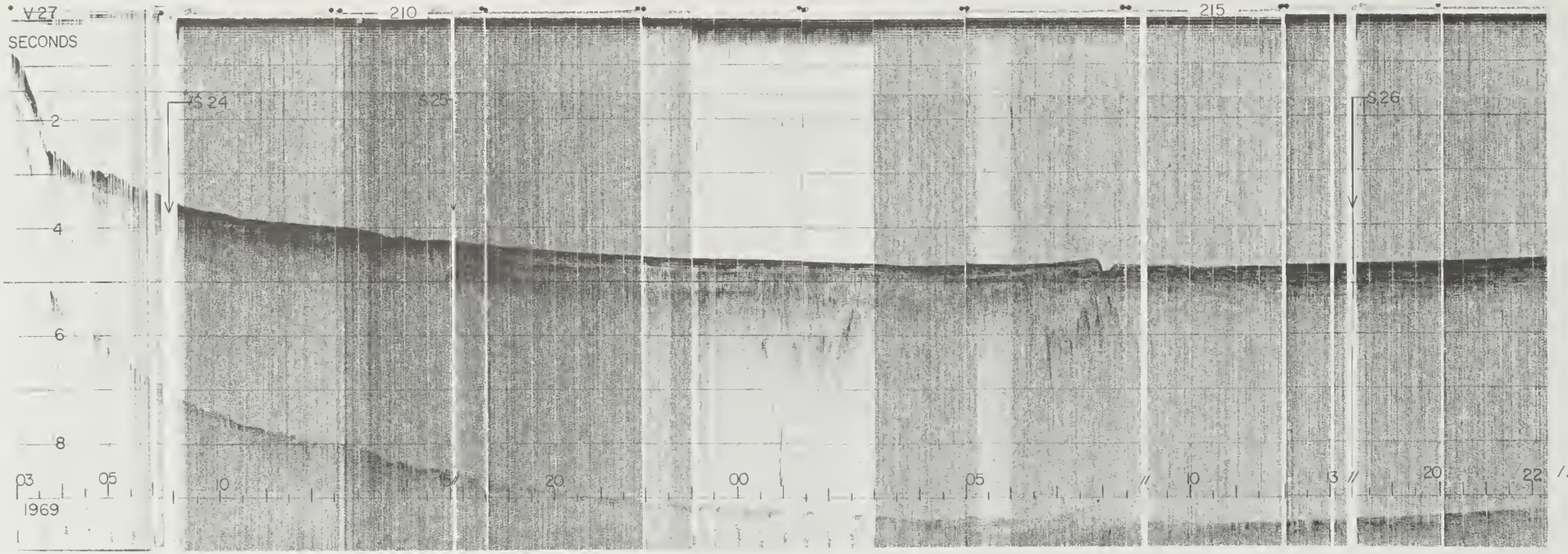

165
V27
FATHOMS
S16
800
1600
00
05
10
015°
28 JUNE
1969

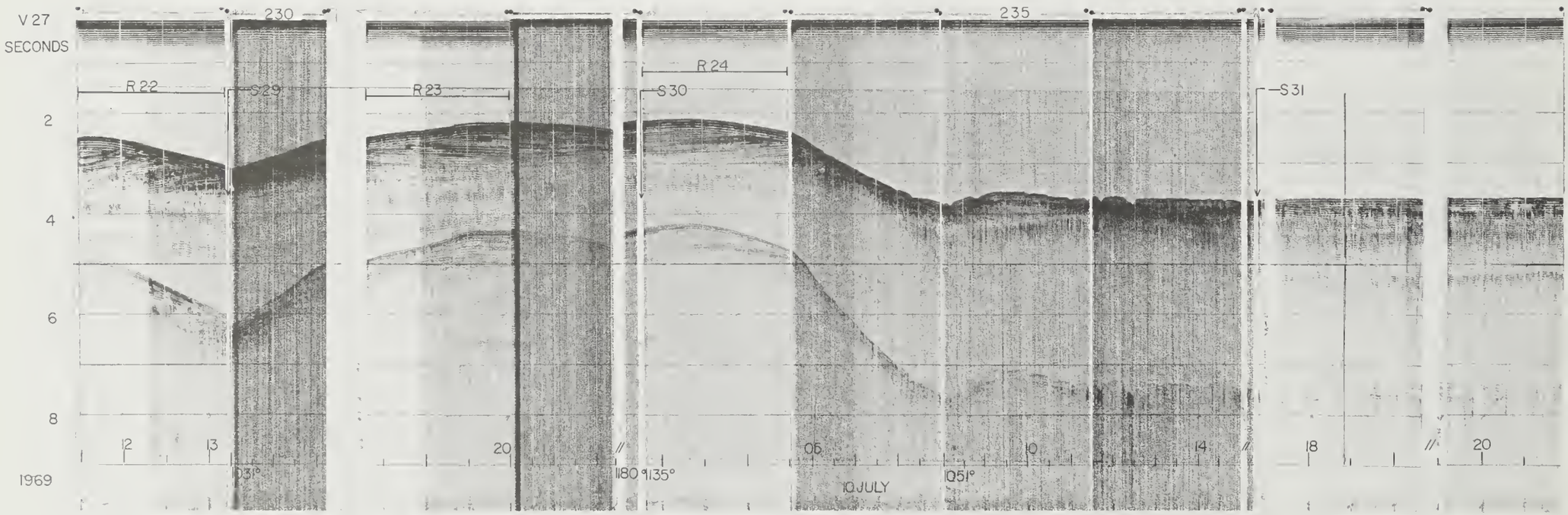

V 27
SECONDS
170
175
S 17
S 18
2
4
6
8
16
18
00
05
10
15
20
03
05
10
1969
015°
29 JUNE
007°
30 JUNE
1305°
1 JULY

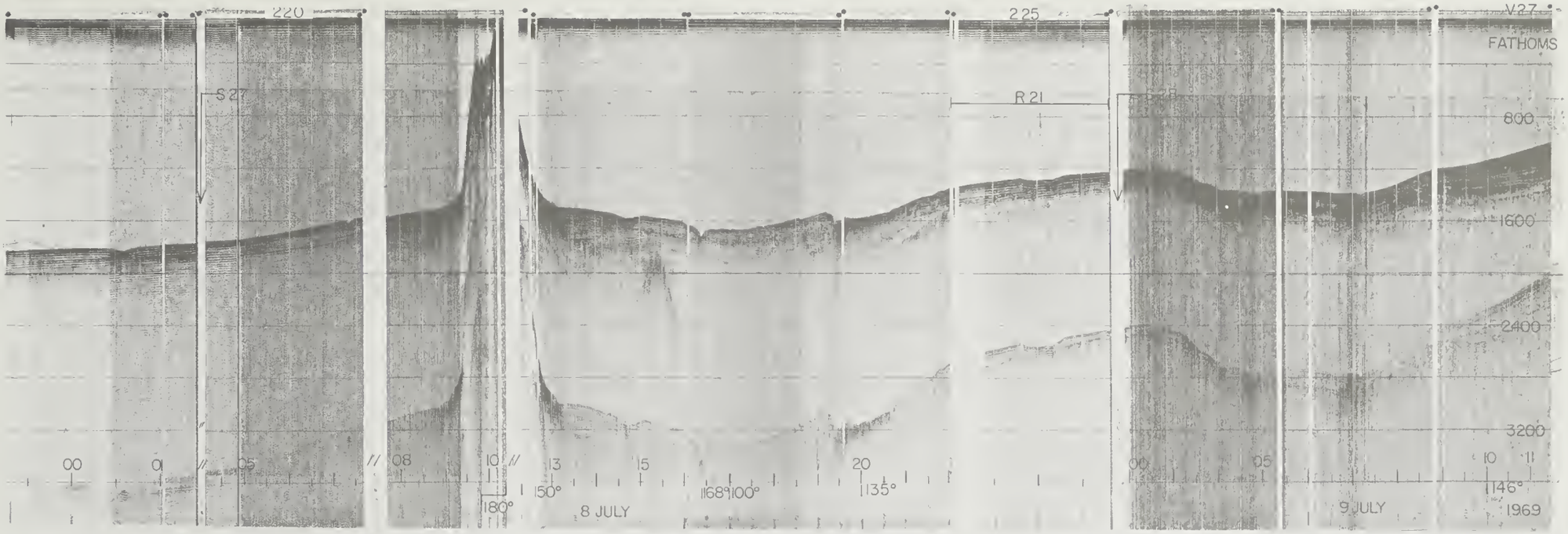

V 27
SECONDS
190
195
S 20
S 21
S 22
R16
2
4
6
8
02
05
10
15
20
00
05
09
12
15
17
1969
3 JULY
1278°
098°
1278°
4 JULY

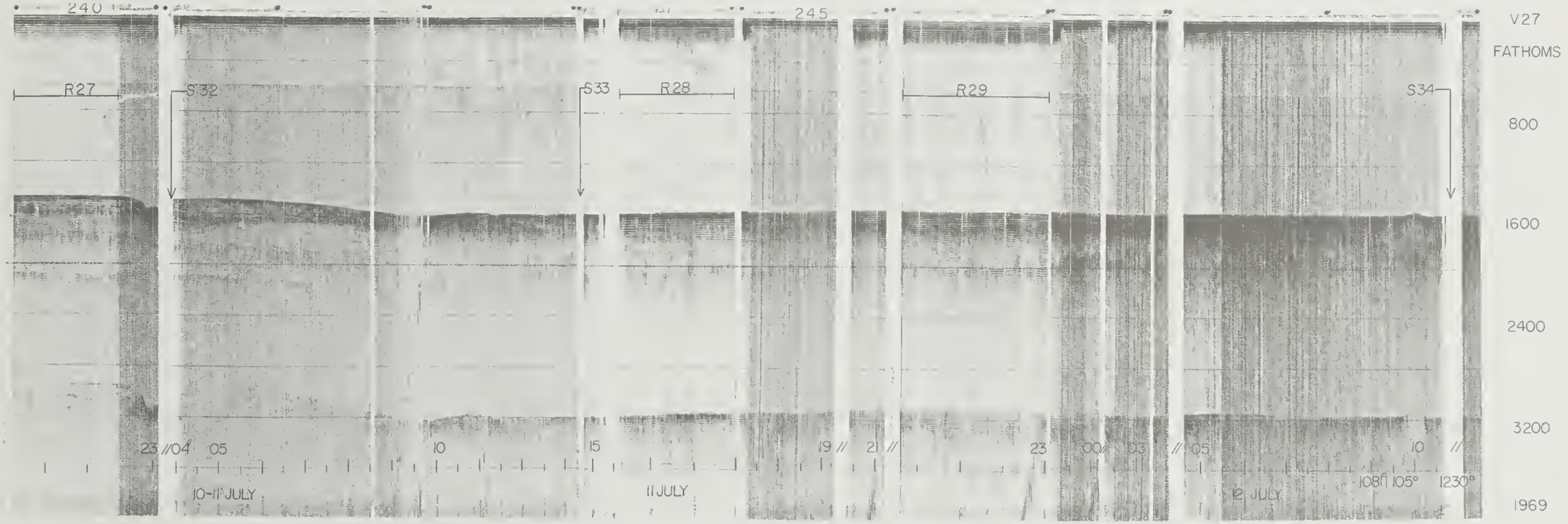

180
185
V27
FATHOMS
S 19
800
1600
2400
3200
12
20
00
05
10
020°
15
20
00
1030°
1237
230°
300°
020°
300°
2 JULY
1969

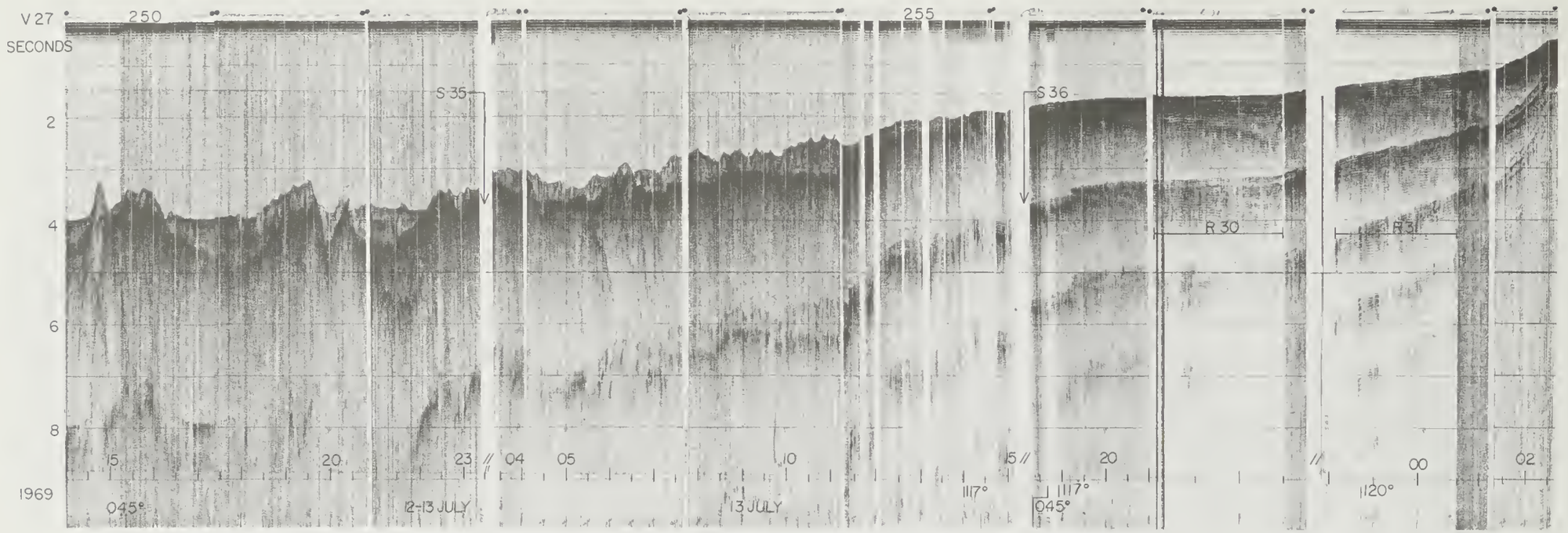

200
205
V27
FATHOMS
R 17
S 23
R 19
800
1600
2400
3200
20
01
04
06
10
15
18
23
00
02
268°
275°
260°
275°
285°
275°
4 JULY
5 JULY
1969

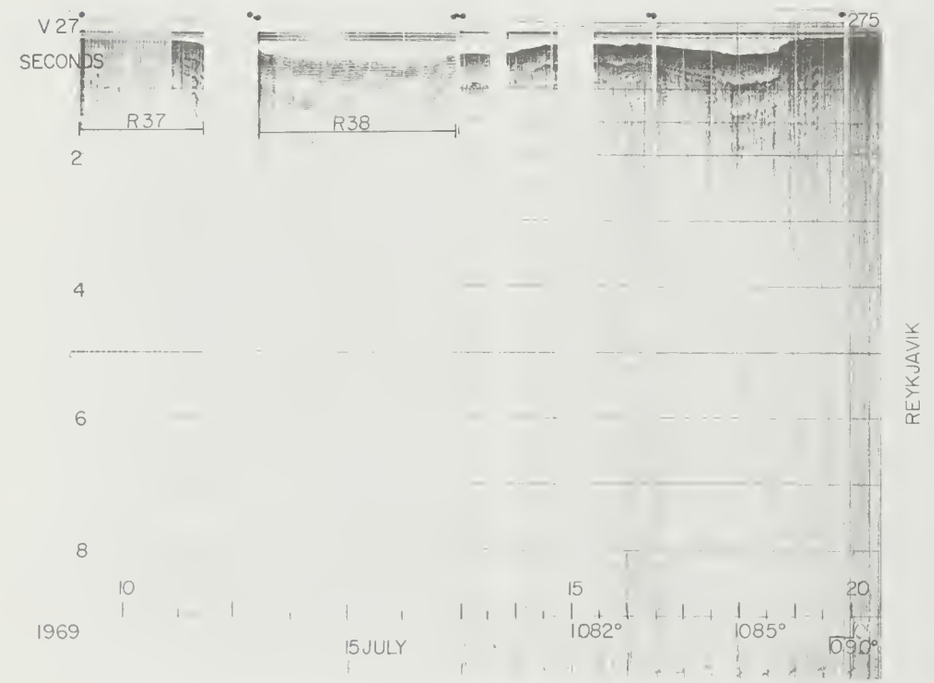

V 27
SECONDS
210
215
S 24
S 25
S 26
2
4
6
8
03
05
10
15
20
00
05
10
13
20
22
1969


V 27
SECONDS
230
235
R 22
S 29
R 23
R 24
S 30
S 31
2
4
6
8
12
13
20
05
10
14
18
20
031°
180
135°
10 JULY
105
1°
1969

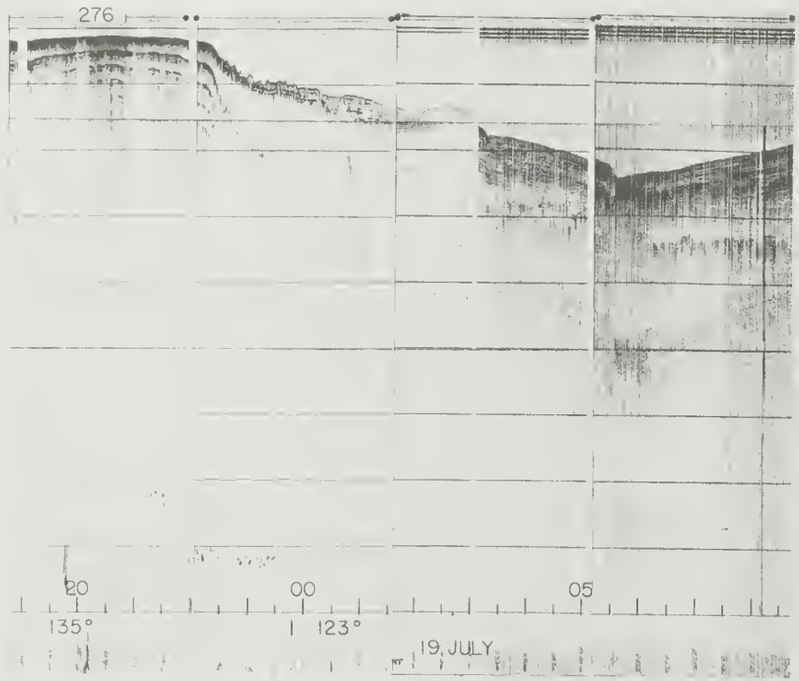

220
225
V27
FATHOMS
S 27
R 21
800
1600
2400
3200
00
01
05
08
10
13
15
20
00
05
10
11
150°
180°
168°
100°
135°
146°
8 JULY
9 JULY
1969

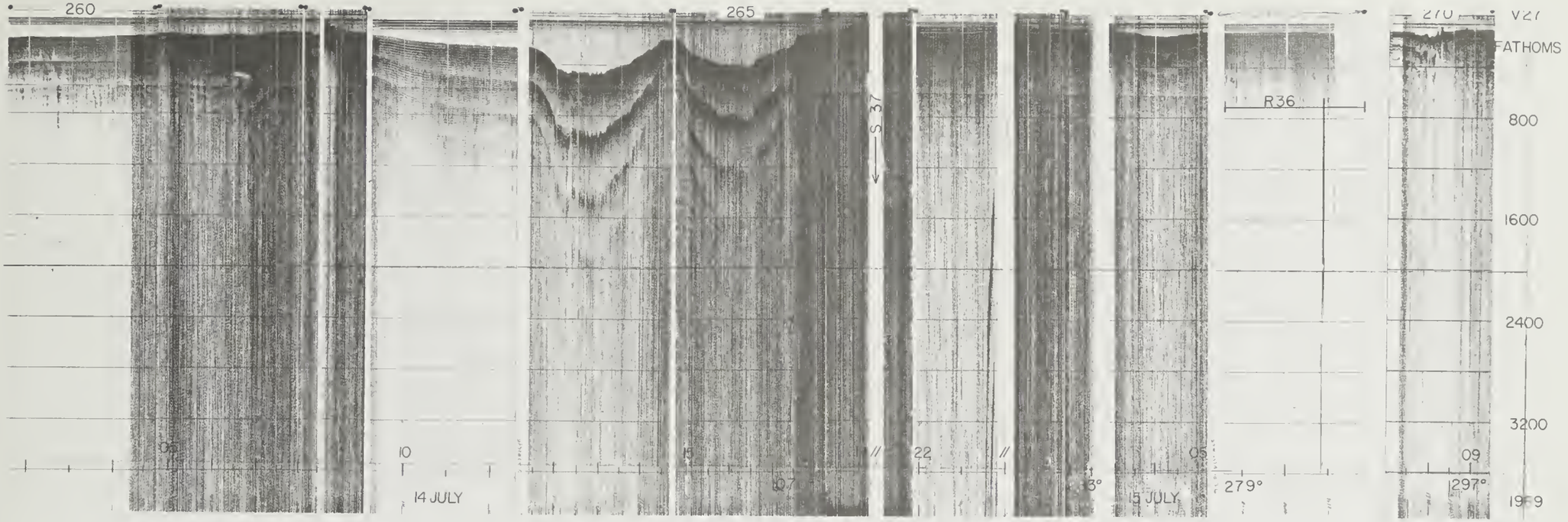

240
245
V27
FATHOMS
R27
S 32
S33
R28
R29
S34
800
1600
2400
3200
23
04
05
10
15
19
21
23
00
03
05
10
108°
105°
123°
10-11 JULY
11 JULY
12 JULY
1969

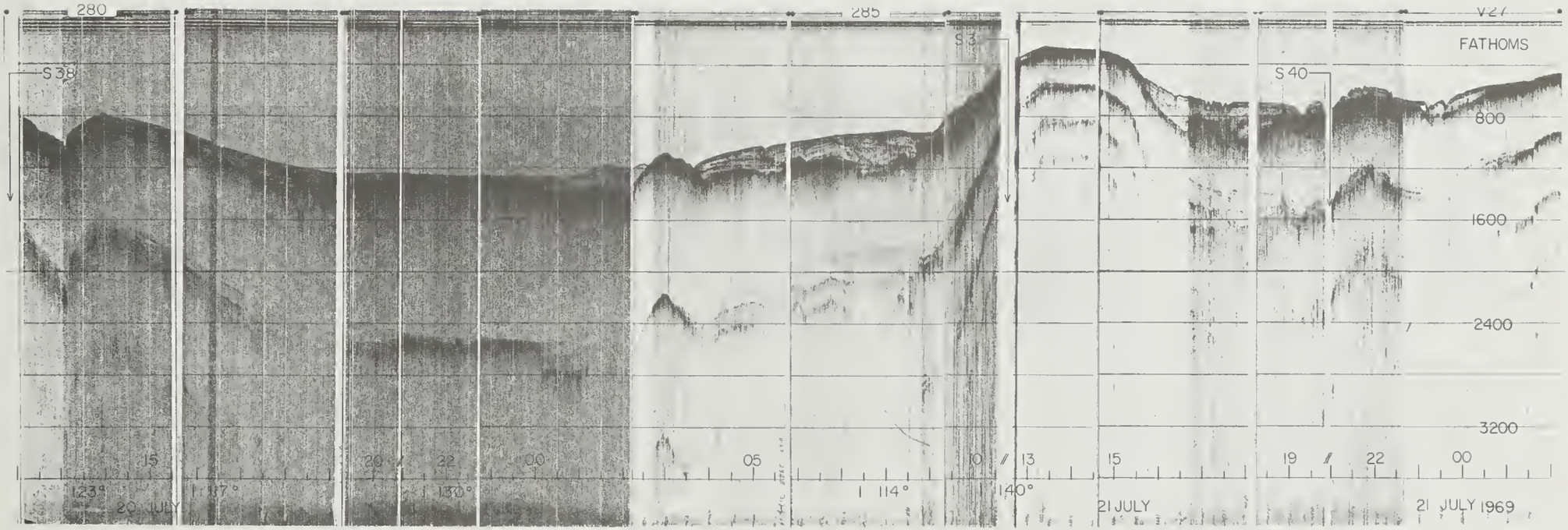

V 27
SECONDS
250
255
S 35
S 36
R 30
R 31
2
4
6
8
15
20
23 // 04
05
10
15 //
20
//
00
02
1969
045°
12-13 JULY
13 JULY
117°
117°
045°
120°

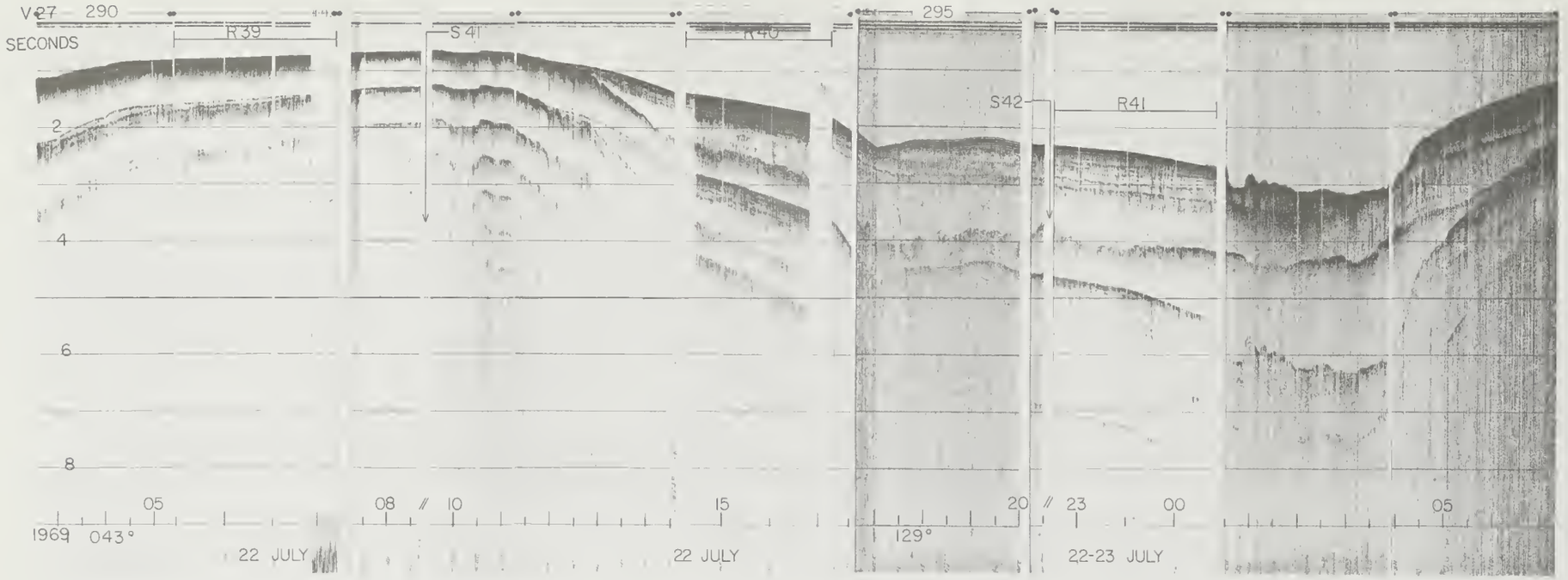

V 27
SECONDS
275
R 37
R 38
2
4
6
8
10
15
20
1969
15 JULY
1082°
1085°
090°

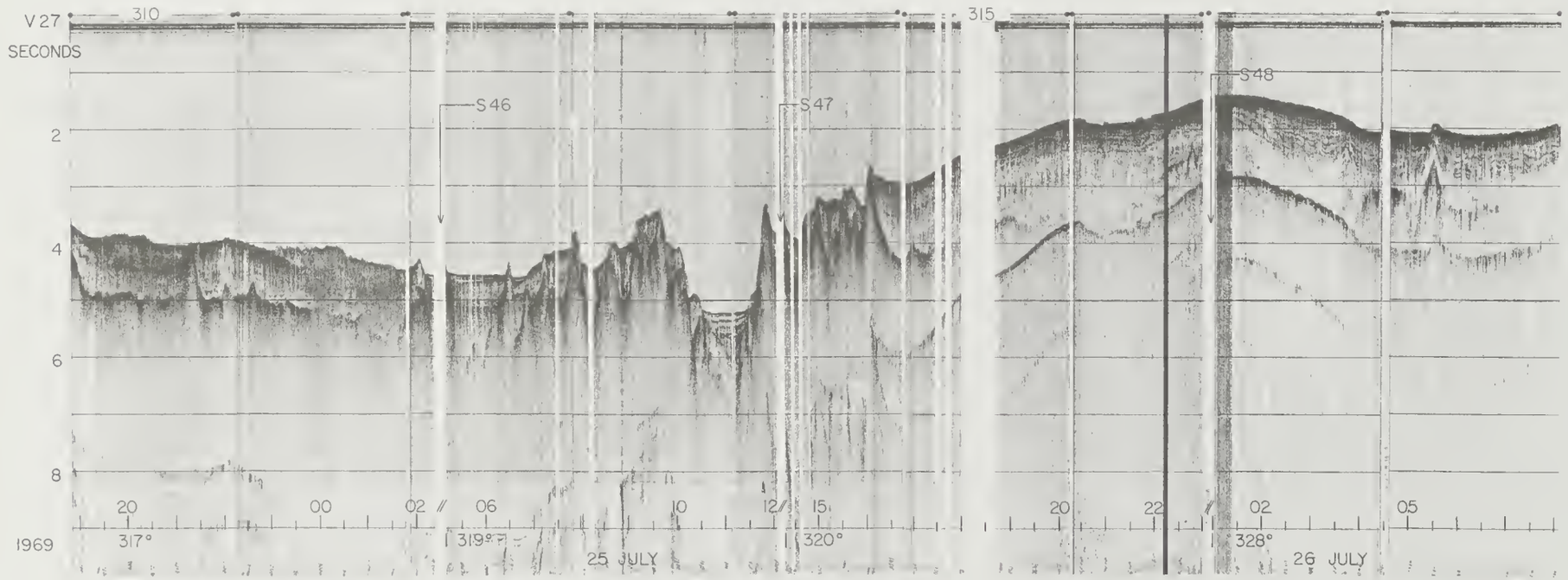
REYKJAVIK

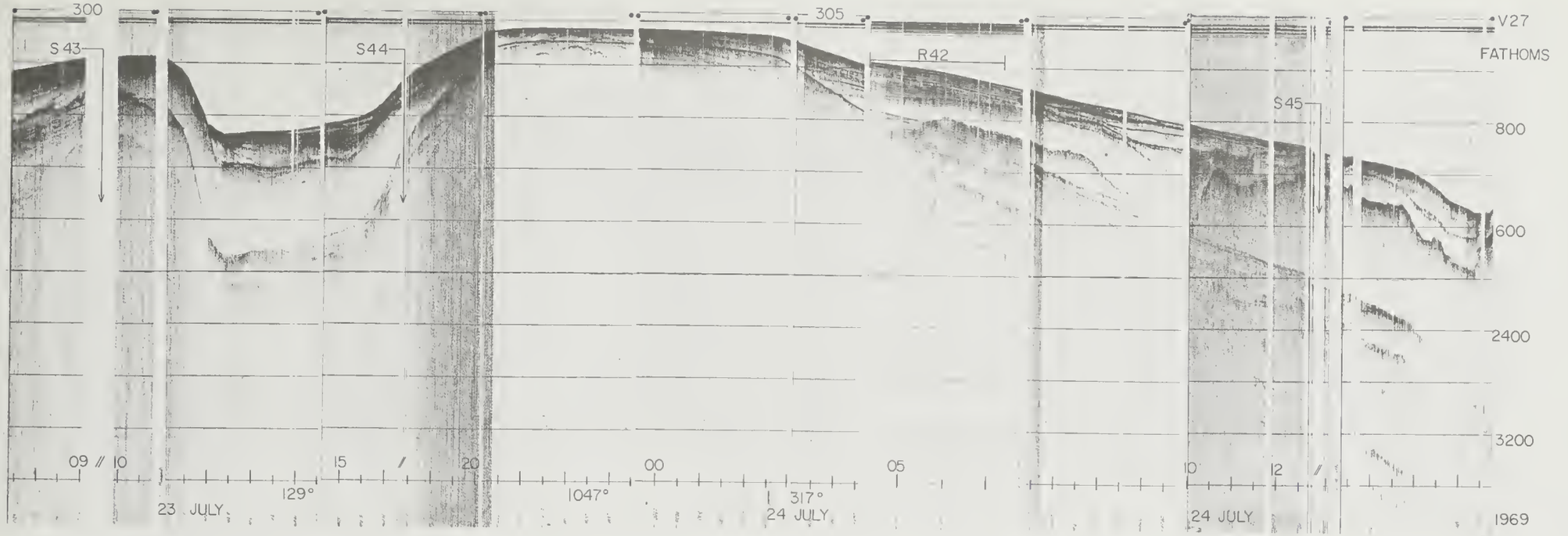

276
20
00
05
135°
123°
19, JULY

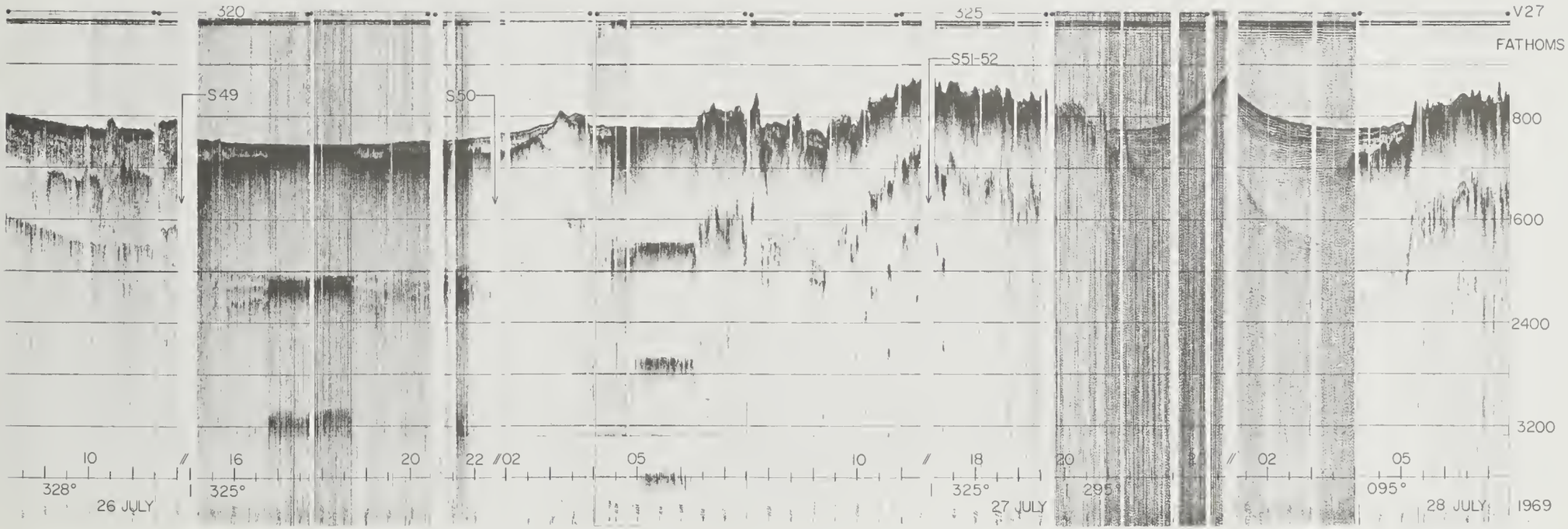

260
265
270
V27
FATHOMS
S 37
R36
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1600
2400
3200
05
10
15
22
05
09
14 JULY
15 JULY
279°
297°

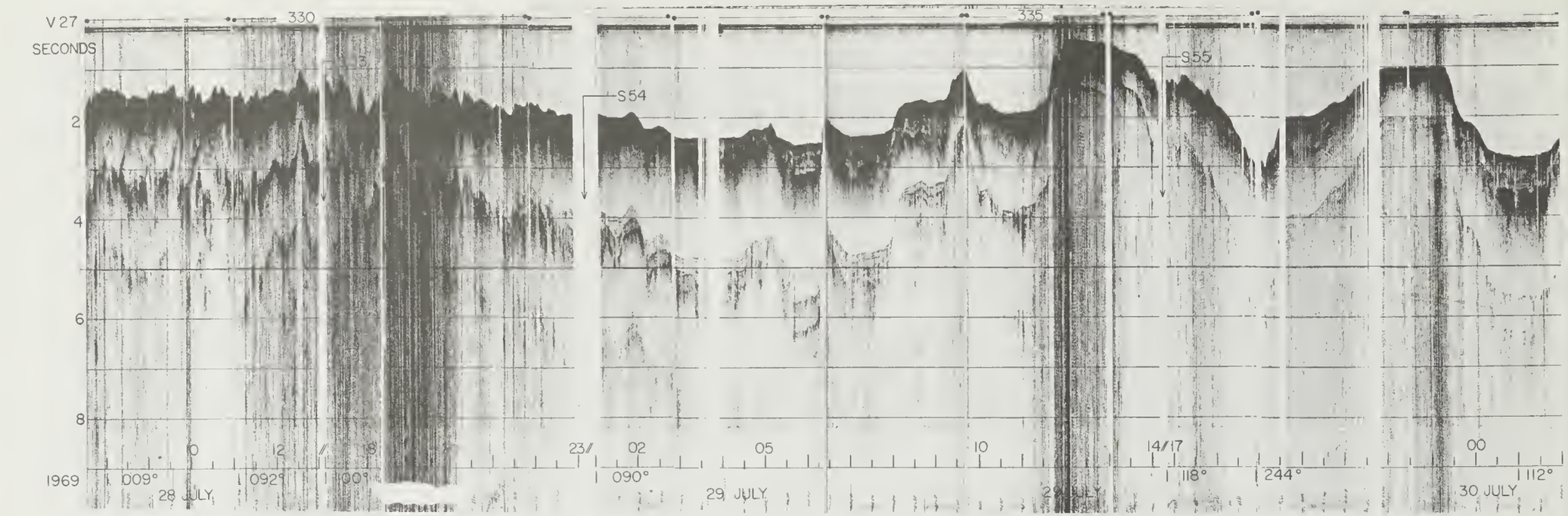

280
285
V27
FATHOMS
S 38
S 39
S 40
800
1600
2400
3200
15
20
22
00
05
10
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19
22
00
123°
117°
130°
114°
140°
20 JULY
21 JULY
21 JULY 1969

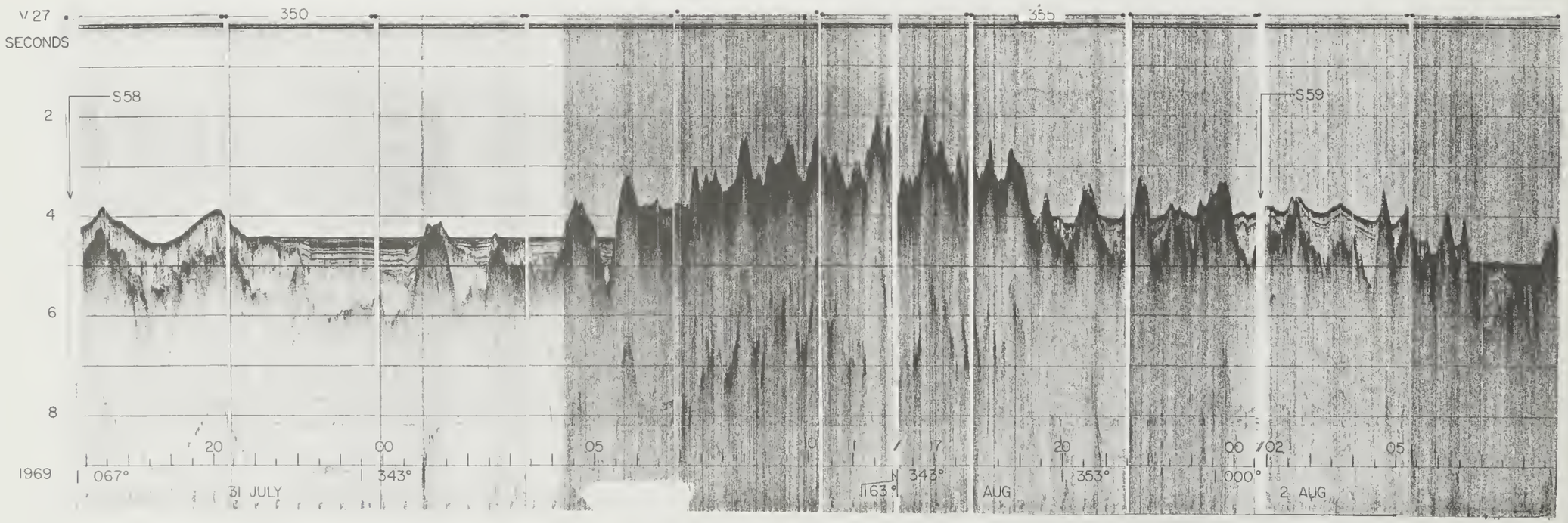

V27
290
295
SECONDS
R39
S41
R40
S42
R41
2
4
6
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15
20
23
00
05
1969
043°
129°
22 JULY
22 JULY
22-23 JULY

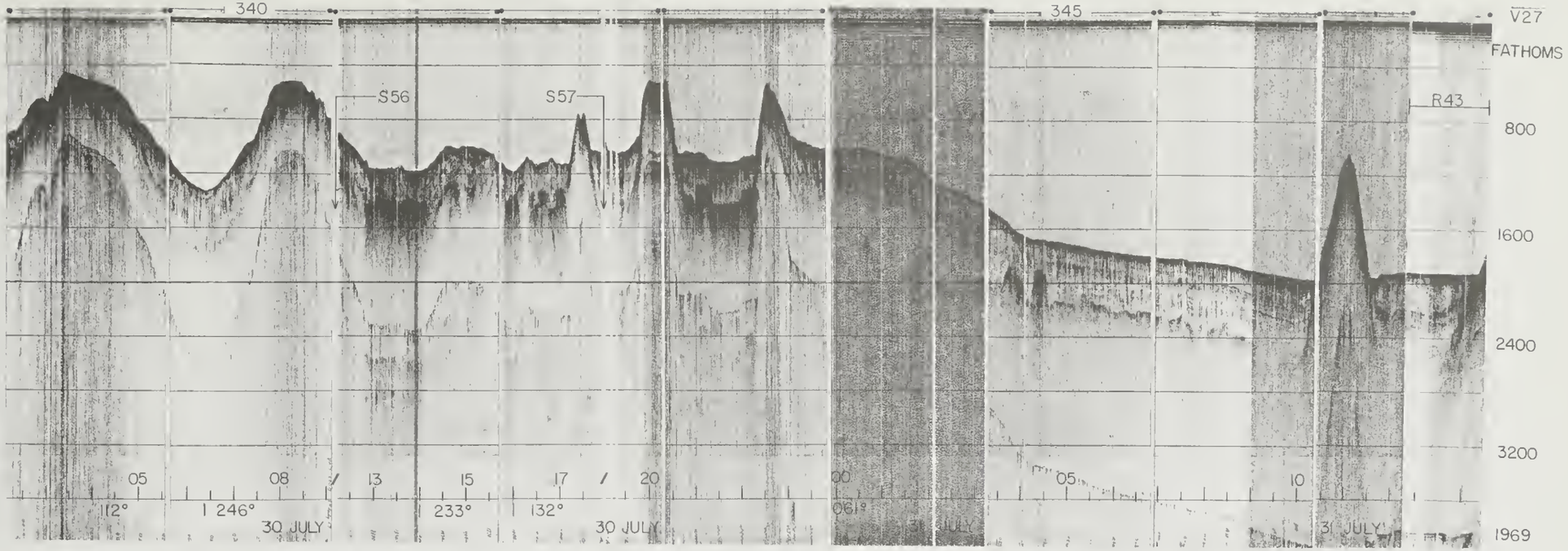

V27
310
315
SECONDS
S46
S47
S48
2
4
6
8
20
00
02
06
10
12
15
20
22
02
05
1969
317°
319°
320°
328°
25 JULY
26 JULY

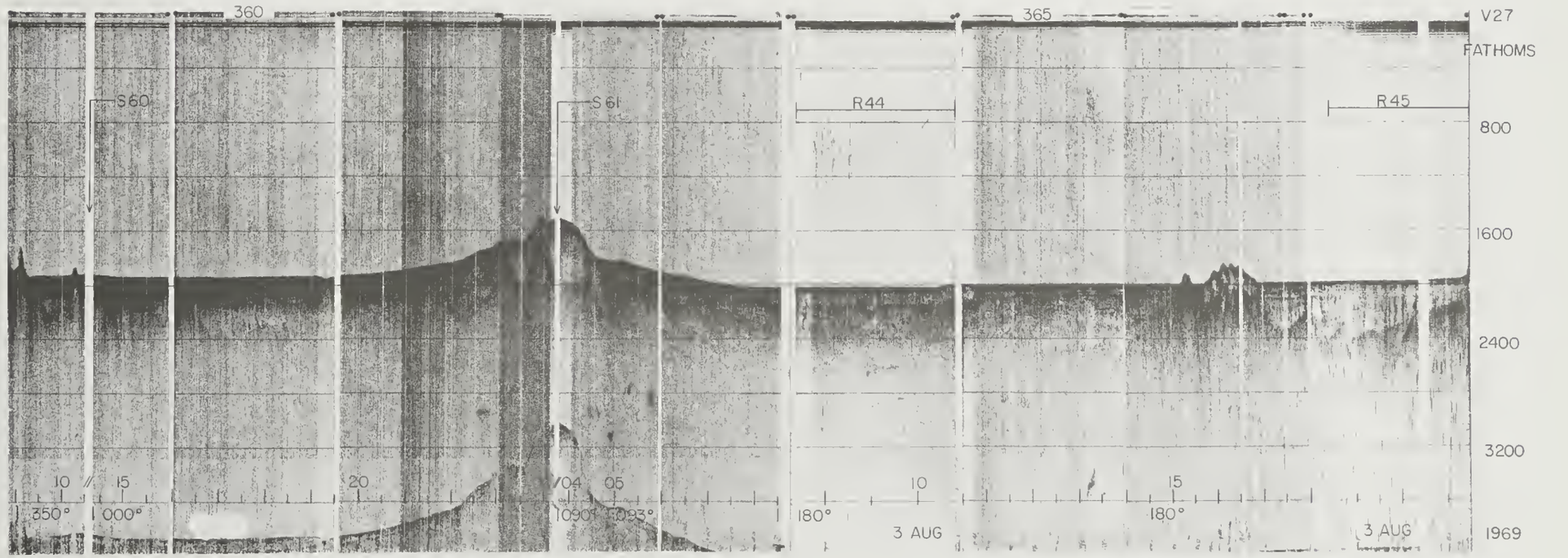

300
305
V27
FATHOMS
S 43
S44
R42
S45
800
600
2400
3200
1969
09 // 10
15 // 20
00
05
10
12 //
129°
1047°
317°
23 JULY
24 JULY
24 JULY

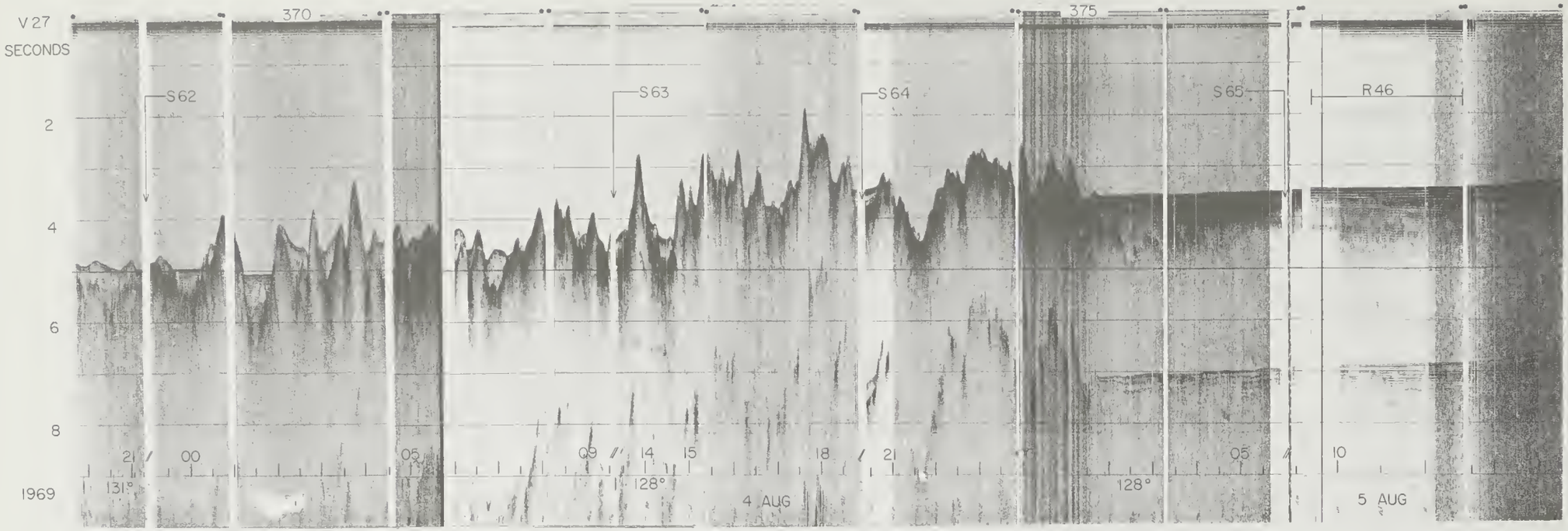

320
325
V27
FATHOMS
S49
S50
S51-52
800
600
2400
3200
1969
10 // 16
20
22 //02
05
10 // 18
20
// 02
05
328°
325°
325°
295°
095°
26 JULY
27 JULY
28 JULY

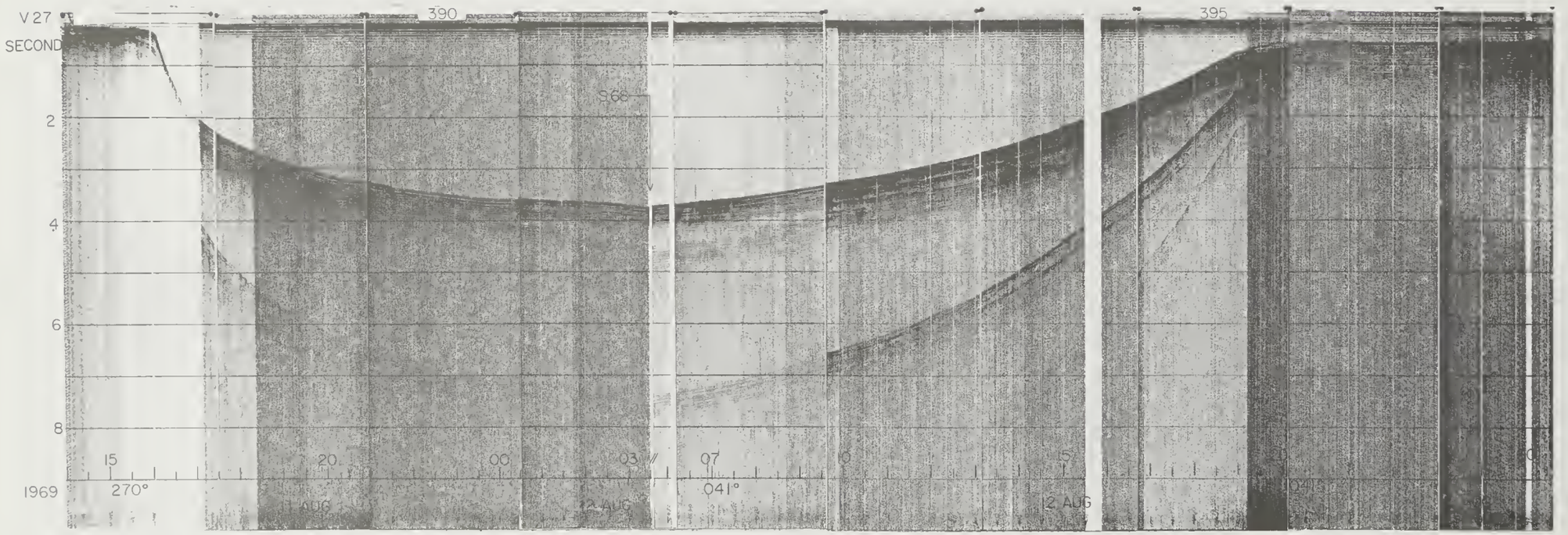

V 27
SECONDS
330
335
S54
S55
2
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8
1969
009°
28 JULY
092°
090°
29 JULY
118°
244°
30 JULY
112°

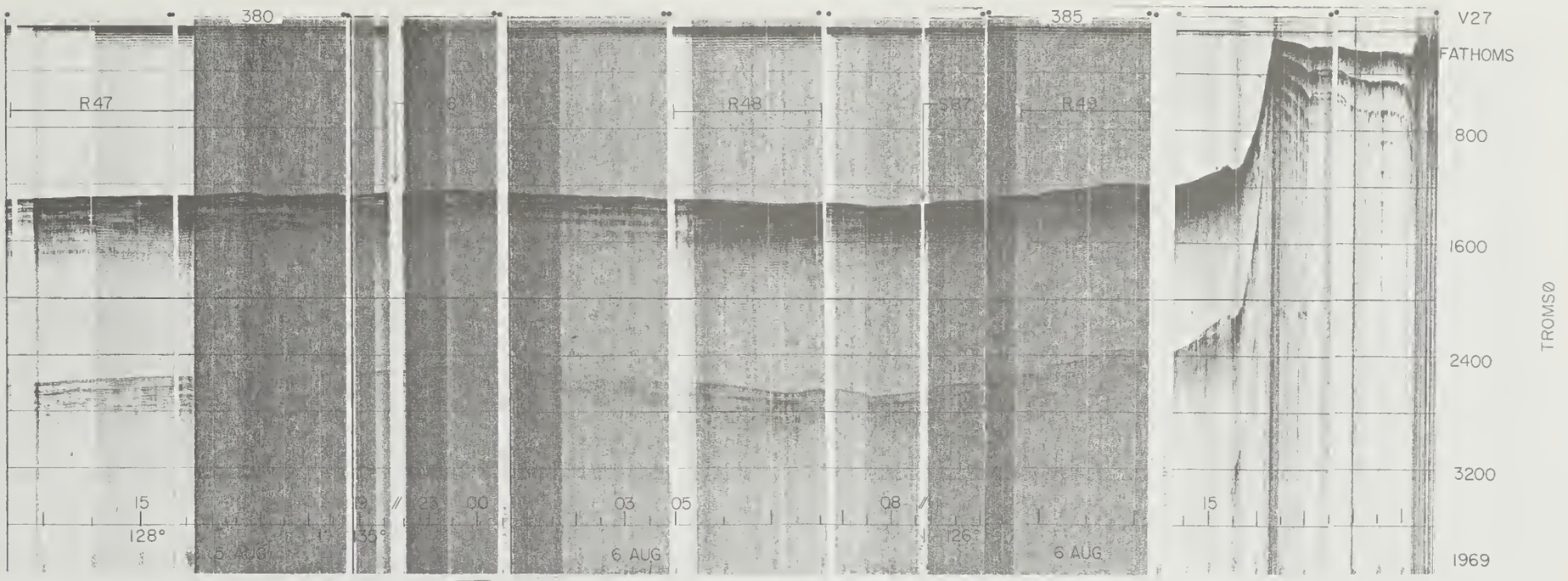

V 27
SECONDS
350
355
S58
S59
2
4
6
8
1969
067°
31 JULY
343°
163°
343°
AUG
353°
000°
2 AUG

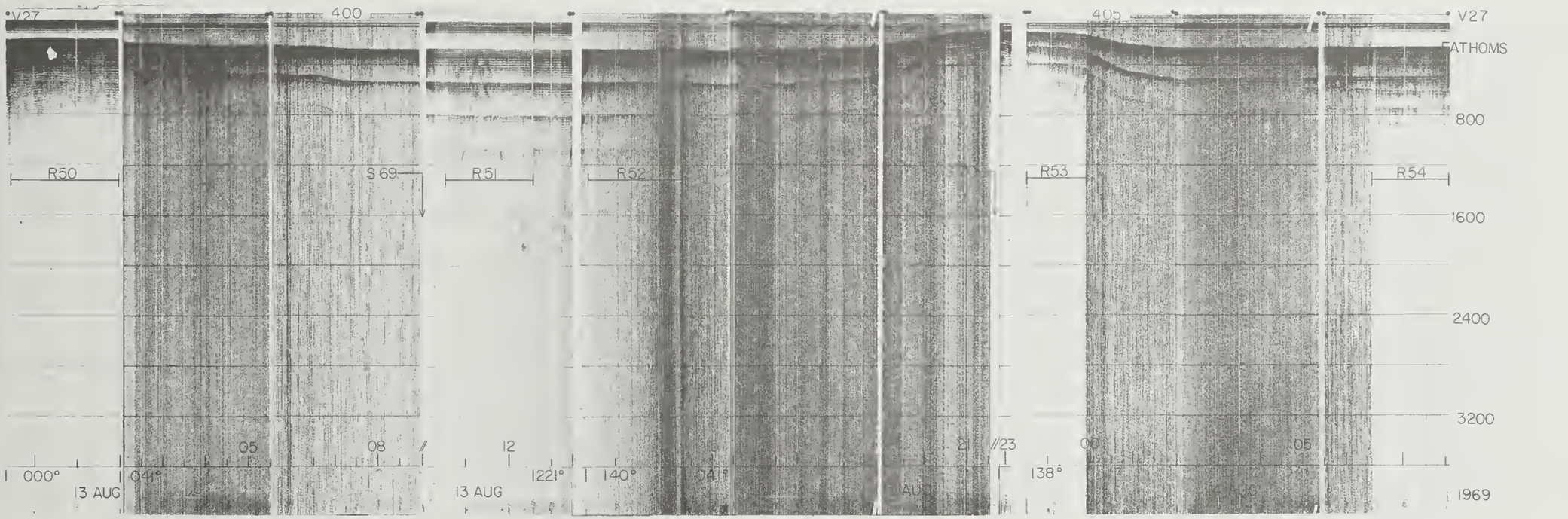

340
345
V27
FATHOMS
S56
S57
R43
800
1600
2400
3200
1969
05
08
13
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17
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10
112°
246°
233°
132°
061°
30 JULY
30 JULY
31 JULY
31 JULY

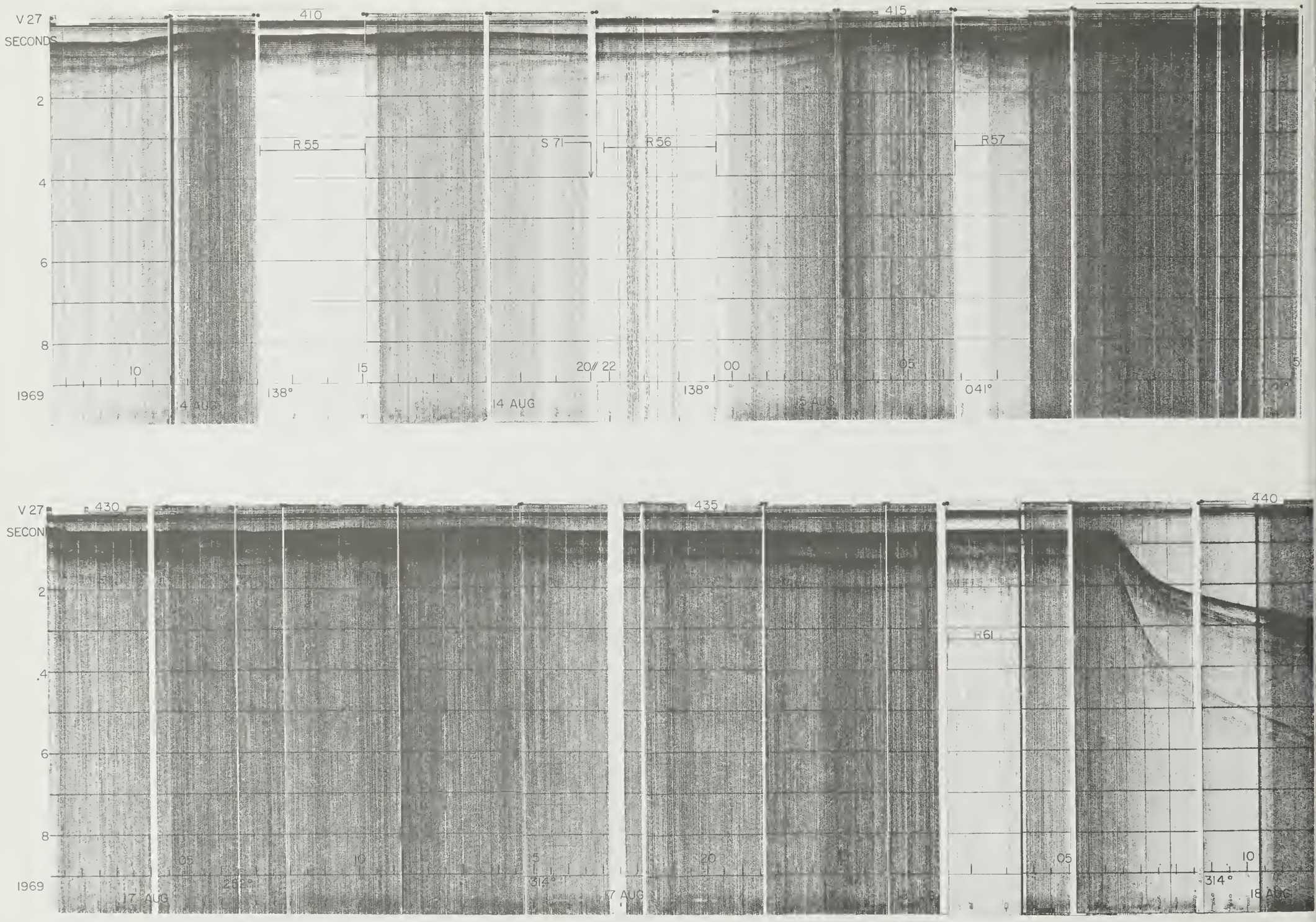

360
365
V27
FATHOMS
S60
S61
R44
R45
800
1600
2400
3200
1969
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20
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180°
180°
3 AUG
3 AUG

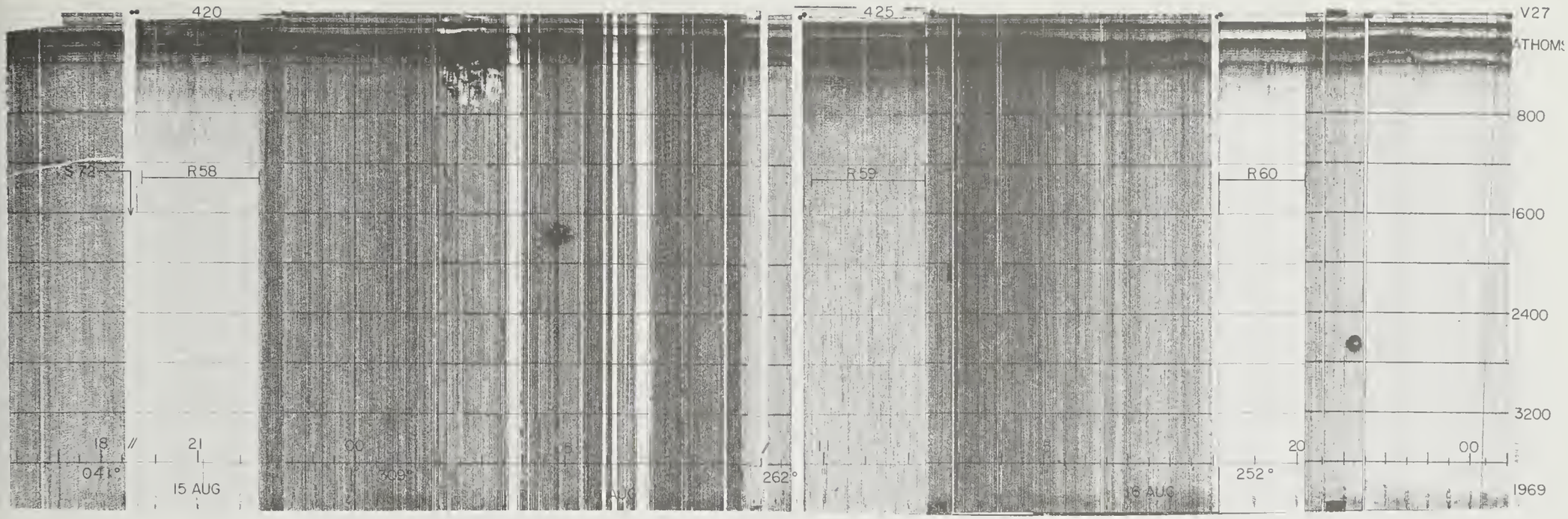

V 27
SECONDS
370
375
S62
S63
S64
S65
R46
2
4
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15
18
21
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1969
131°
128°
4 AUG
128°
5 AUG

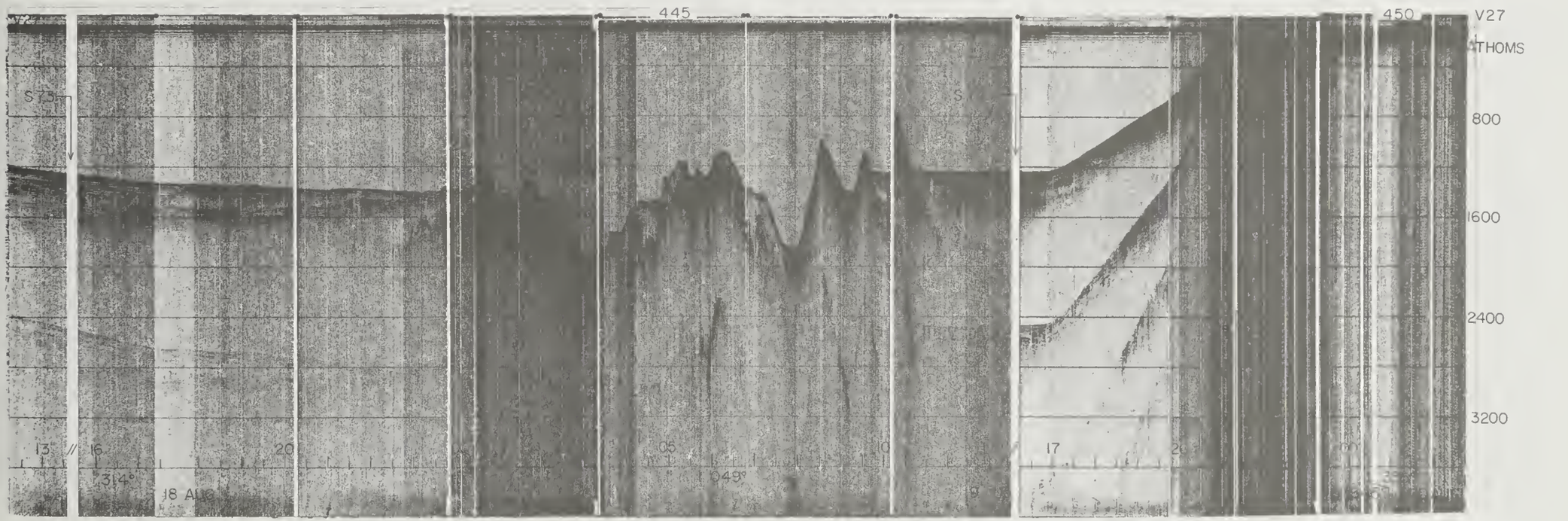

V 27
SECOND
390
395
S68
2
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20
00
03
07
0
5
0
1969
270°
041°
12 AUG


380
R47
S67
R48
385
R49
V27
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3200
1969
TROMSØ
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6 AUG
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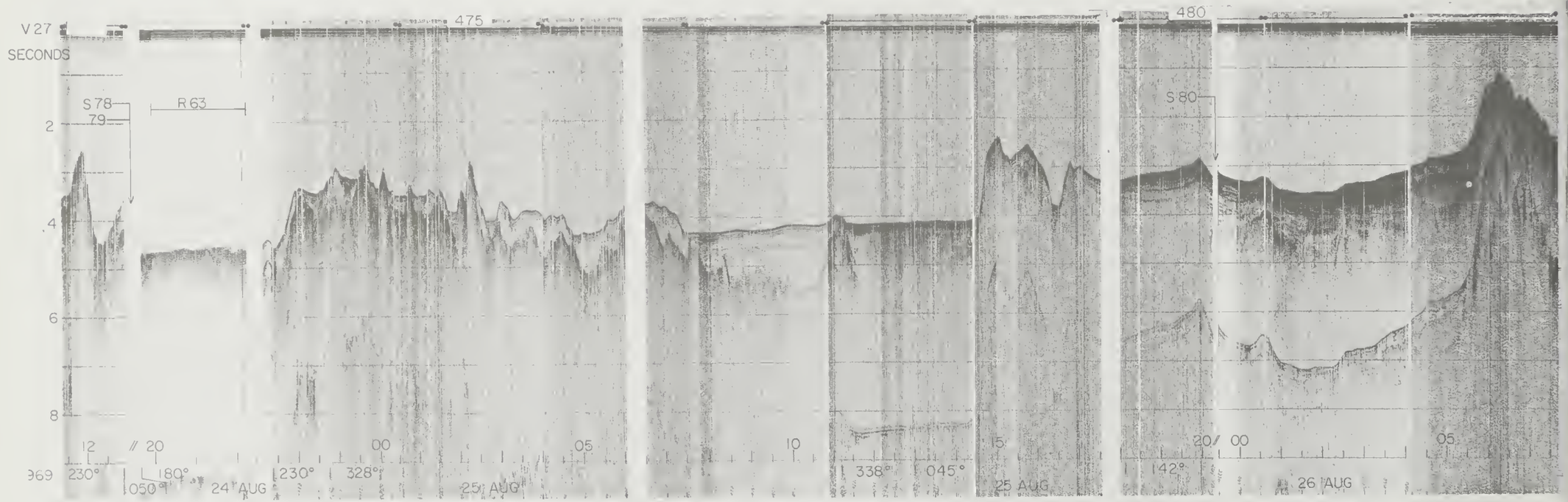

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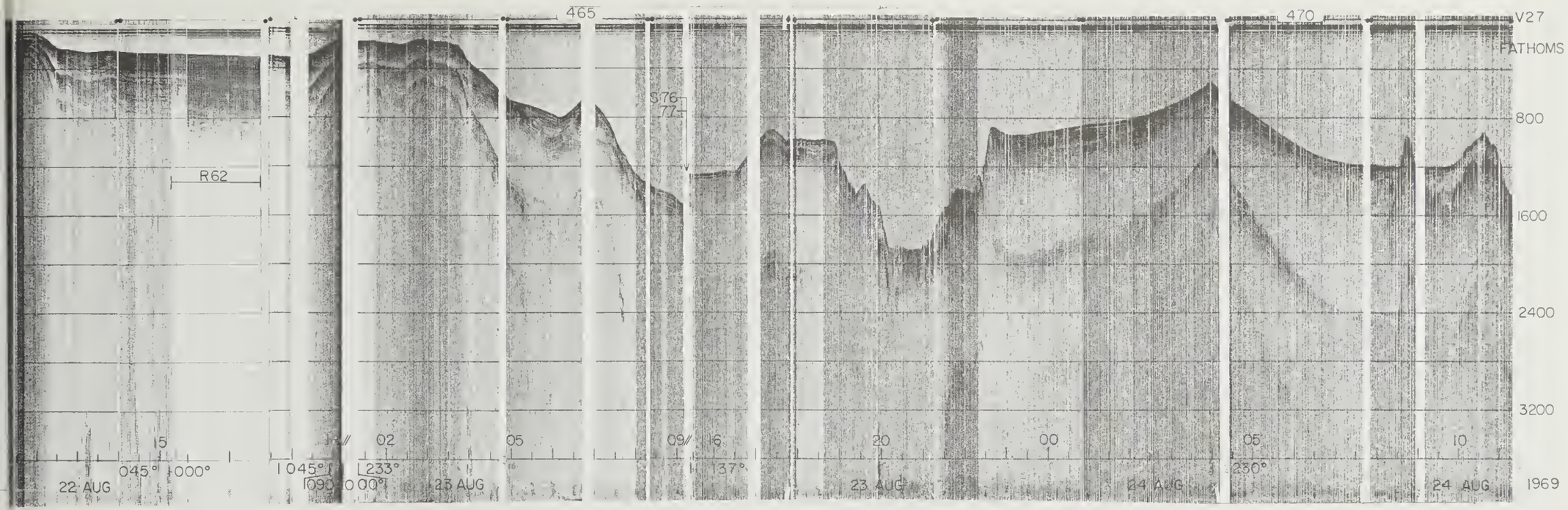

V 27
SECONDS
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410
415
R 55
S 71
R 56
R 57
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14 AUG
138°
14 AUG
138°
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R 61
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314°
18 AUG

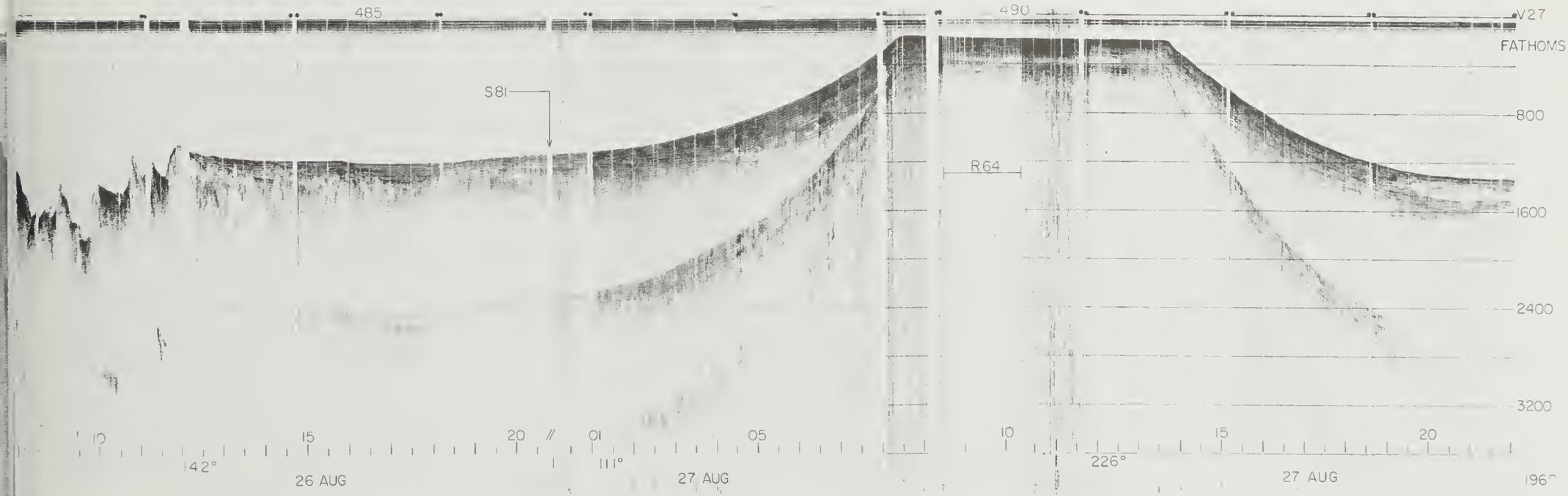

420
425
V27
THOMS
800
1600
2400
3200
1969
S 74
R58
R59
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18 // 21
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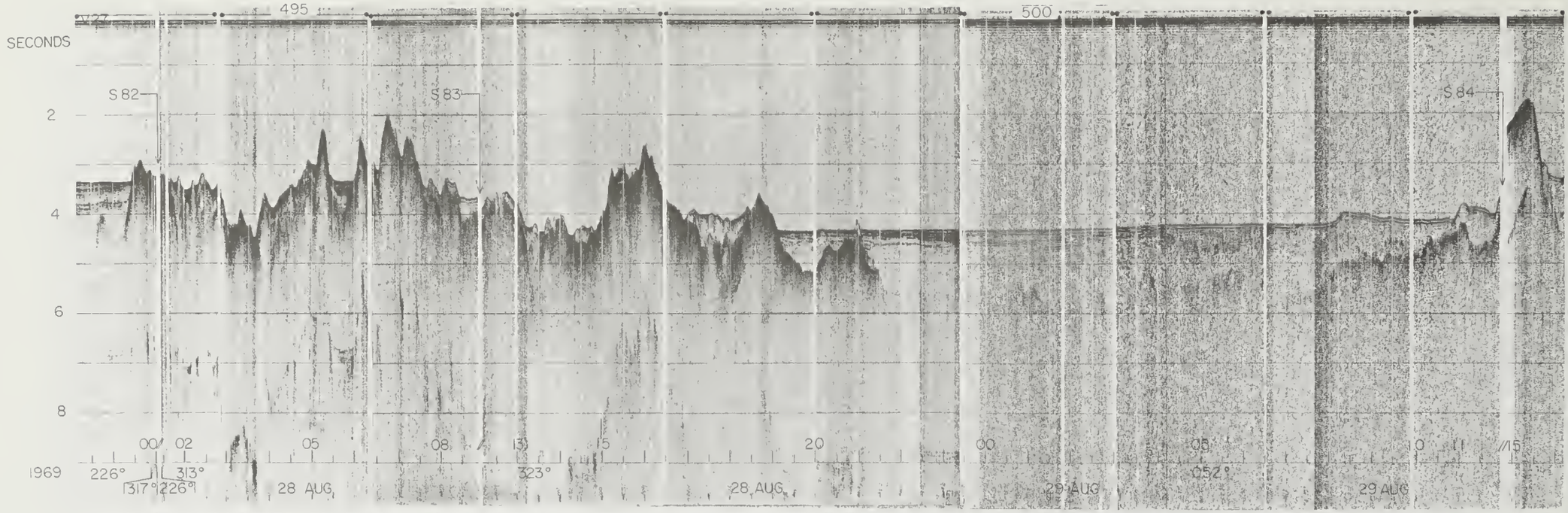

445
450
V27
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S 75
13 // 16
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17
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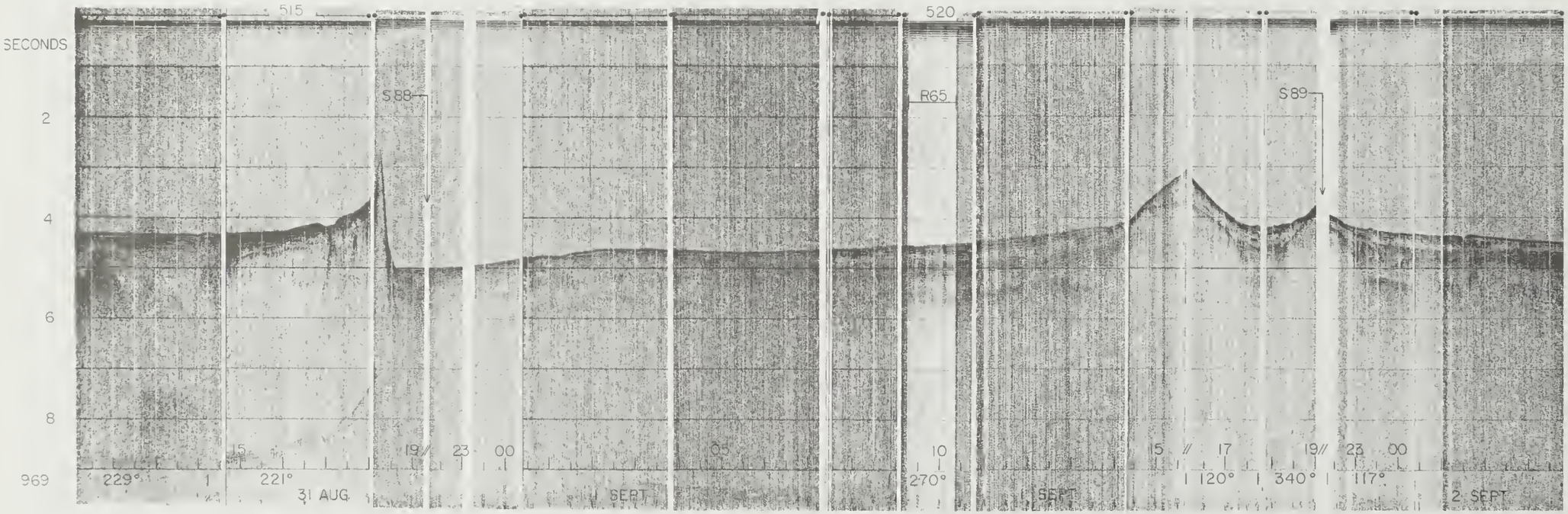

27
SECON
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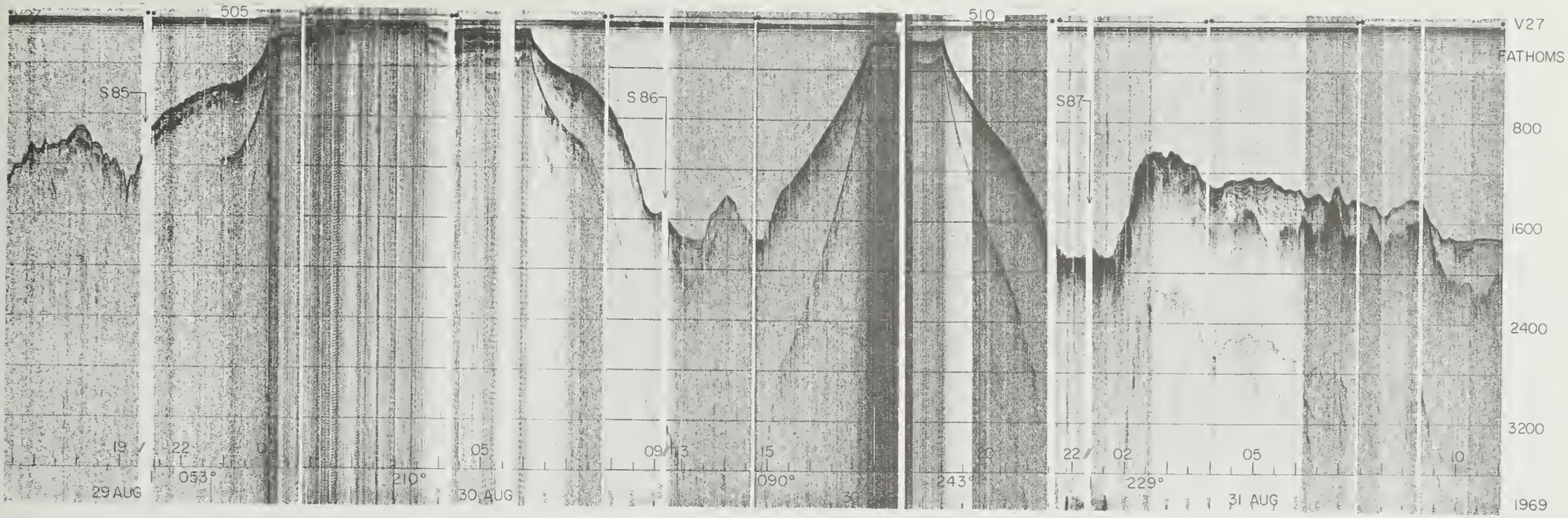

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SECONDS
475
480
S78
79
R63
S80
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12
20
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05
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20
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180°
050°
230°
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338°
045°
142°
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25 AUG
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26 AUG

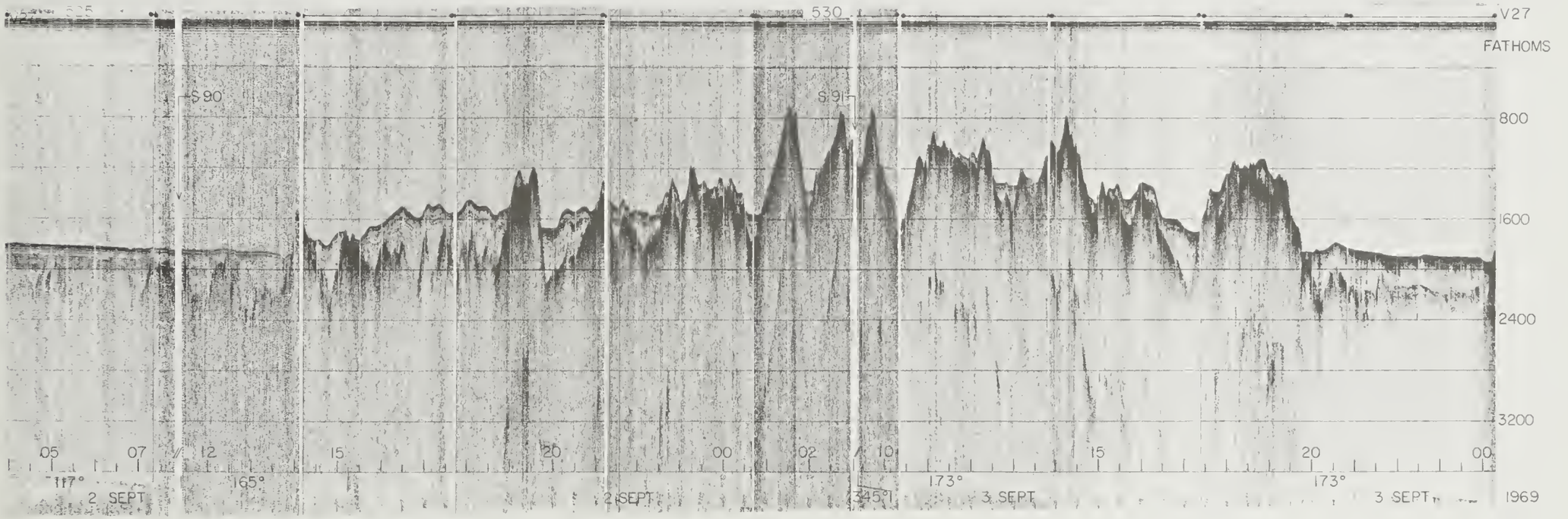

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470
V27
FATHOMS
800
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2400
3200
S76
77
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02
05
09
16
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05
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000°
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137°
230°
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23 AUG
23 AUG
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24 AUG
1969

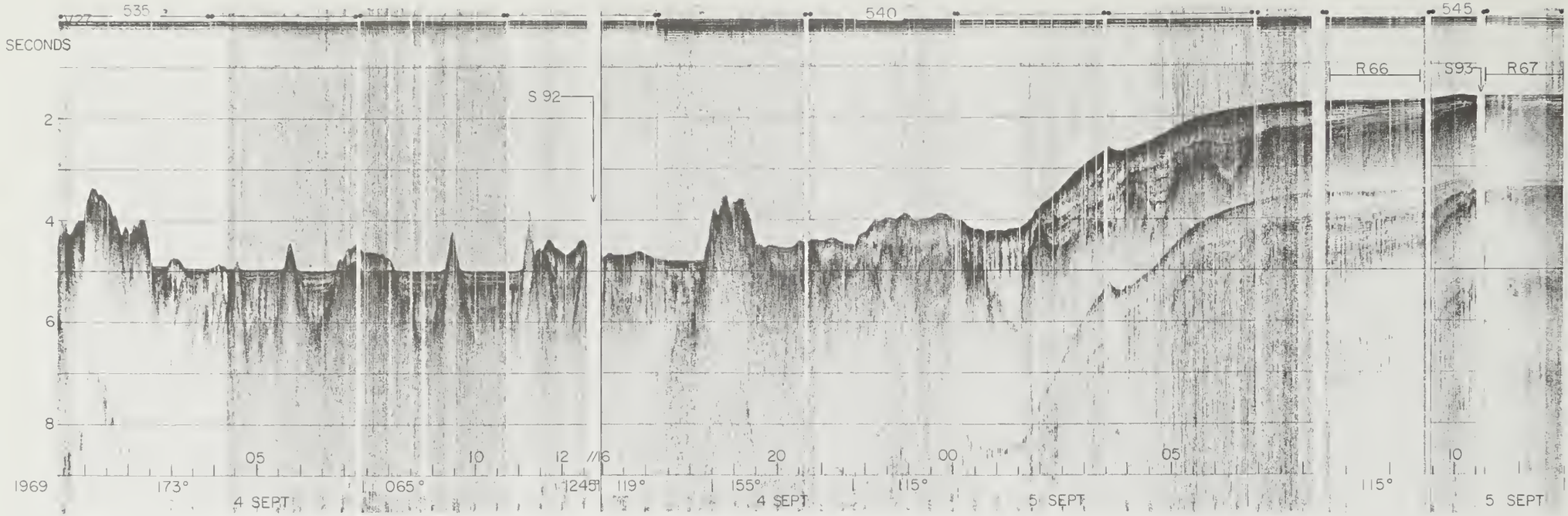

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490
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01
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196

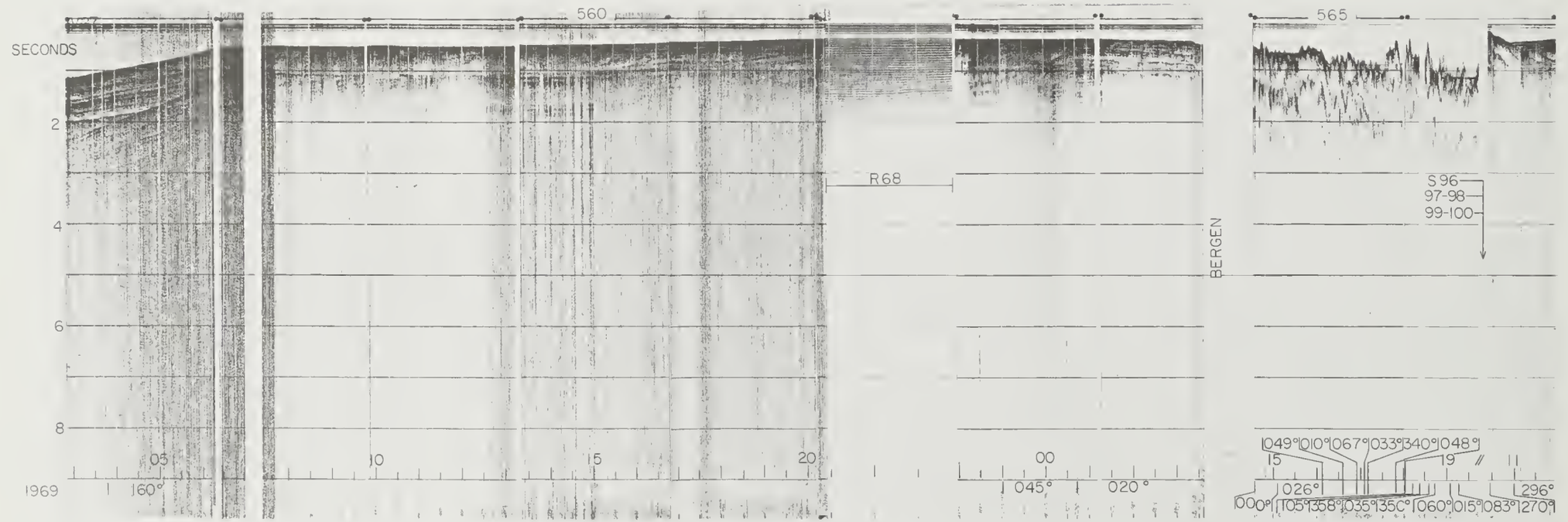

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2
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6
8
S 82
S 83
S 84
00
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05
08
13
15
20
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226°
313°
317°
226°
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323°
28 AUG
29 AUG
052°
29 AUG

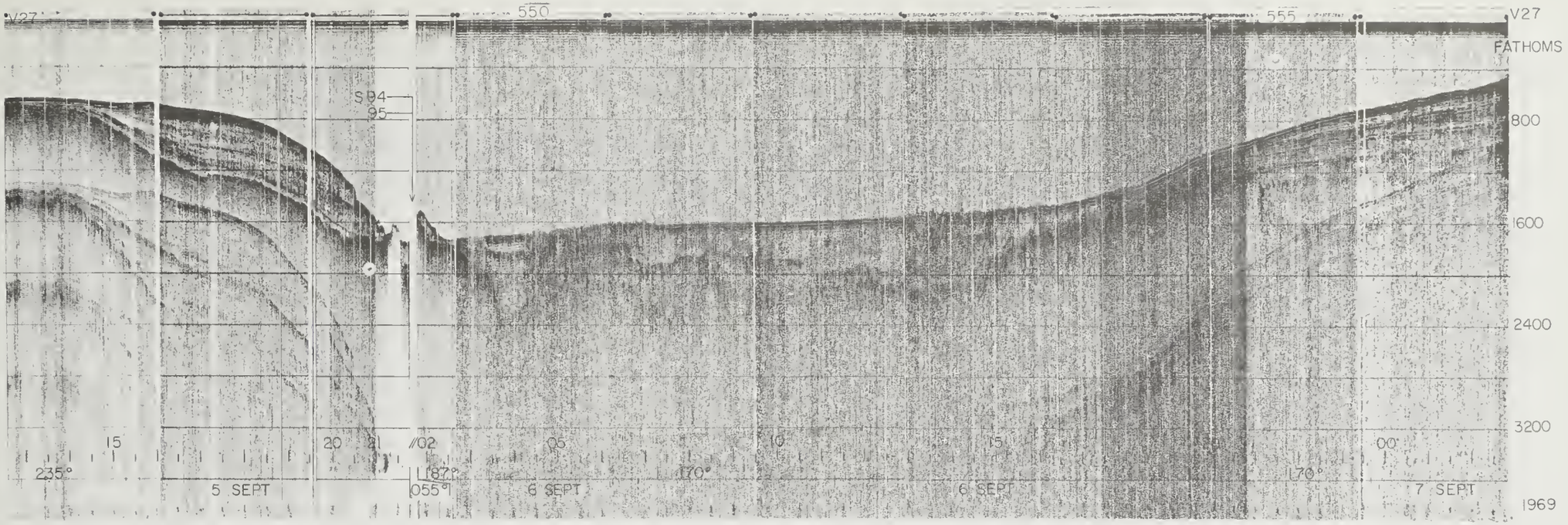

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520
SECONDS
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6
8
S 88
R65
S 89
15
19
23
00
05
10
15
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23
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969
229°
1
221°
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1 SEPT
270°
1 SEPT
120°
340°
117°
2 SEPT

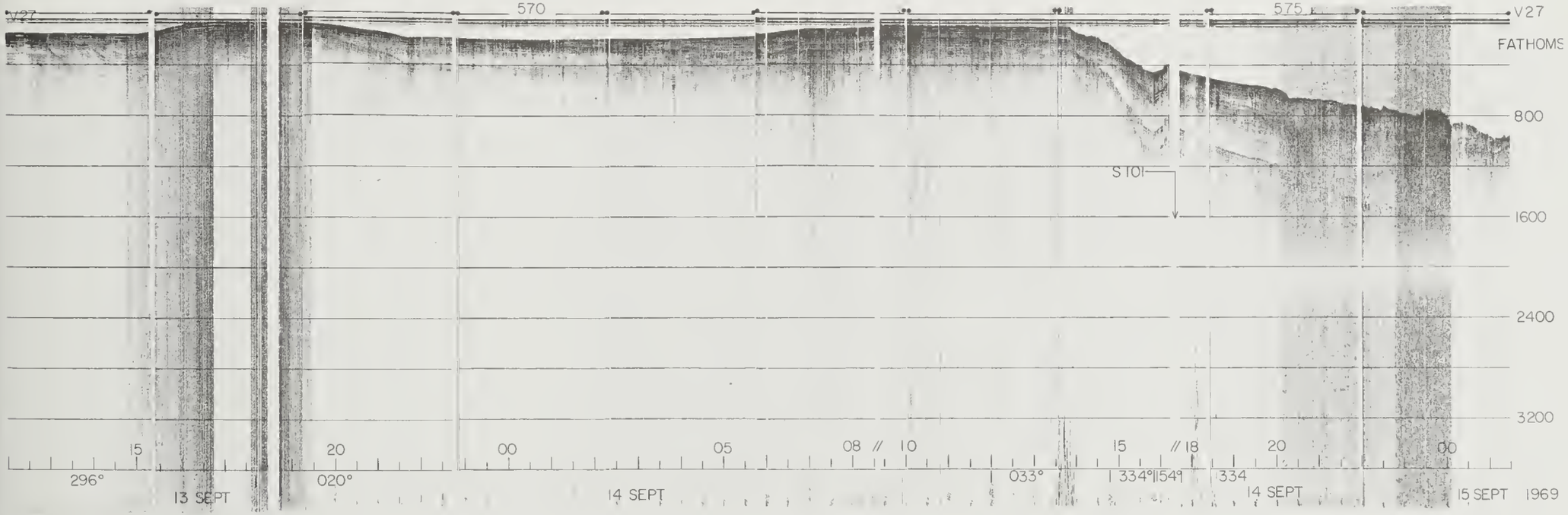

505
510
V27
FATHOMS
S 85
S 86
S 87
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3200
1969
19
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29 AUG
30 AUG
31 AUG

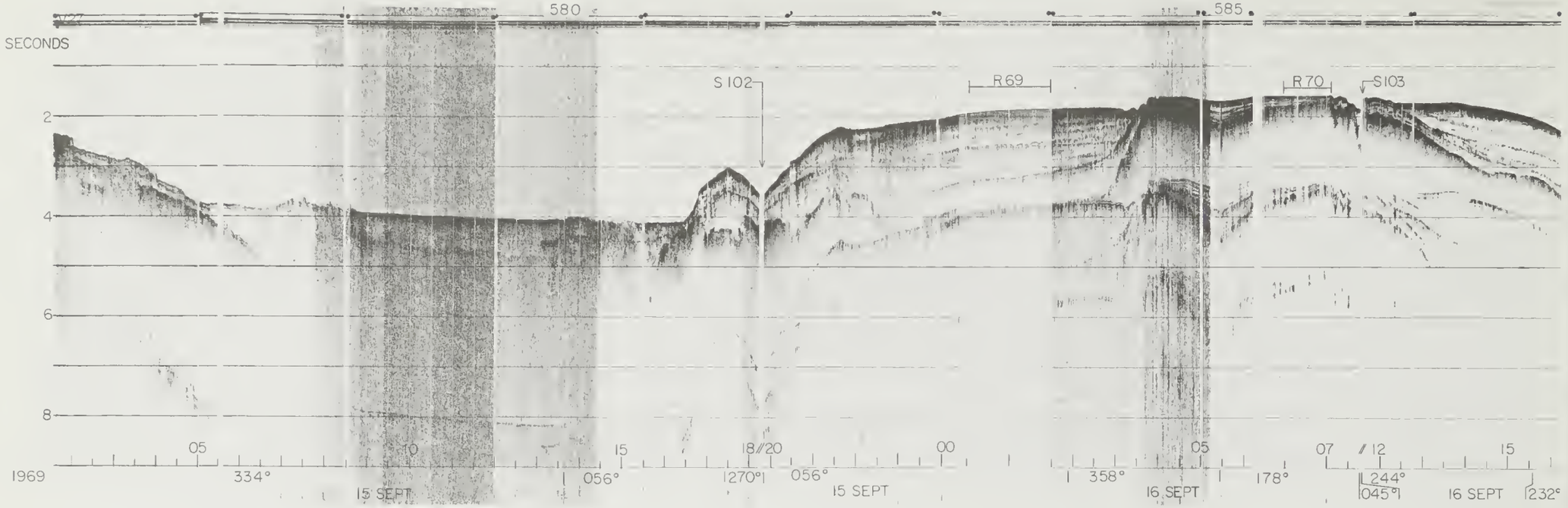

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530
V27
FATHOMS
S 90
S 91
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07
12
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345°
173°
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2 SEPT
3 SEPT
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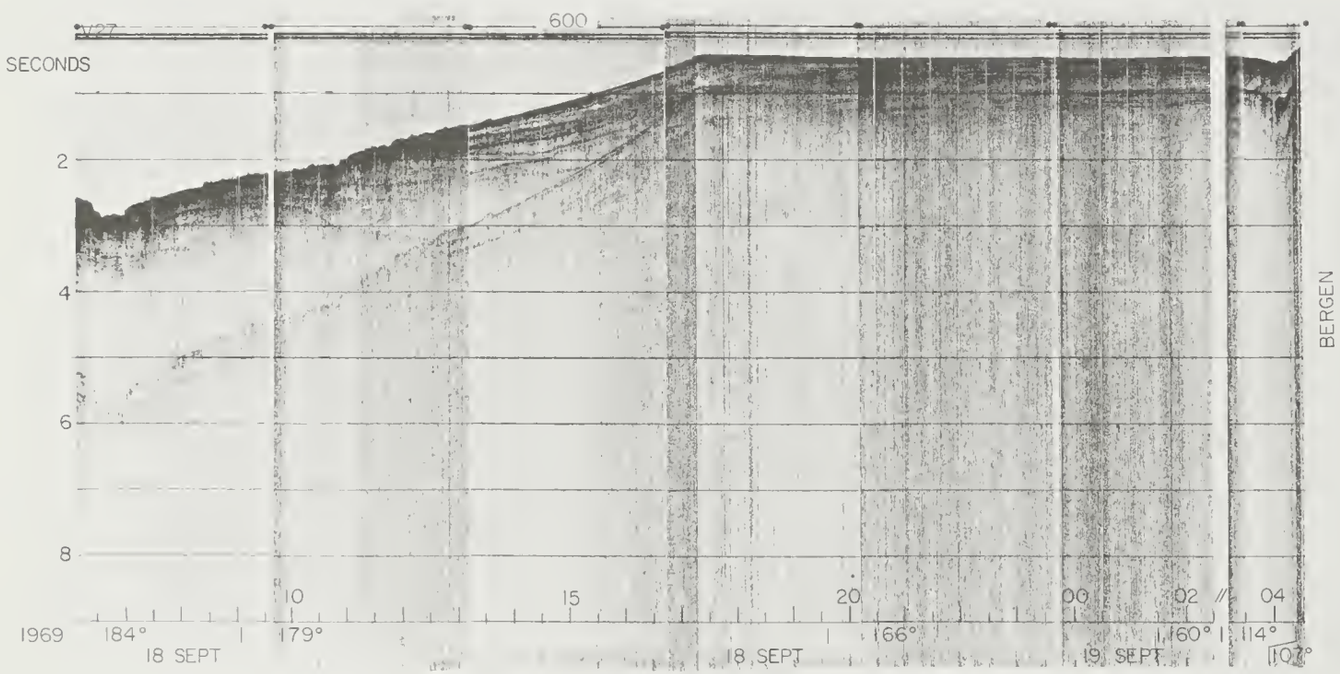

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540
545
SECONDS
2
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8
S 92
R66
S93
R67
05
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065°
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155°
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115°
4 SEPT
4 SEPT
5 SEPT
5 SEPT

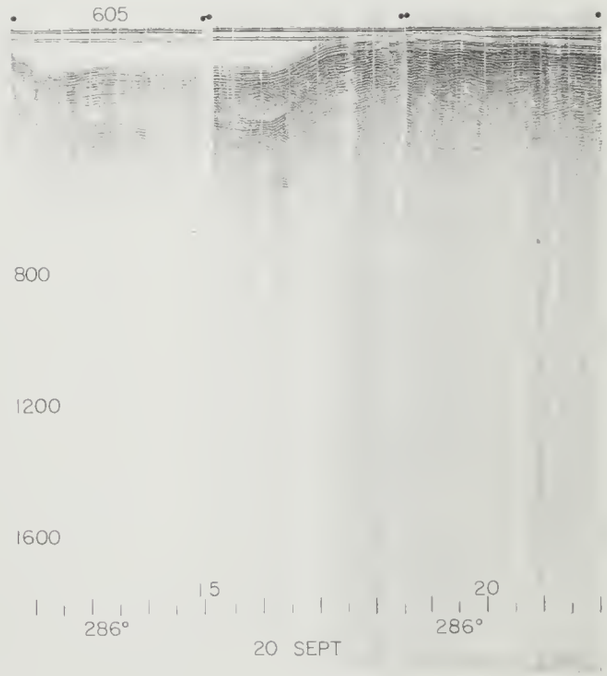

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565
SECONDS
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R68
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97-98
99-100
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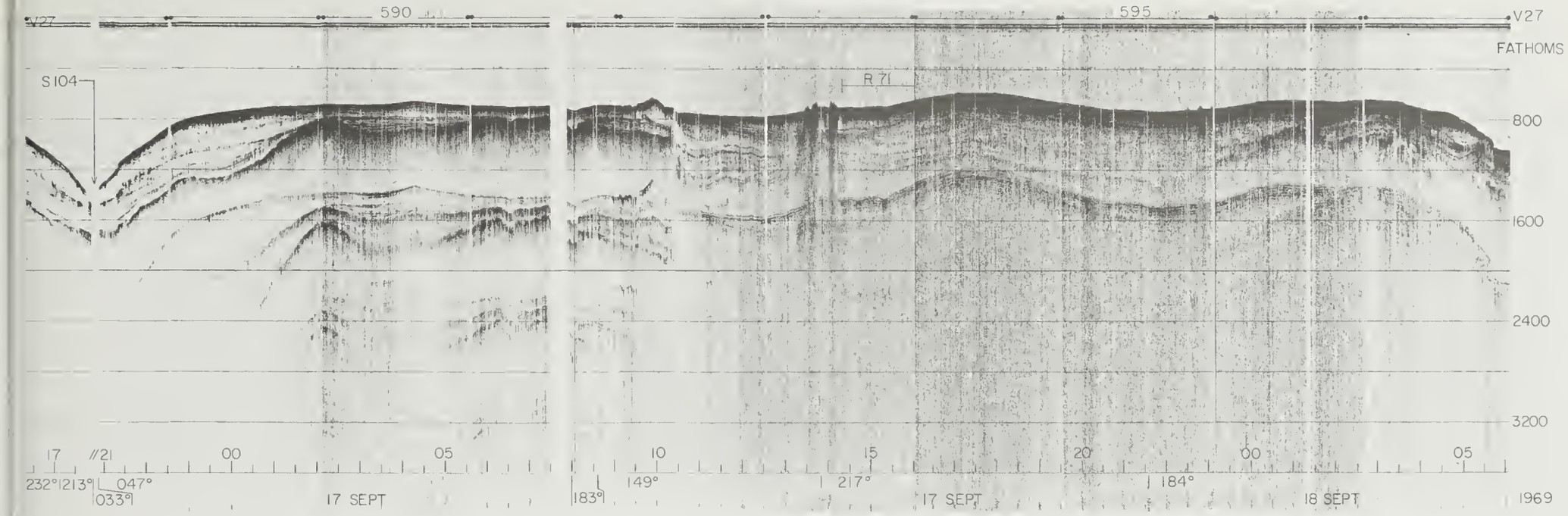

V27
550
555
V27
FATHOMS
800
1600
2400
3200
1969
S 94
95
15
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6 SEPT
170°
6 SEPT
170°
7 SEPT

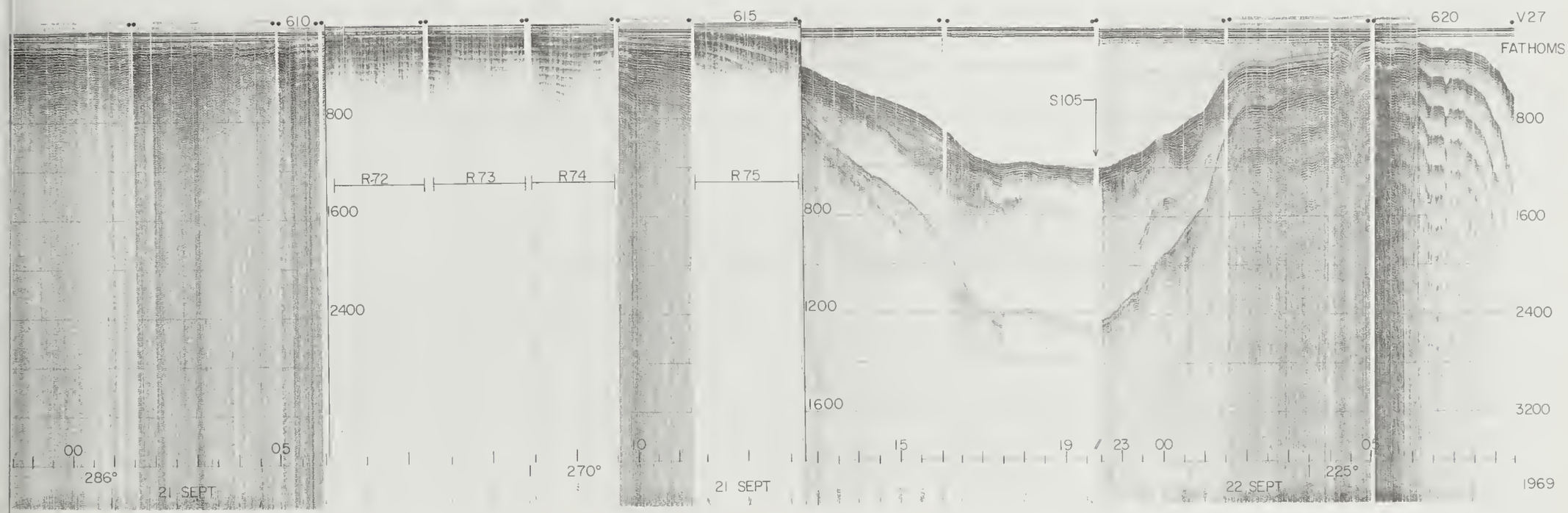

V27
570
575
V27
FATHOMS
800
S 101
1600
2400
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296°
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334°
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15 SEPT
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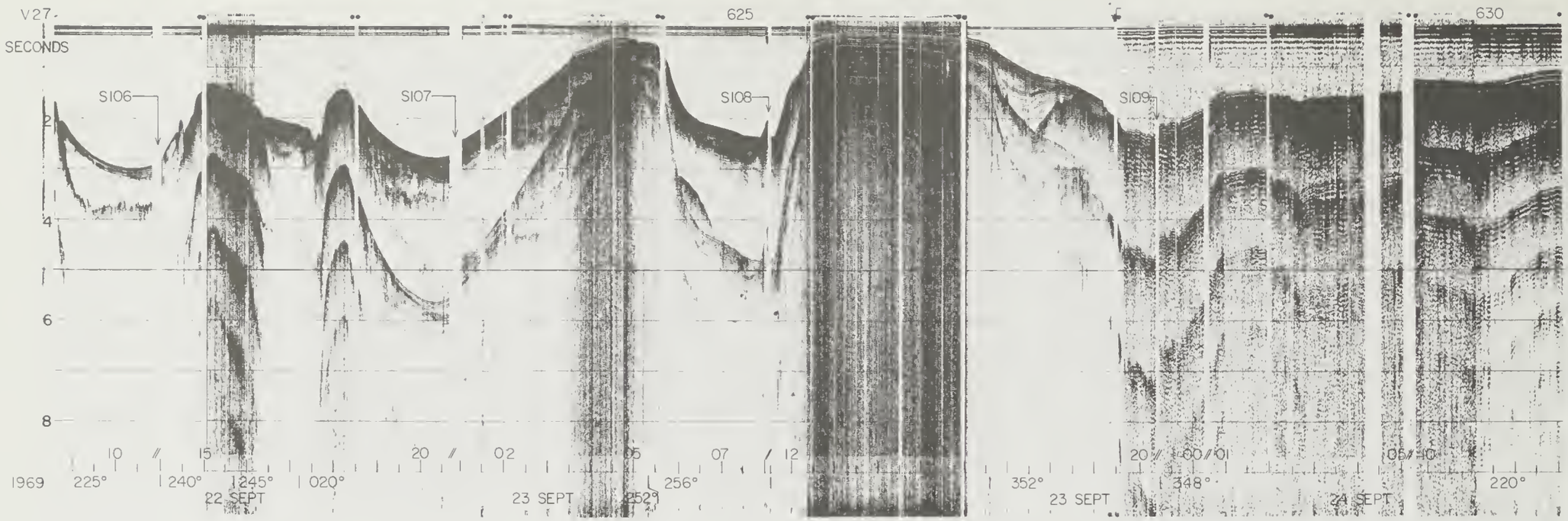

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580
585
SECONDS
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S102
R69
R70
S103
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18//20
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16 SEPT
16 SEPT

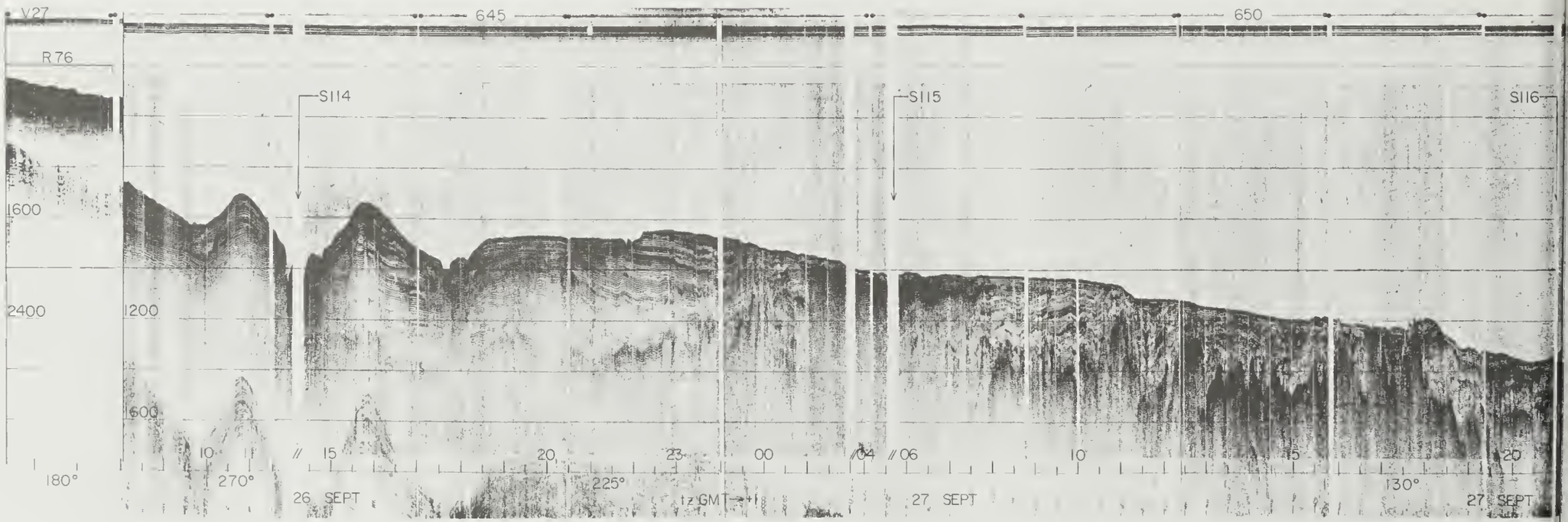

V27
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184°
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114°
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18 SEPT
19 SEPT
BERGEN

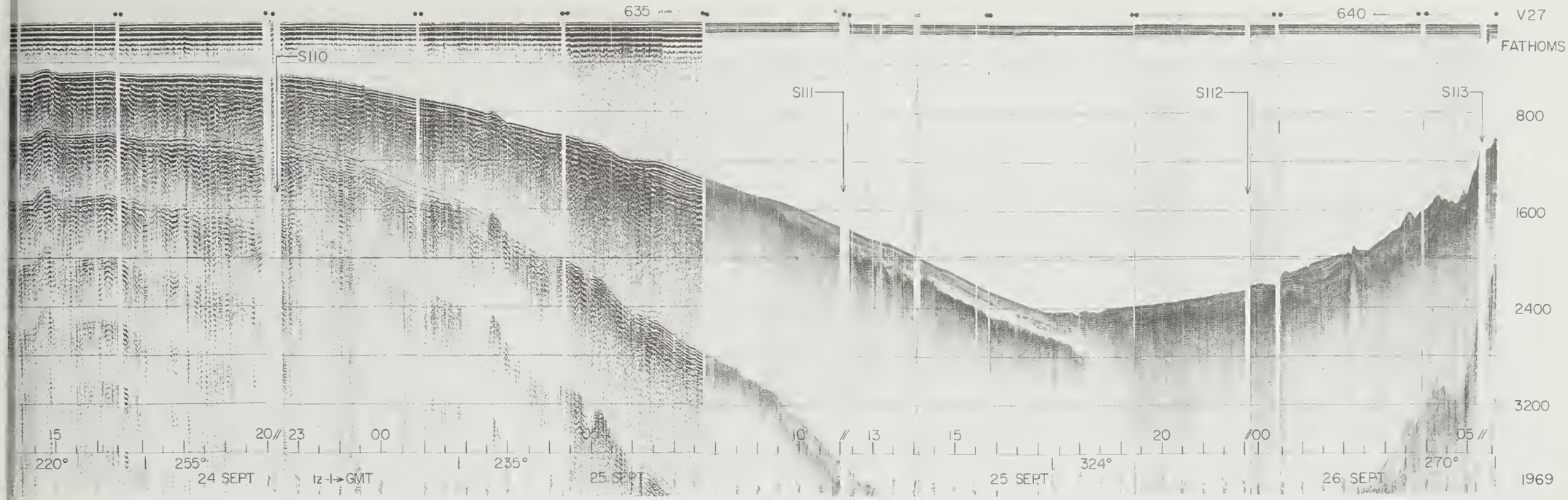

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286°
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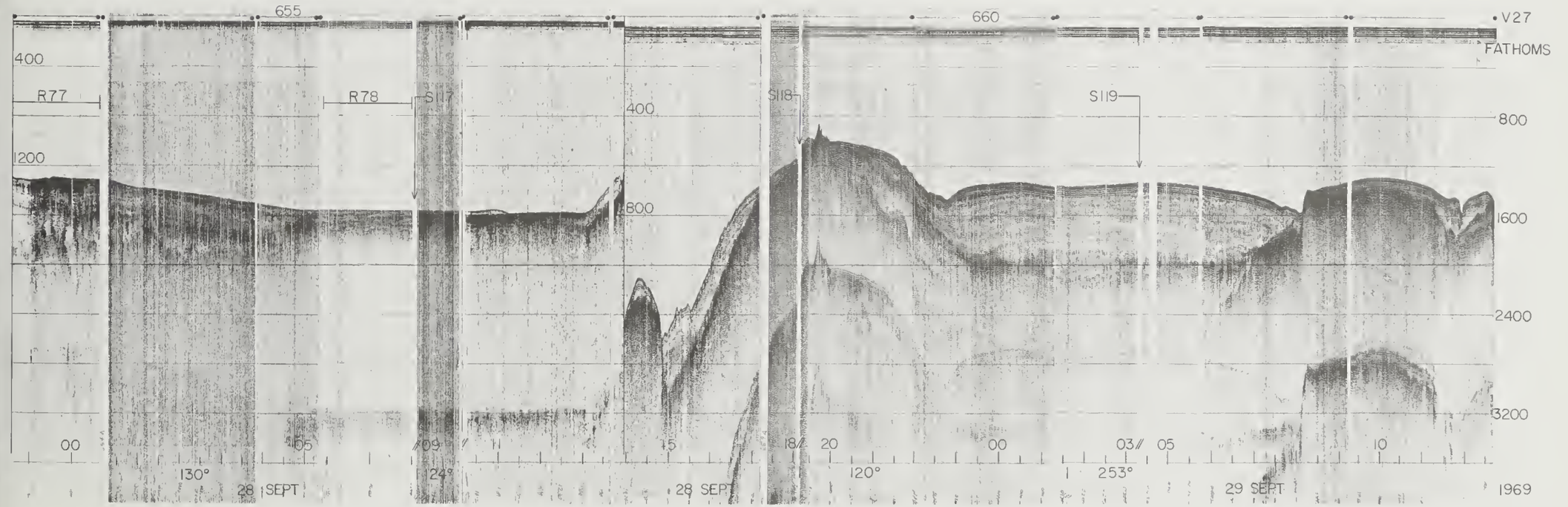

V27
590
595
V27
FATHOMS
S104
R 71
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1600
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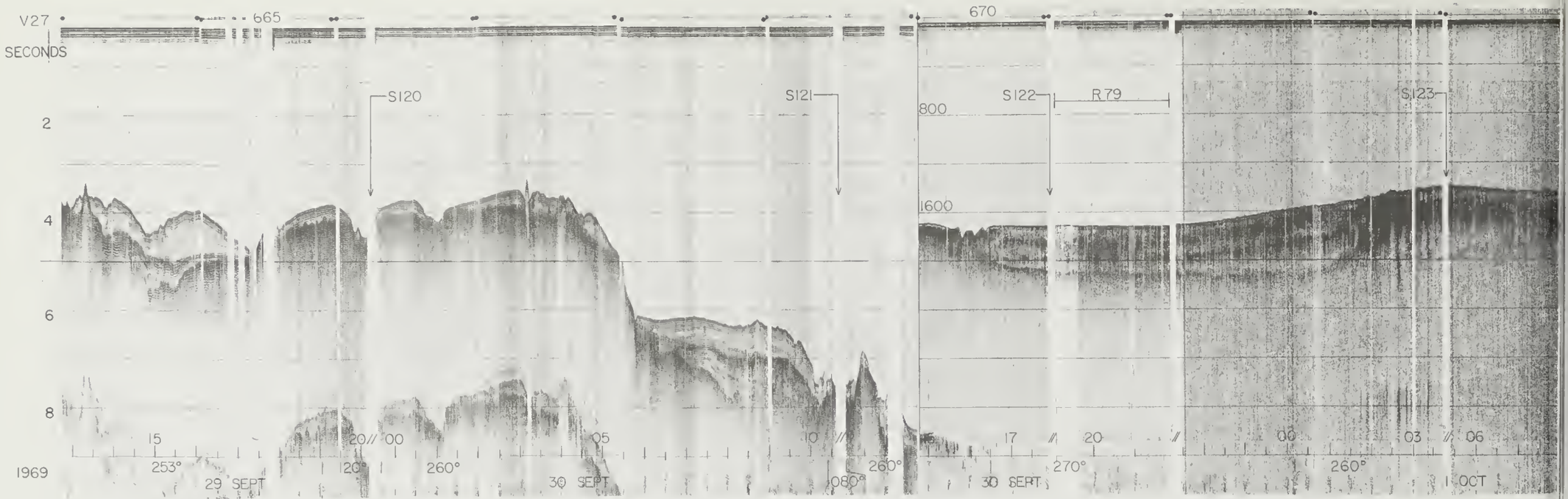

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620
V27
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R 72
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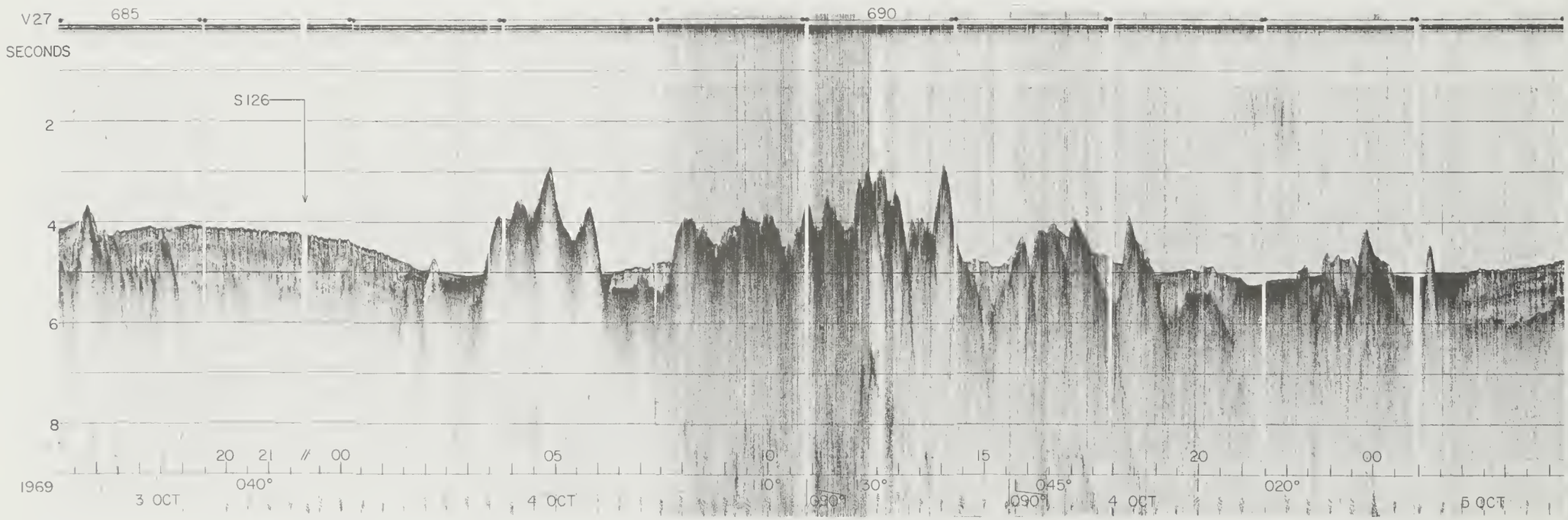

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S106
S107
S108
S109
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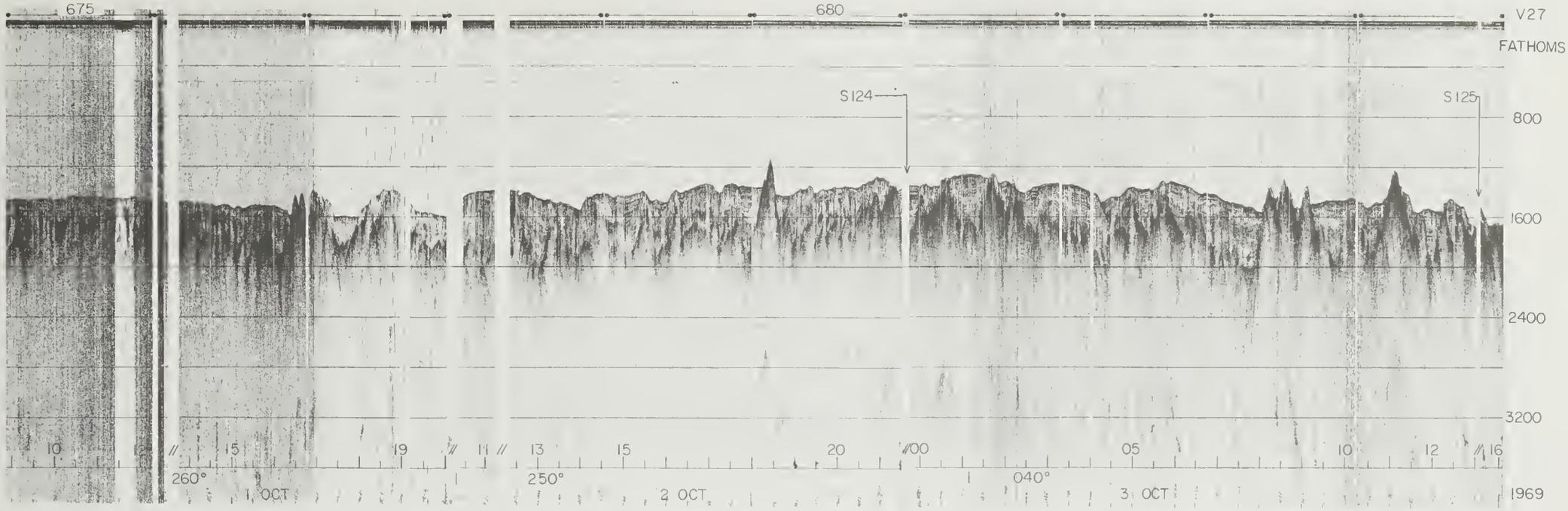

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S115
S116
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270°
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225°
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27 SEPT
130°
27 SEPT

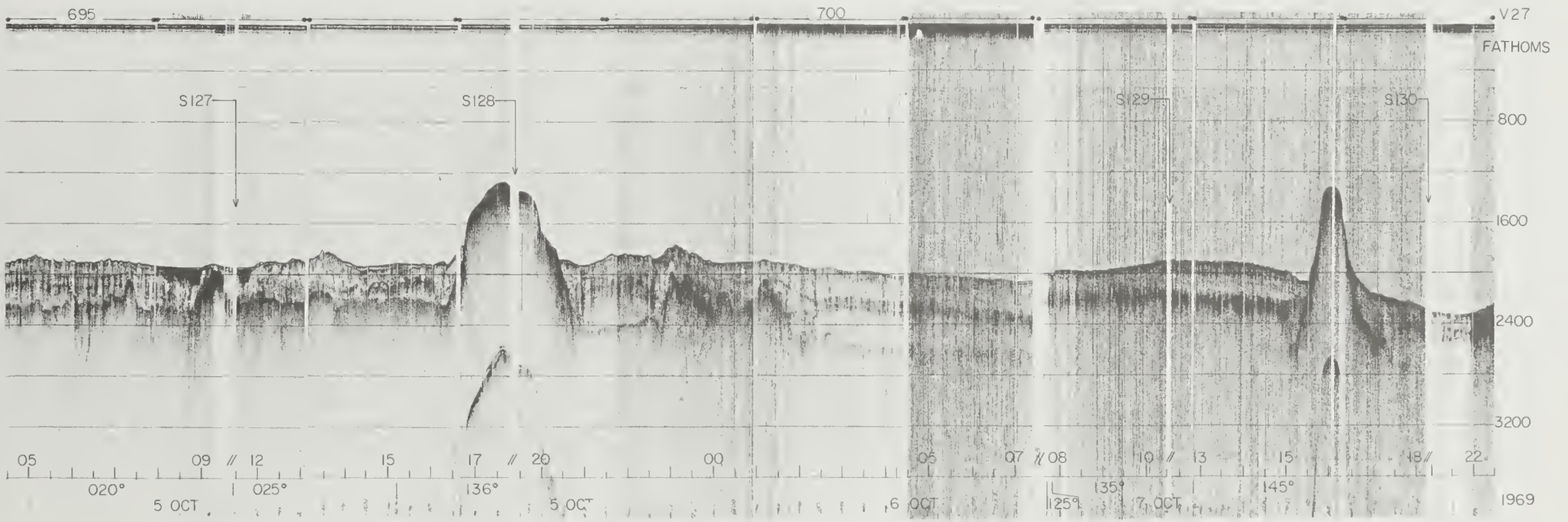

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S111
S112
S113
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1600
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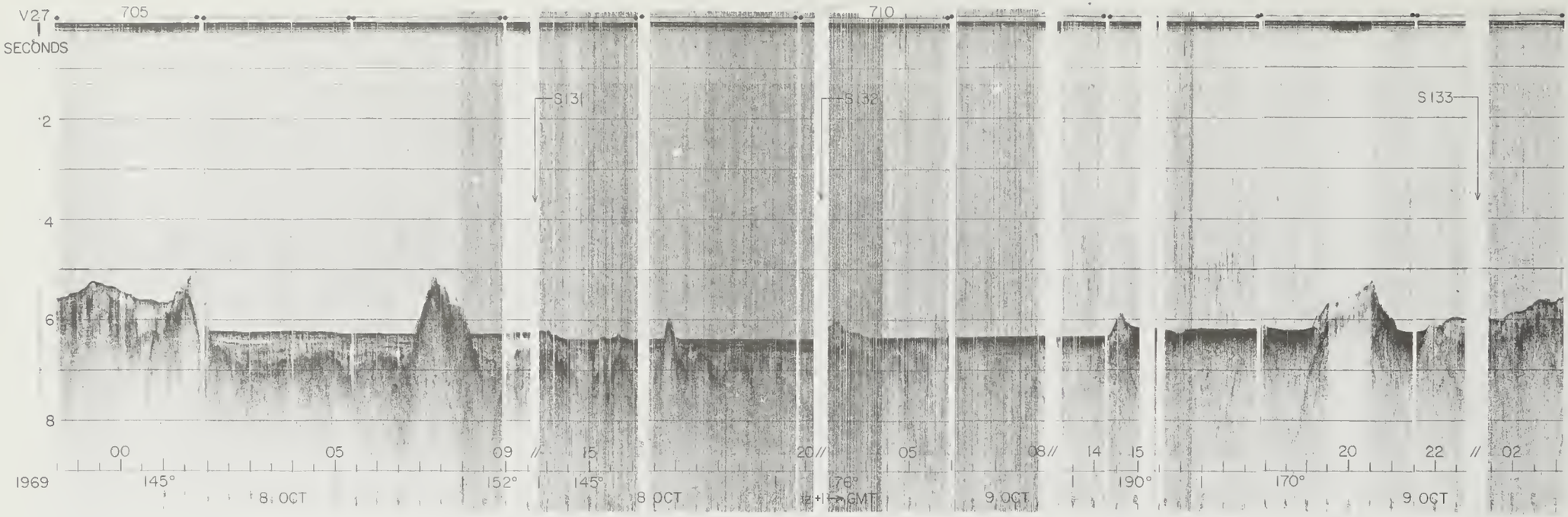

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660
V27
FATHOMS
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R78
S117
S118
S119
1200
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2400
3200
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253°
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1969

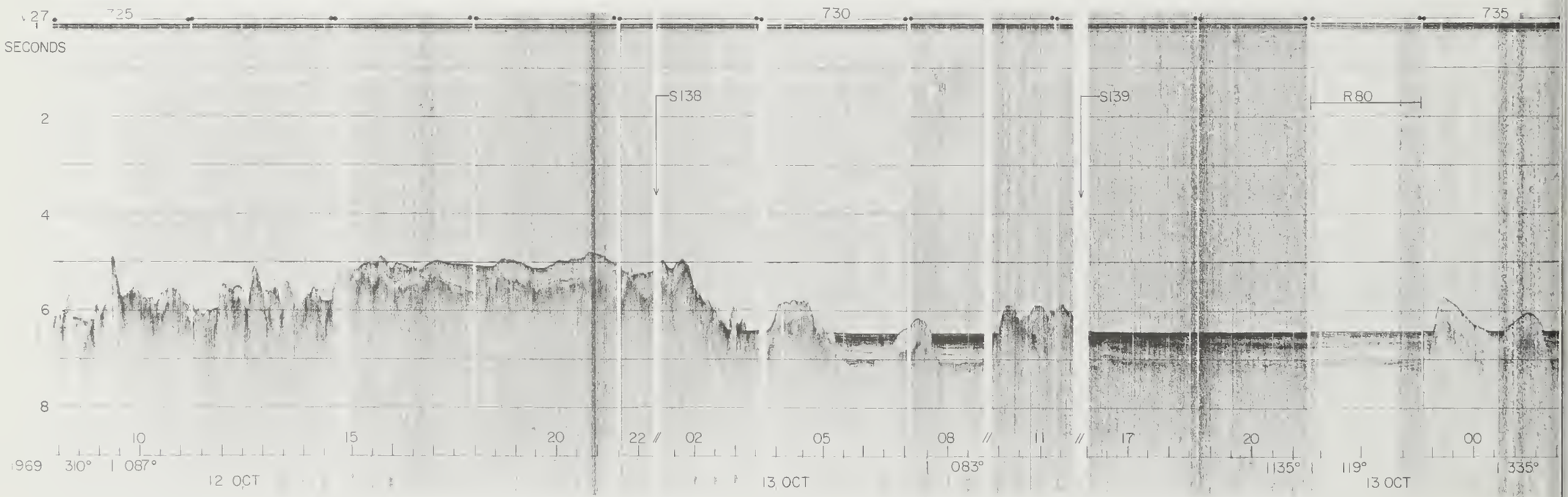

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670
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S122
R79
S123
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1600
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10 // 15
17 // 20
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080°
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1 OCT

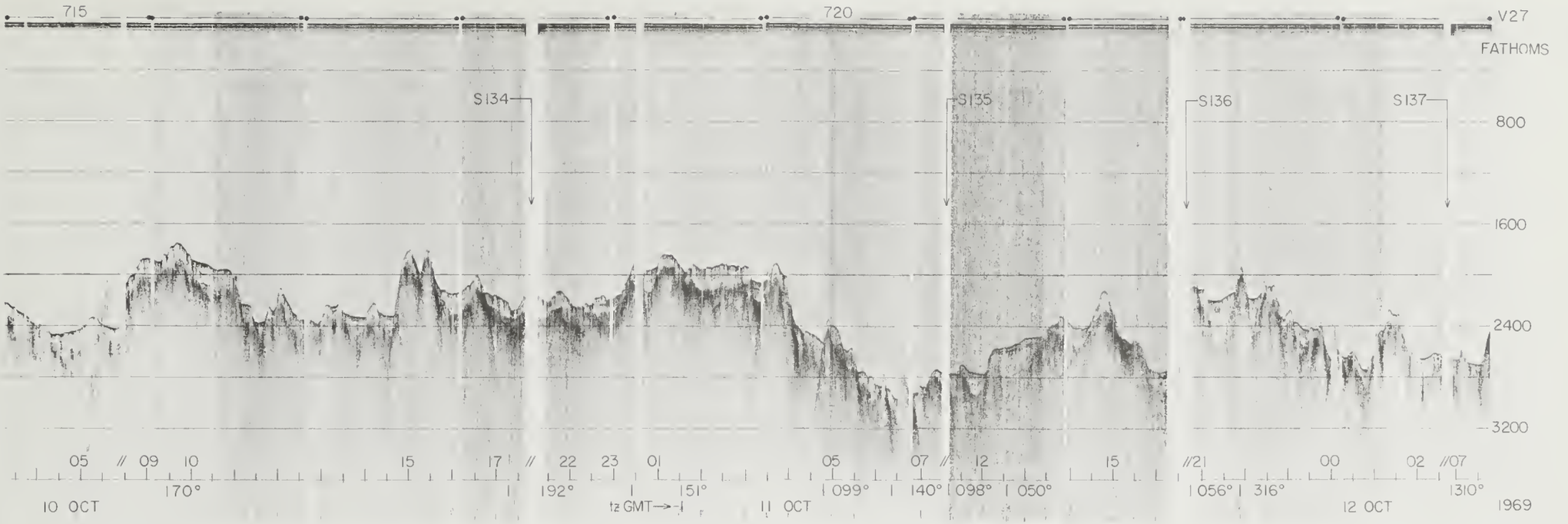

V27
685
690
SECONDS
S126
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4 OCT
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020°
5 OCT

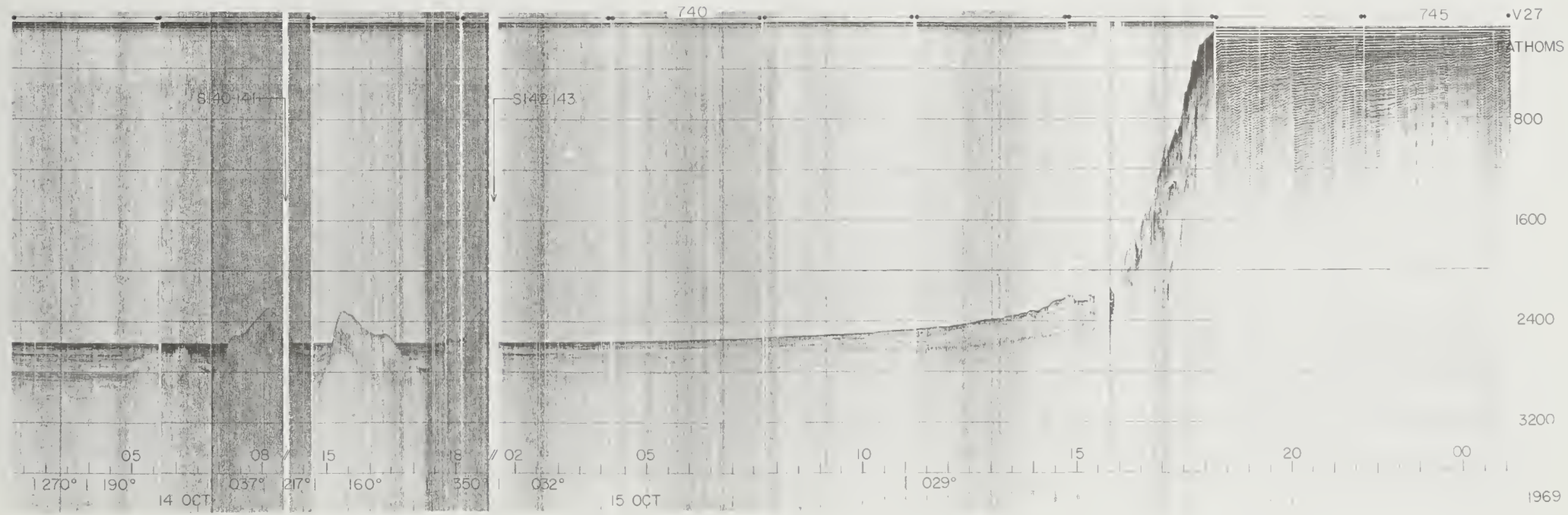

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680
V27
FATHOMS
S124
S125
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3200
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1 OCT
2 OCT
3 OCT

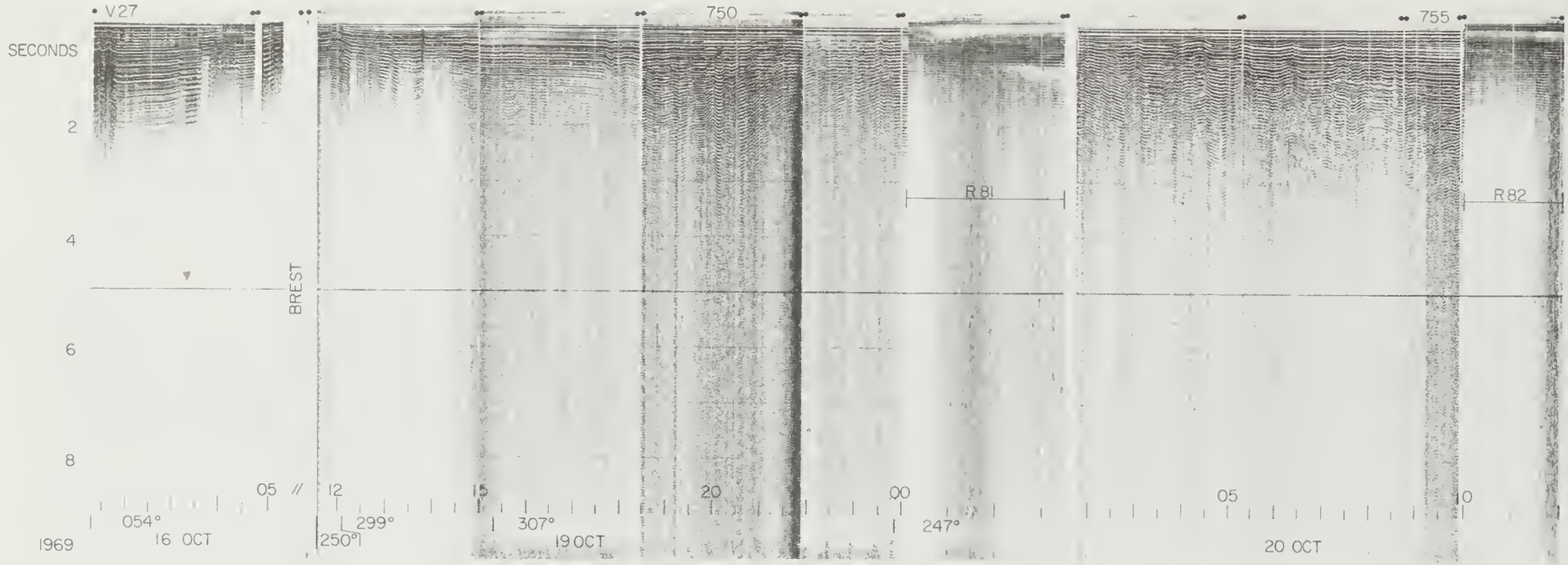

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V27
FATHOMS
S127
S128
S129
S130
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1600
2400
3200
1969
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22
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136°
135°
145°
5 OCT
5 OCT
6 OCT
7 OCT

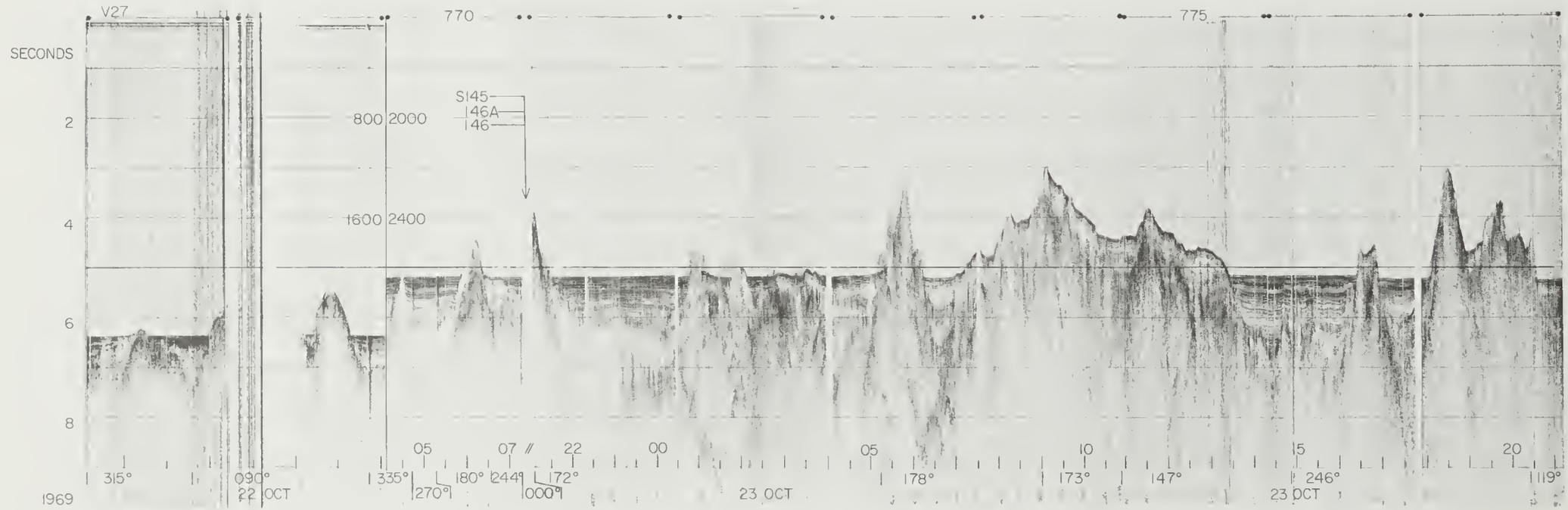

V27
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710
SECONDS
2
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S131
S132
S133
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05
08
14
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8 OCT
8 OCT
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9 OCT
190°
170°
9 OCT
GMT +1

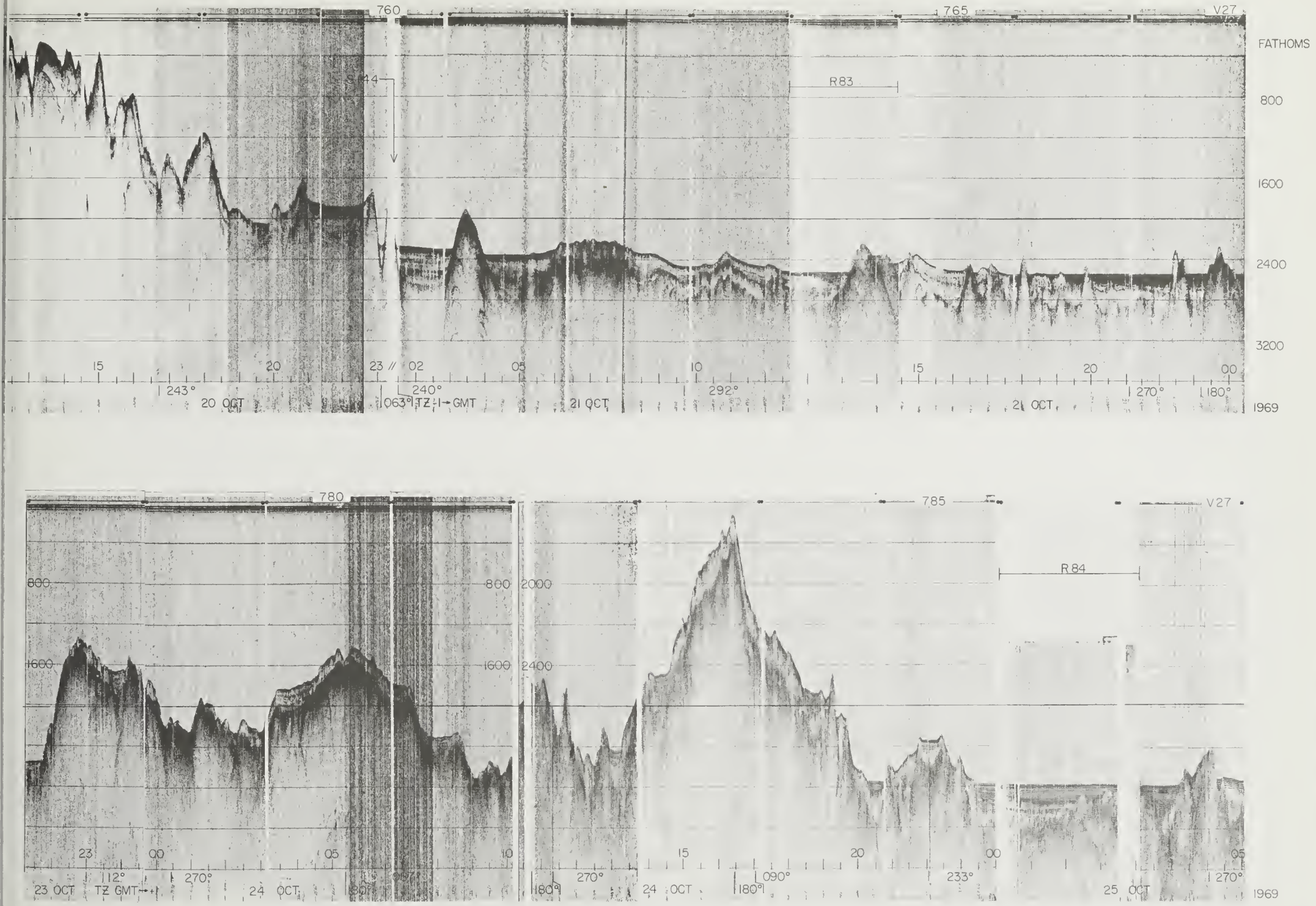

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730
735
SECONDS
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S138
S139
R80
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13 OCT
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335°
13 OCT

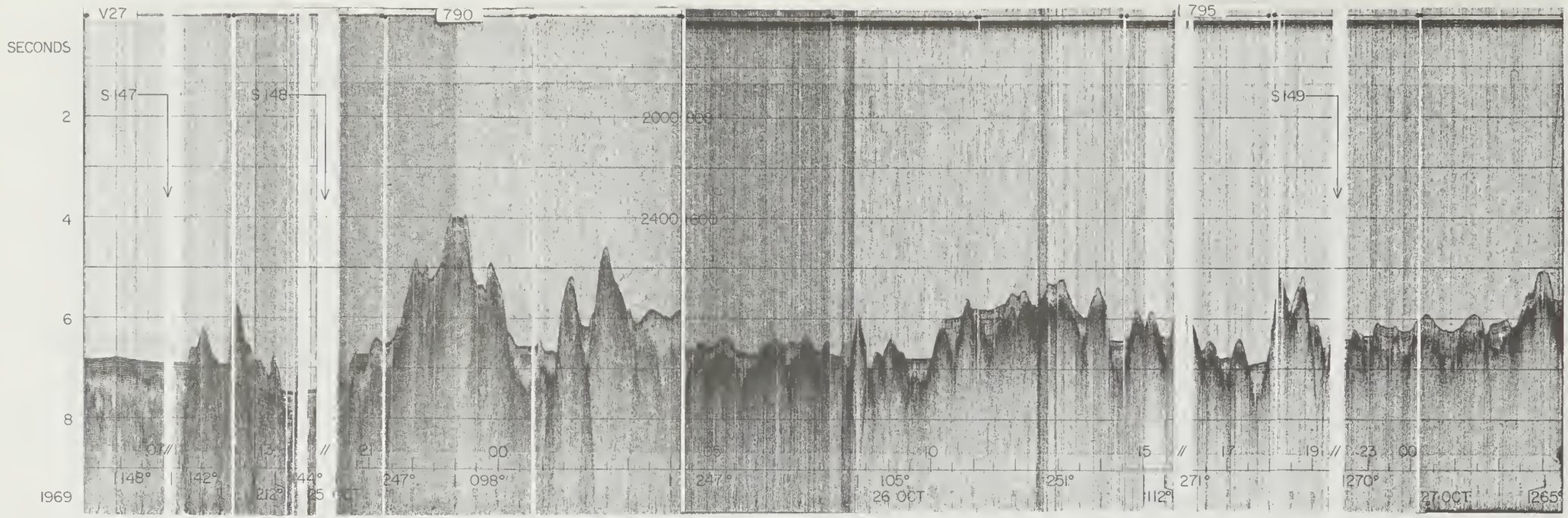

715
720
V27
FATHOMS
S134
S135
S136
S137
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1600
2400
3200
05 // 09 10 15 17 // 22 23 01 05 07 // 12 15 //21 00 02 //07
170° 192° 151° 099° 140° 098° 050° 056° 316° 1310°
10 OCT
tz GMT→-1
11 OCT
12 OCT
1969

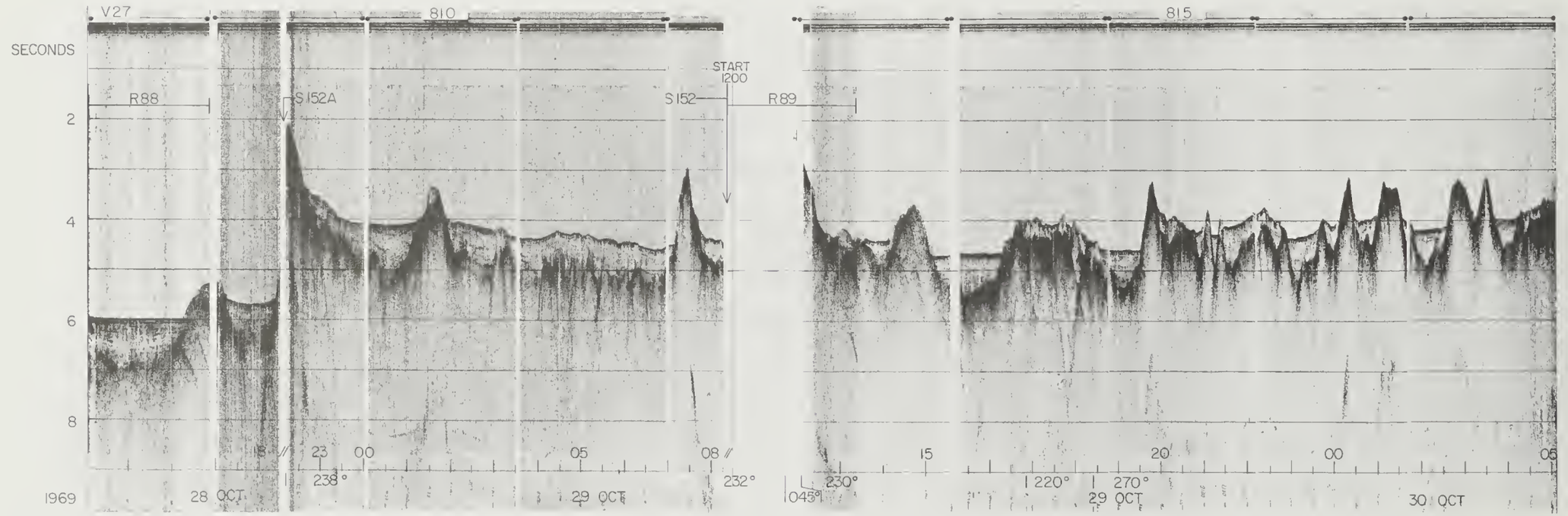

740
745
V27
FATHOMS
S140 141
S142 143
800
1600
2400
3200
05 08 // 15 18 // 02 05 10 15 20 00
270° 190° 037° 217° 160° 350° 032° 029°
14 OCT
15 OCT
1969

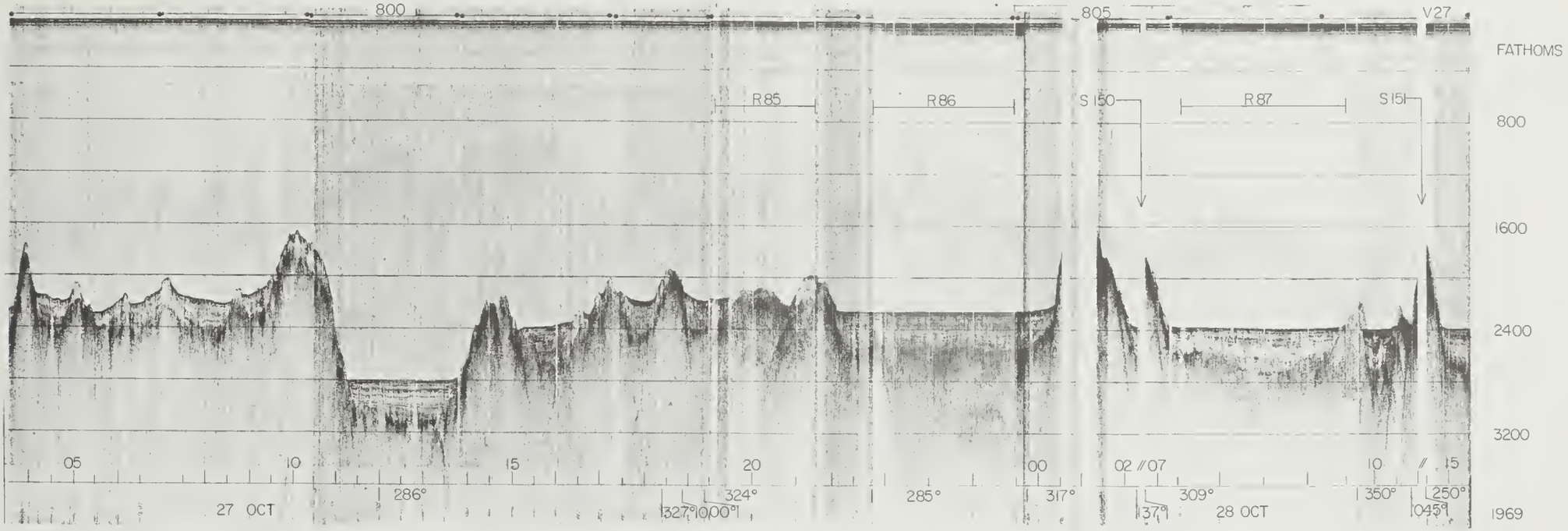

V27
750
755
SECONDS
2
4
6
8
BREST
R81
R82
05
12
15
20
00
05
10
054°
299°
307°
247°
1969
16 OCT
250°
19 OCT
20 OCT

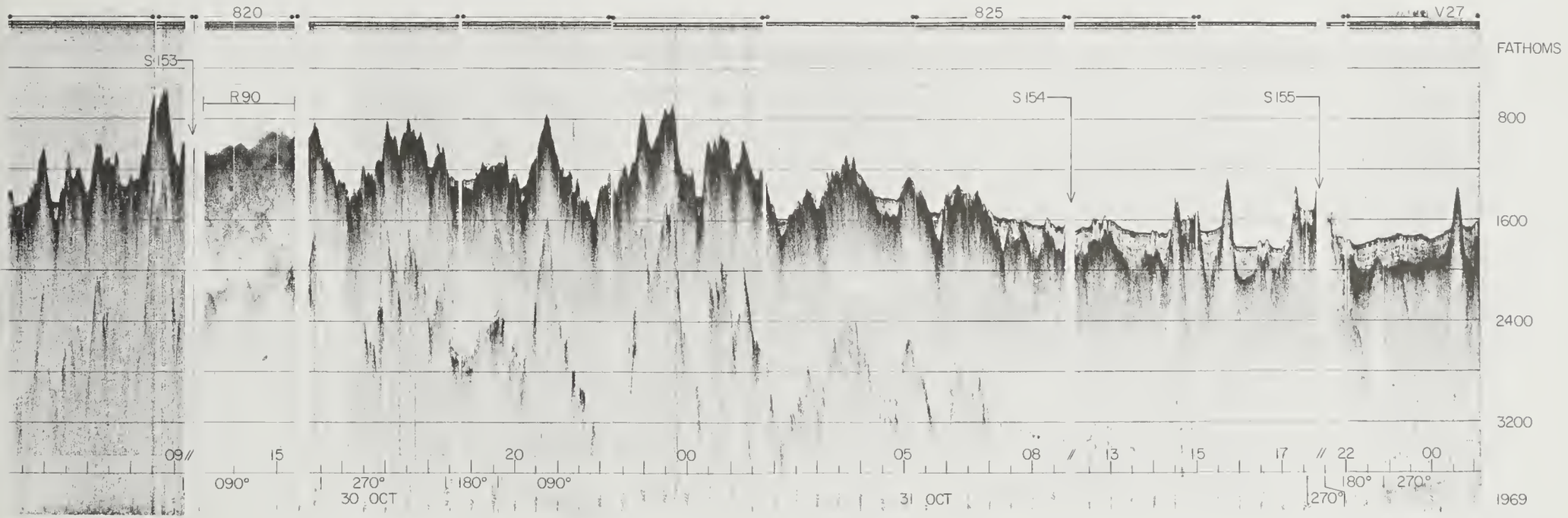

V27
770
775
SECONDS
2
4
6
8
S145
146A
146
800 2000
1600 2400
05
07
22
00
05
10
15
20
315°
090°
335°
180°
244°
172°
178°
173°
147°
246°
119°
1969
22 OCT
270°
000°
23 OCT
23 OCT

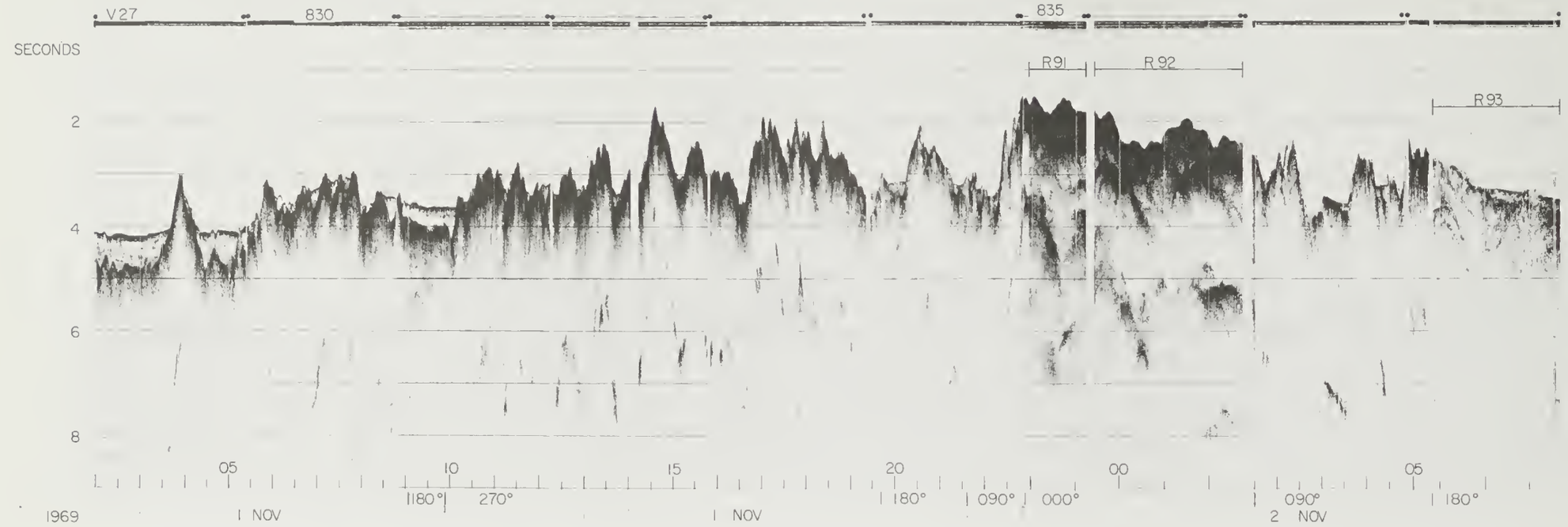

760
765
V27
FATHOMS
800
1600
2400
3200
R83
15
20
23 // 02
05
10
15
20
00
243°
240°
063° TZ -1→ GMT
292°
270°
180°
20 OCT
21 OCT
21 OCT
1969
780
785
V27
R84
800
1600
2000
2400
23
00
05
10
15
20
00
05
112°
270°
090°
233°
270°
180°
23 OCT TZ GMT→+1
24 OCT
24 OCT
25 OCT
1969

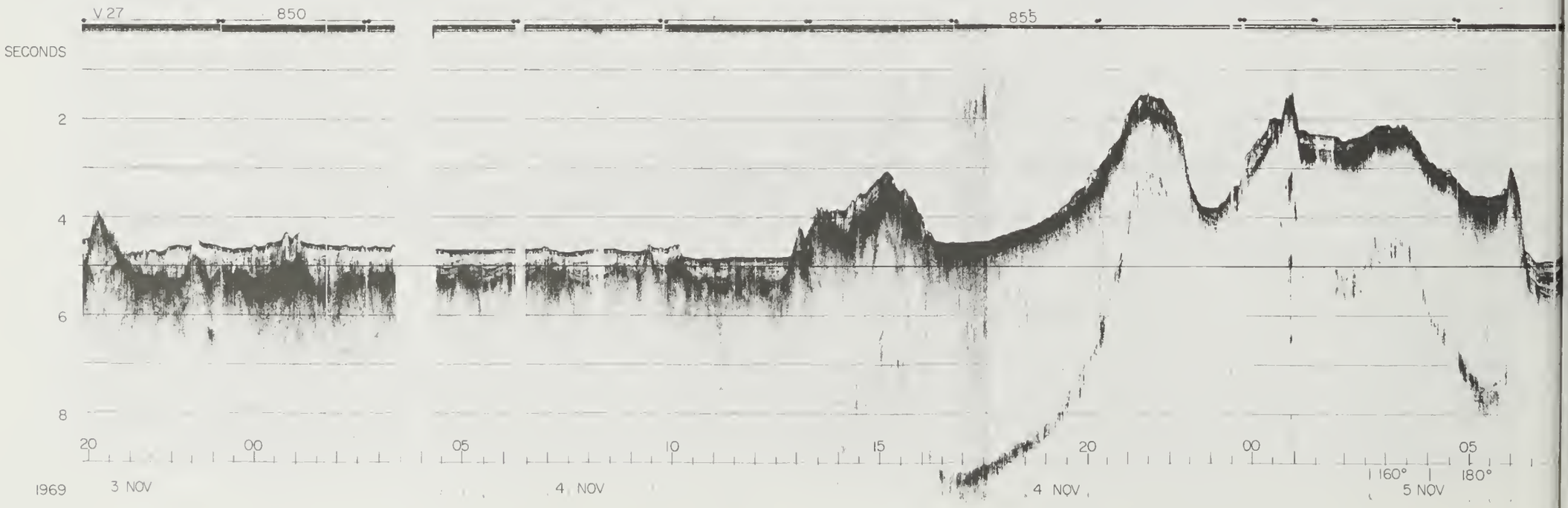

V27
790
795
SECONDS
S 147
S 148
S 149
2
4
6
8
2000
2400
1969
148°
142°
247°
098°
247°
105°
26 OCT
251°
112°
271°
270°
27 OCT
265°

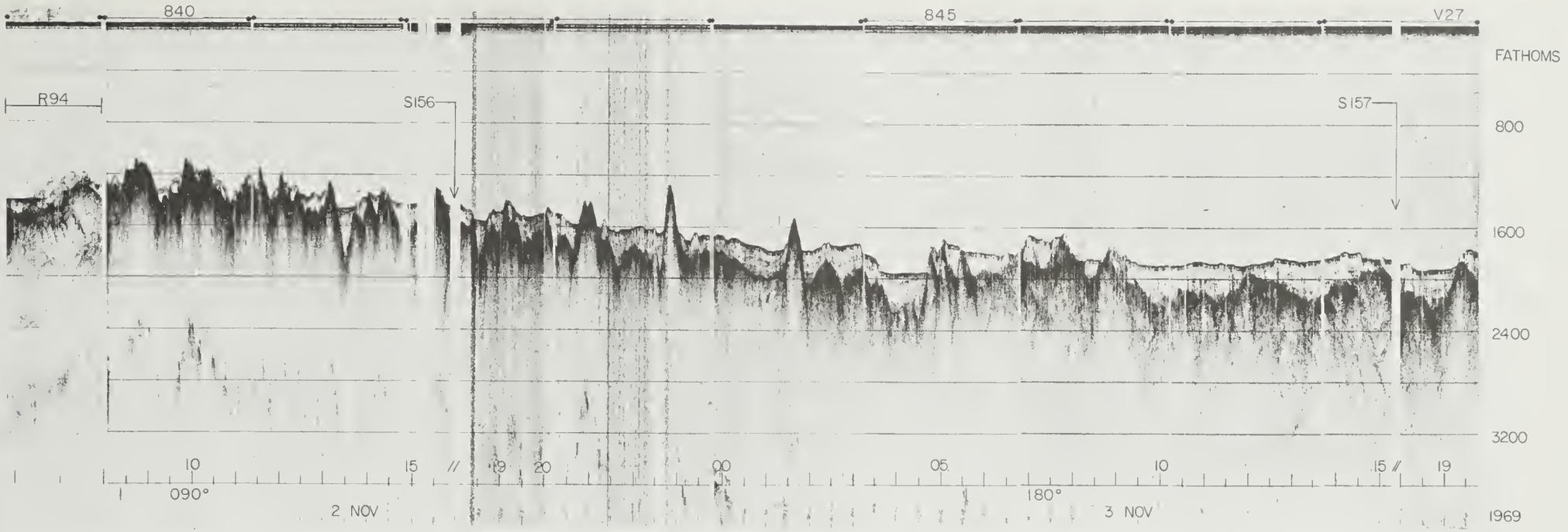

V27
810
815
SECONDS
R88
S 152A
S 152
START
1200
R89
2
4
6
8
238°
232°
230°
045°
220°
270°
28 OCT
29 OCT
29 OCT
30 OCT
1969

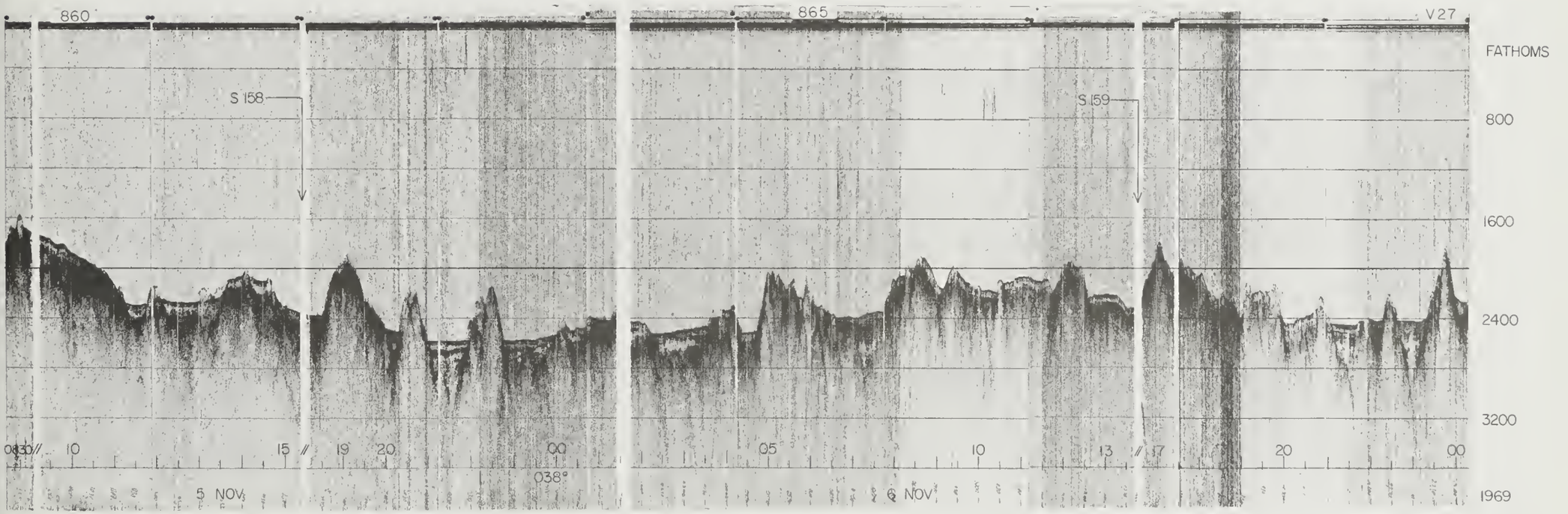

800
805
V27
FATHOMS
R85
R86
S150
R87
S151
800
1600
2400
3200
1969
05
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15
20
00
02
07
10
15
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324°
327°
000°
285°
317°
309°
350°
250°
045°
27 OCT
37°
28 OCT

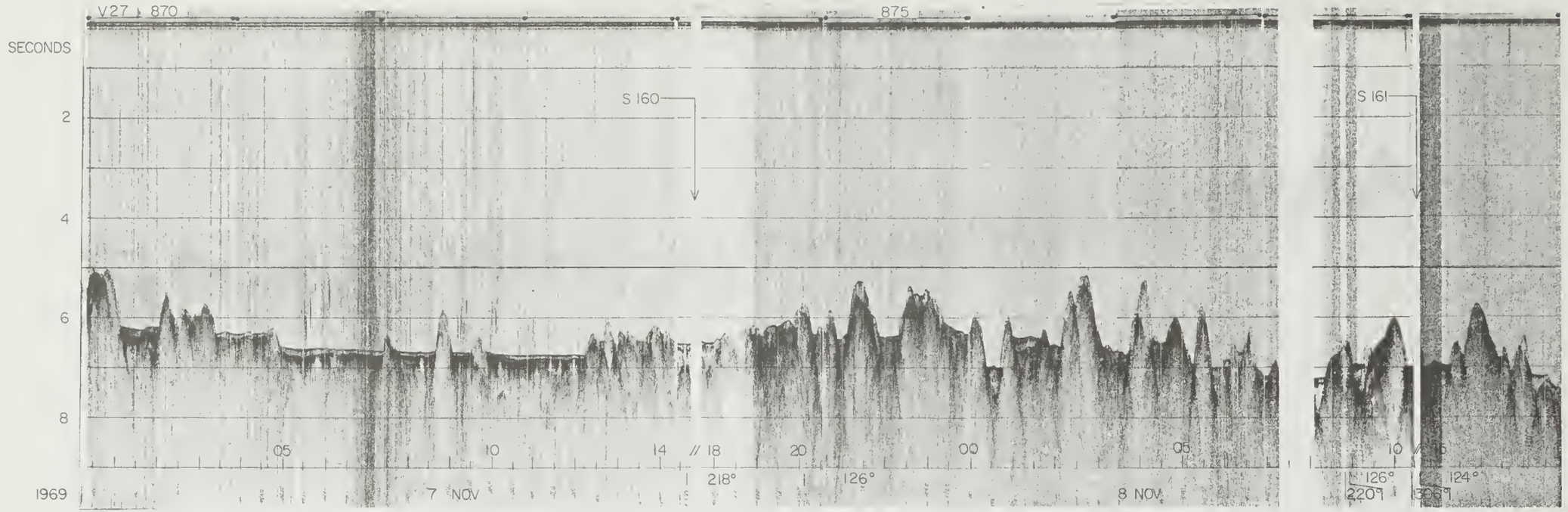

820
825
V27
FATHOMS
S153
R90
S154
S155
800
1600
2400
3200
1969
09
15
20
00
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08
13
15
17
22
00
090°
270°
180°
090°
30 OCT
31 OCT
180°
270°
270°

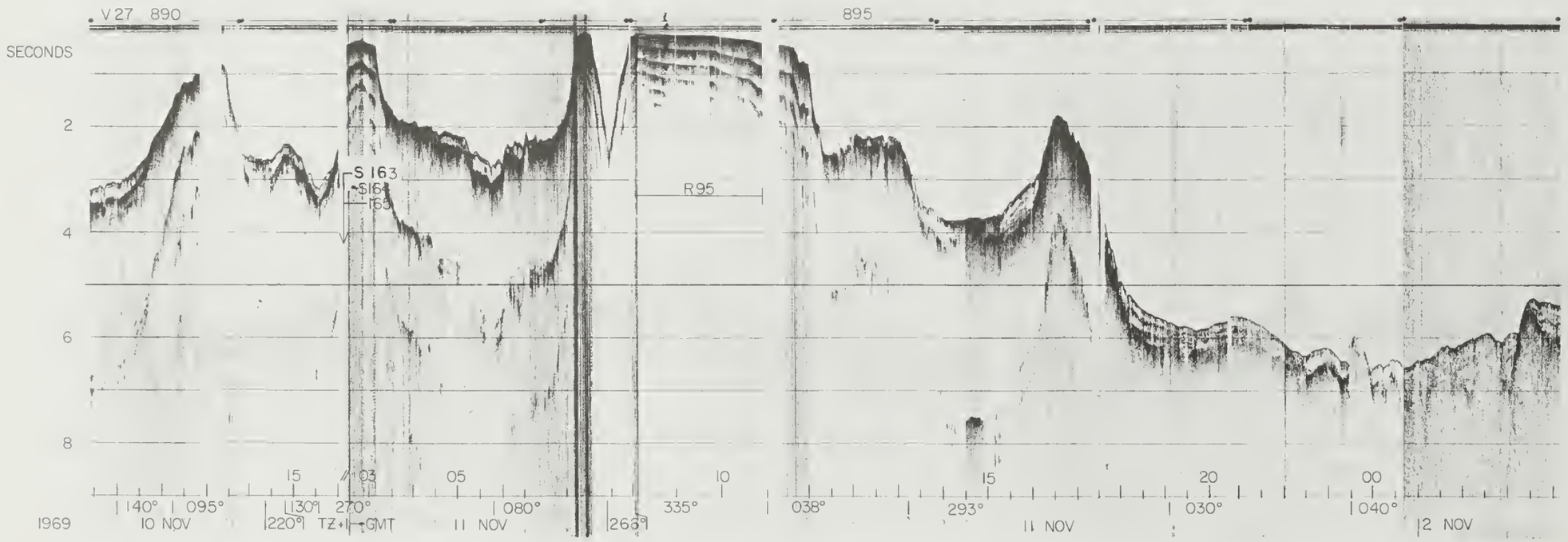

V27
830
835
SECONDS
R91
R92
R93
2
4
6
8
05
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15
20
00
05
1180°
270°
180°
090°
000°
090°
180°
1969
1 NOV
1 NOV
2 NOV

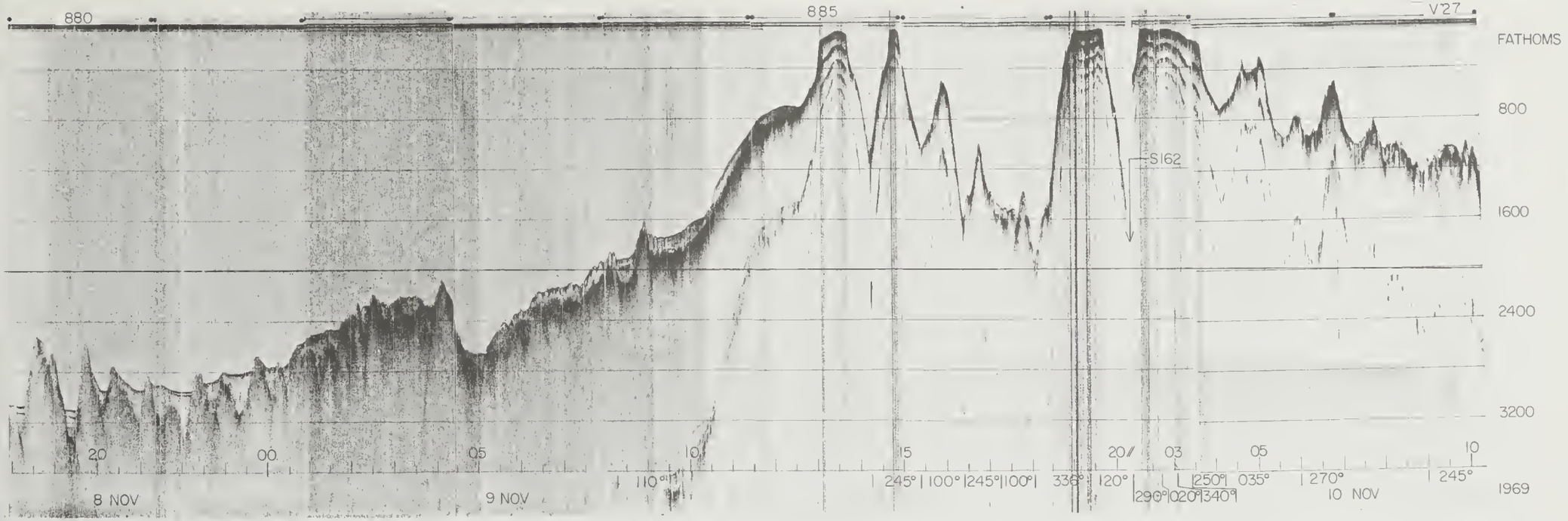

V27
850
855
SECONDS
2
4
6
8
20
00
05
10
15
20
00
05
160°
180°
1969
3 NOV
4 NOV
4 NOV
5 NOV

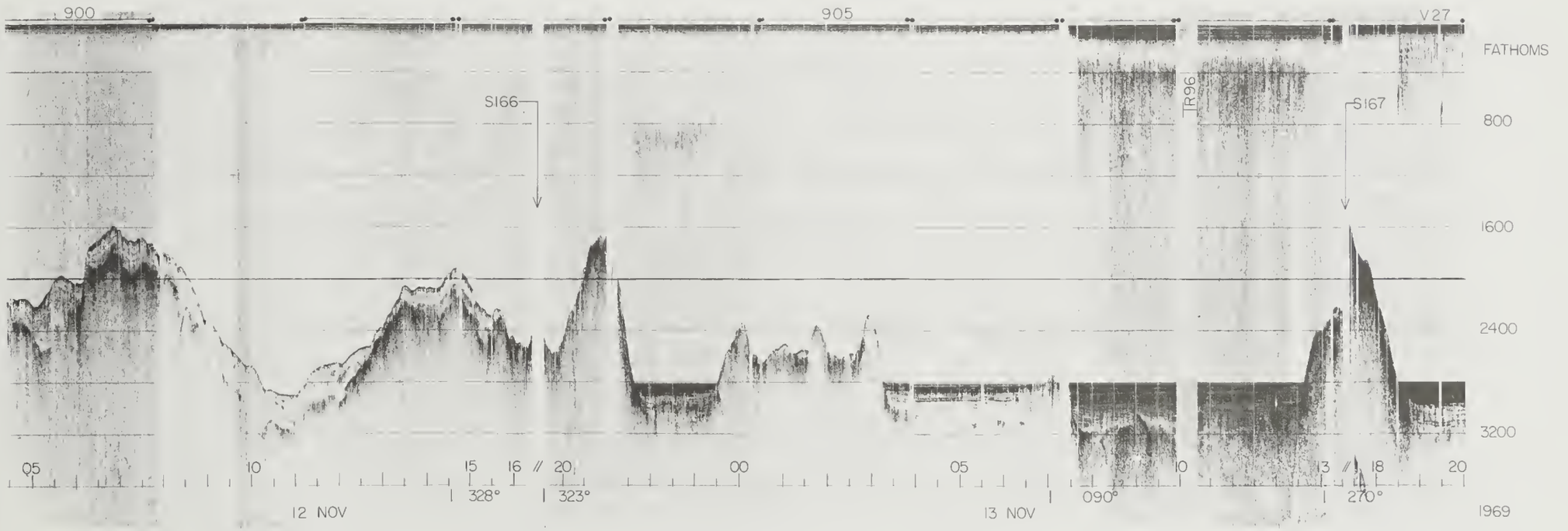

840
845
V27
FATHOMS
R94
S156
S157
800
1600
2400
3200
1969
10
15
19
20
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180°
2 NOV
3 NOV

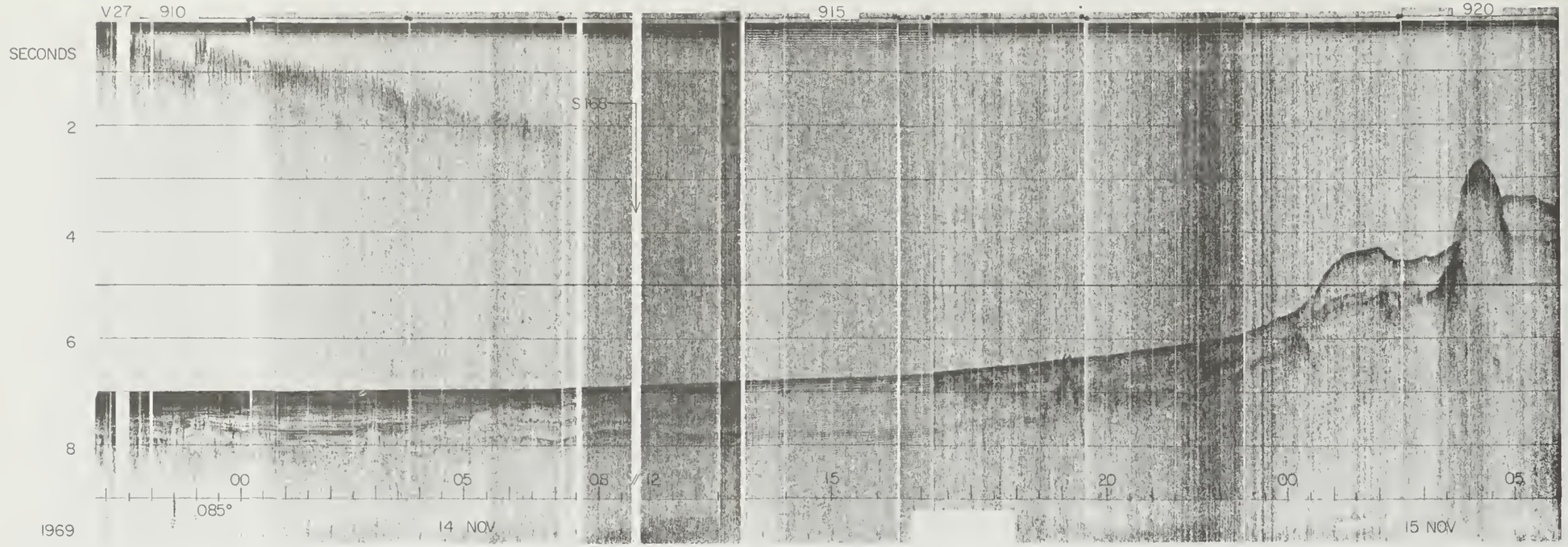

860
865
V27
FATHOMS
S158
S159
800
1600
2400
3200
1969
10
15
19
20
00
05
10
13
17
20
00
038°
5 NOV
6 NOV

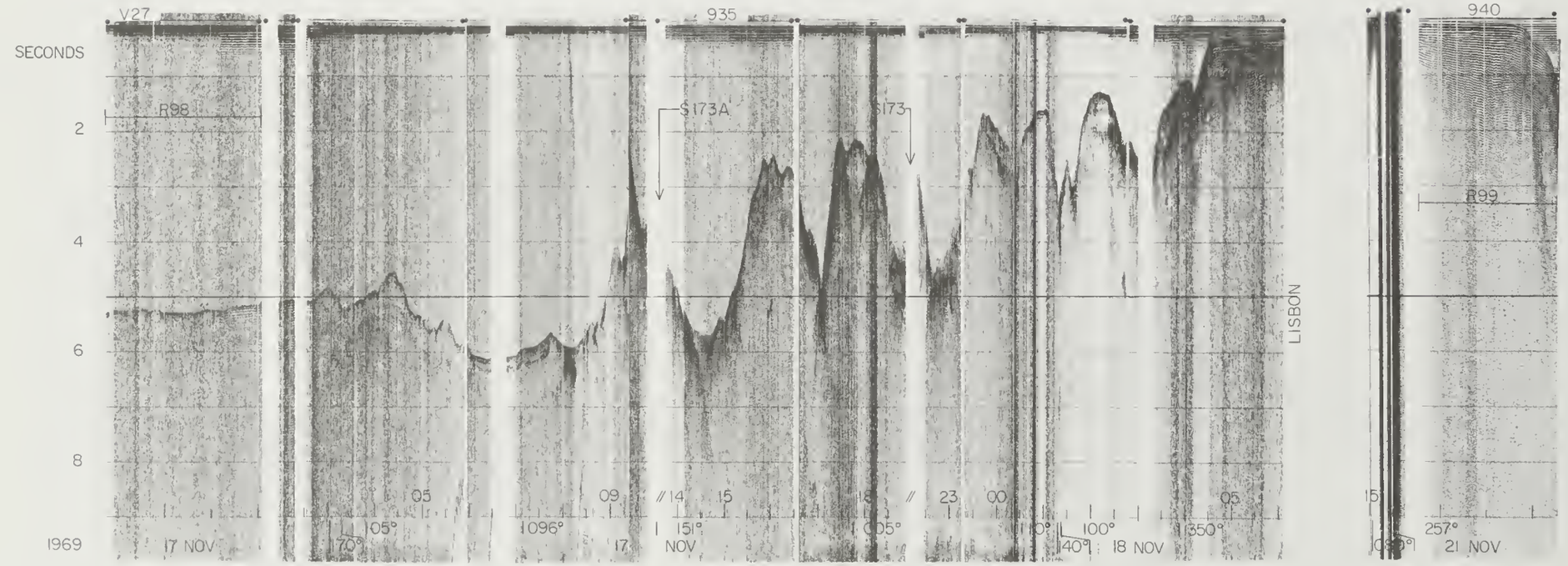

V27 870
875
SECONDS
2
4
6
8
S 160
S 161
05
10
14
// 18
20
00
05
10
1969
7 NOV
218°
126°
8 NOV
126°
220°
124°

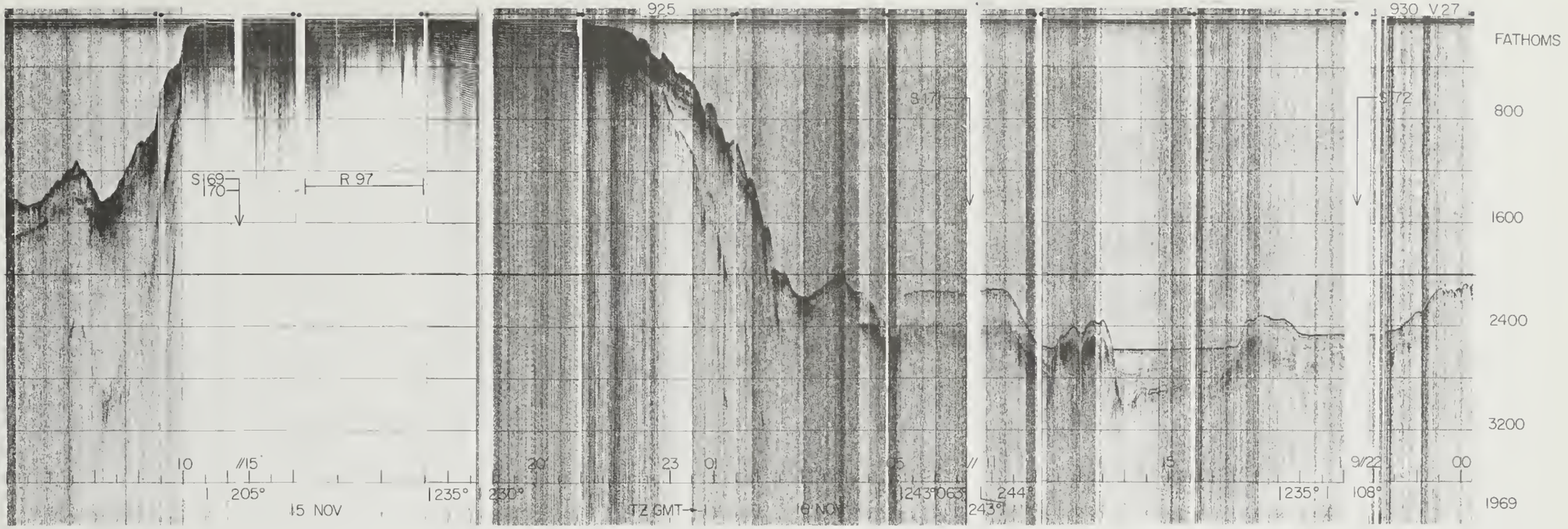

V27 890
895
SECONDS
2
4
6
8
S 163
S164
165
R95
15
// 03
05
10
15
20
00
140°
095°
130°
270°
080°
335°
038°
293°
030°
040°
1969
10 NOV
220°
TZ+1
GMT
11 NOV
266°
11 NOV
12 NOV

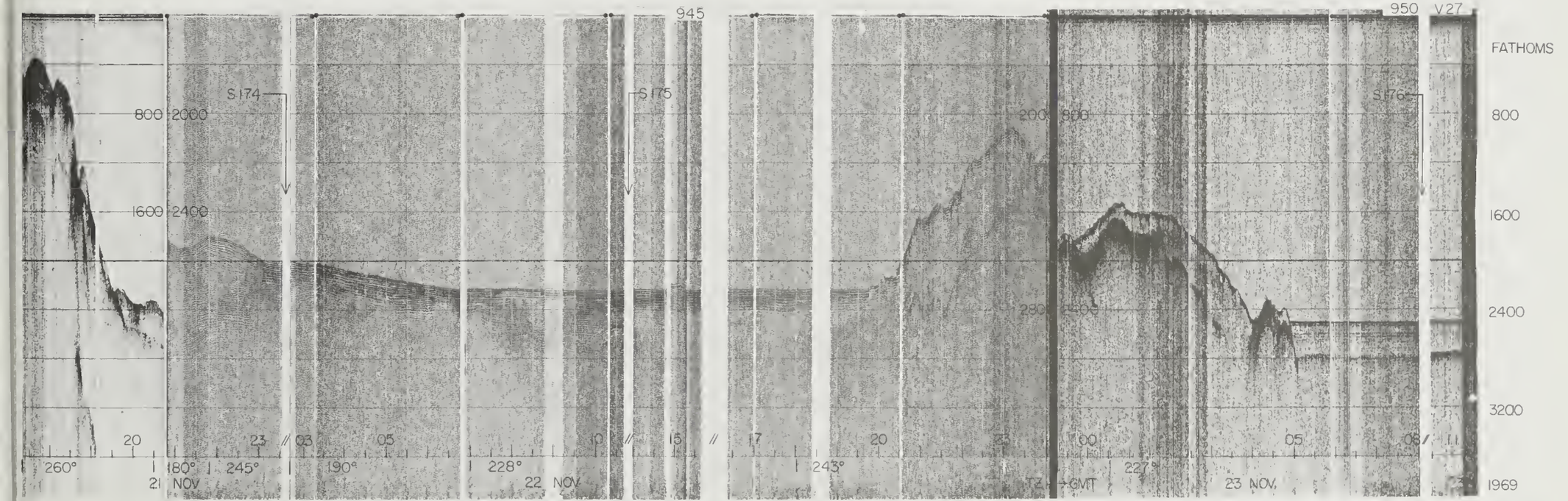

880
885
V27
FATHOMS
800
1600
2400
3200
1969
S162
20
00
05
10
15
20
03
05
10
110°
245°
100°
245°
100°
336°
120°
250°
035°
270°
245°
290°
020°
340°
8 NOV
9 NOV
10 NOV

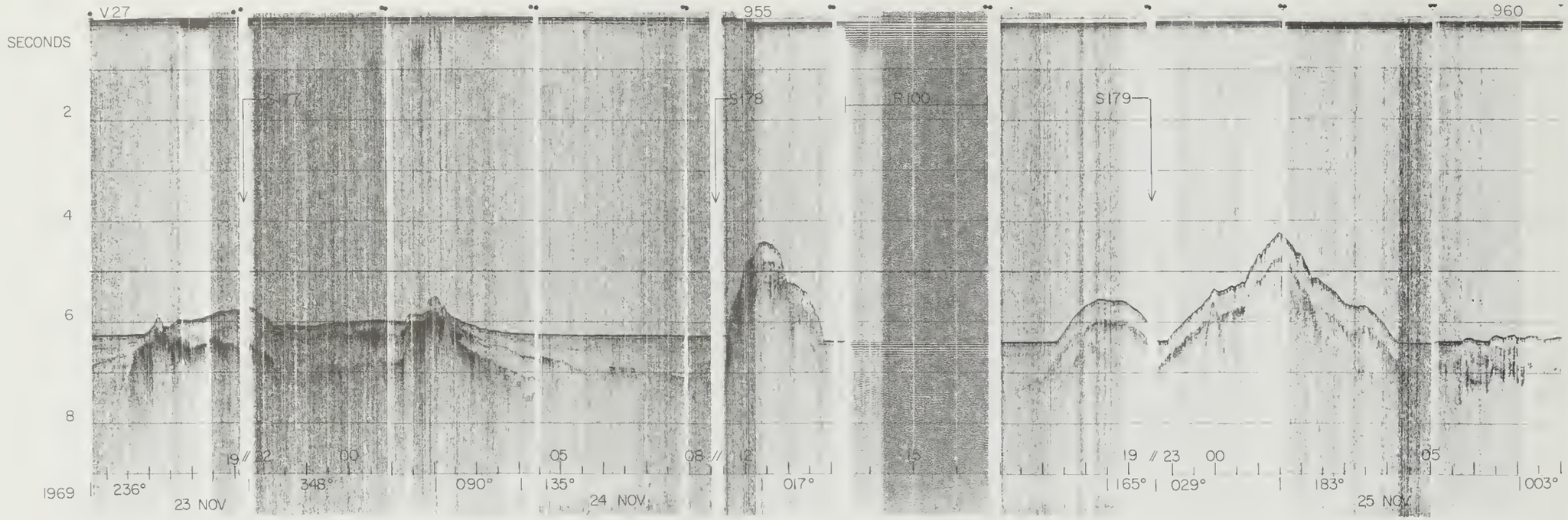

900
905
V27
FATHOMS
800
1600
2400
3200
1969
S166
TR96
S167
05
10
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16
20
00
05
10
13
18
20
328°
323°
090°
270°
12 NOV
13 NOV

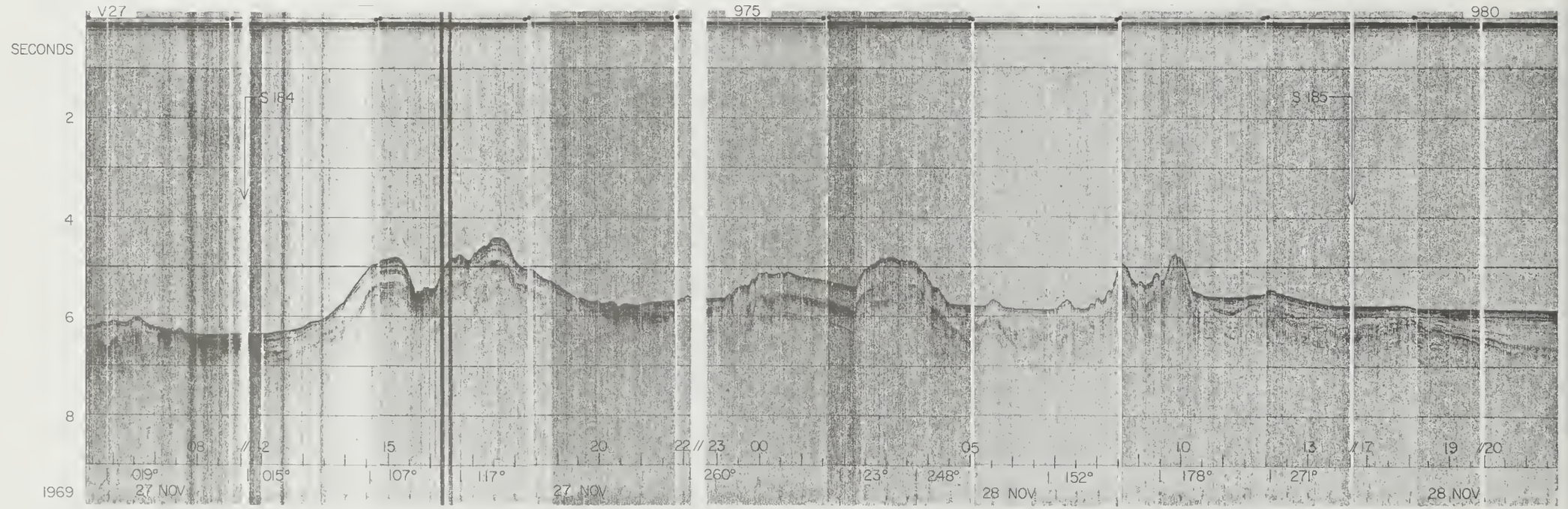

V27
910
915
920
SECONDS
2
4
6
8
S168
00
05
08
12
15
20
00
05
085°
1969
14 NOV
15 NOV

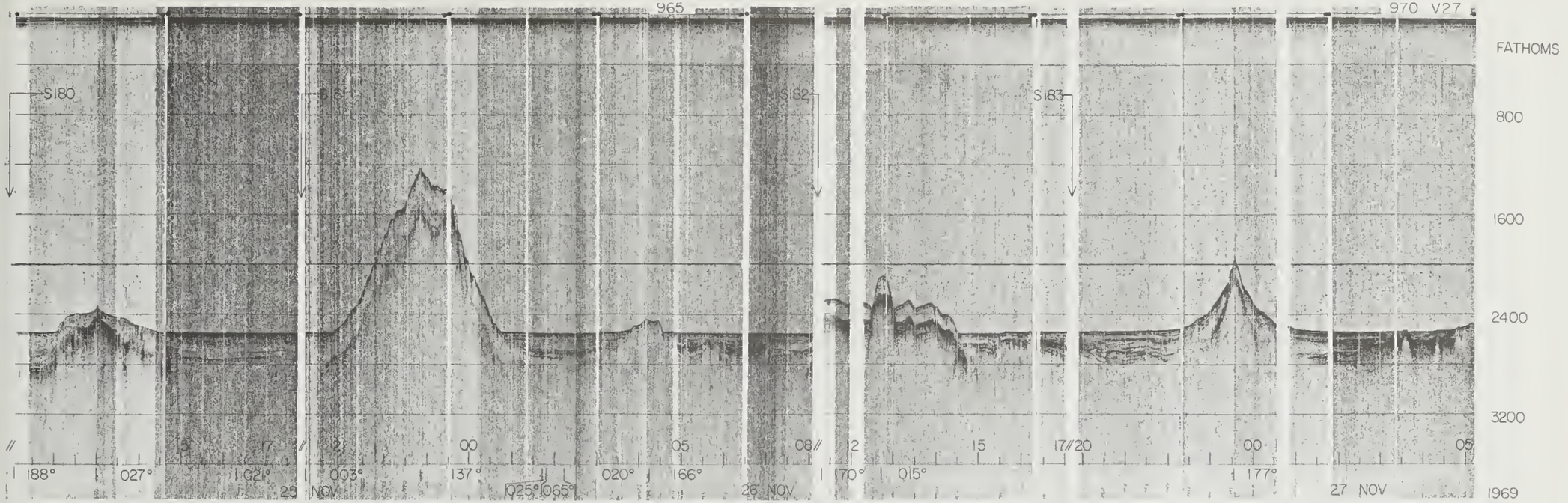

V27
935
940
SECONDS
2
4
6
8
R98
S173A
S173
R99
LISBON
05
09
14
15
18
23
00
05
15
05°
096°
151°
005°
100°
350°
257°
070°
140°
17 NOV
17 NOV
18 NOV
21 NOV
1969

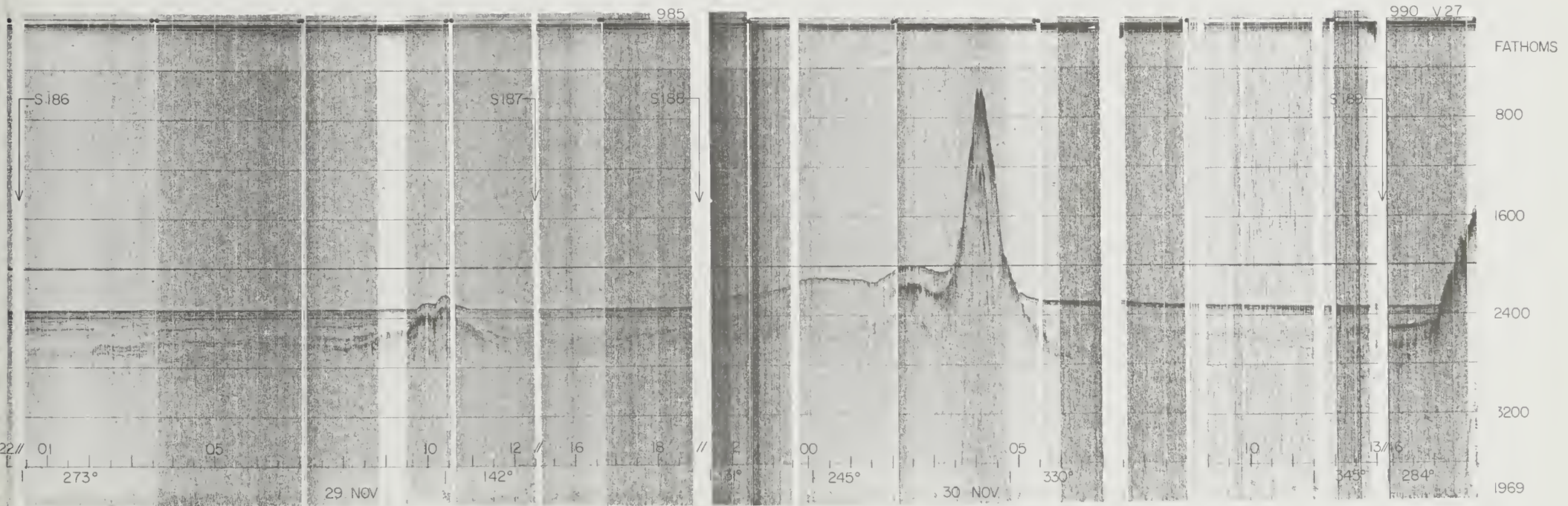

925
930 V27
FATHOMS
S169
170
R 97
S171
S172
800
1600
2400
3200
1969
10
15
20
23
01
05
15
9/22
00
205°
235°
230°
15 NOV
TZ GMT
16 NOV
243°
244°
108°

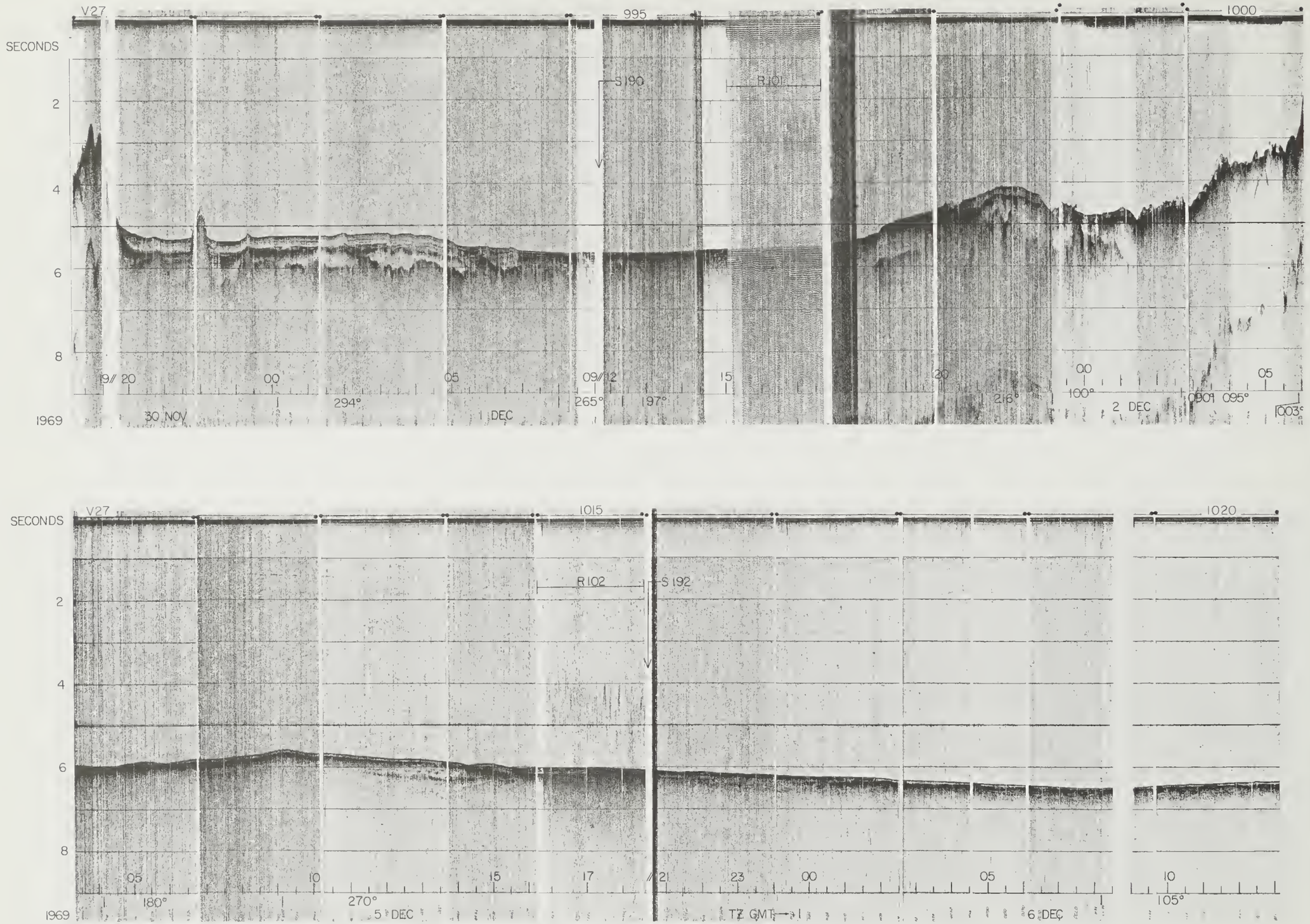

945
950 V27
FATHOMS
S174
S175
S176
800
1600
2400
3200
1969
2000
20
23
03
05
10
15
17
00
08
260°
180°
245°
190°
228°
243°
227°
21 NOV
22 NOV
TZ GMT
23 NOV.

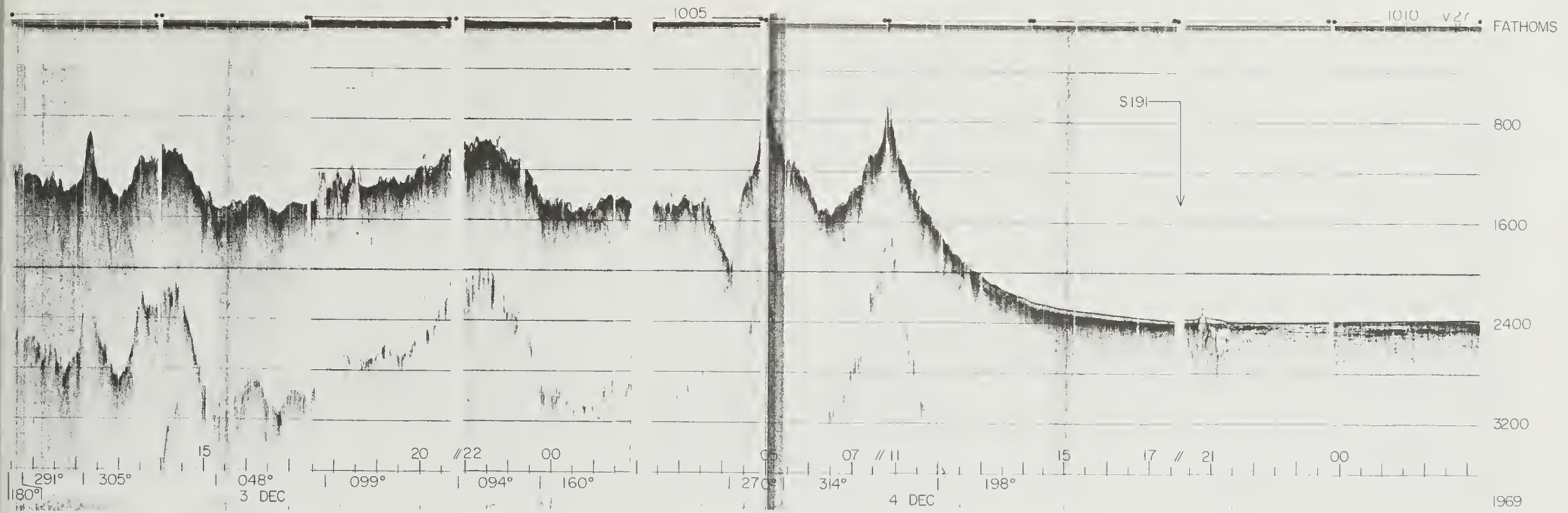

V27
955
960
SECONDS
2
4
6
8
S 177
S 178
R 100
S 179
19 // 22
00
05
08 // 12
15
19 // 23
00
05
1969
236°
23 NOV
348°
090°
135°
24 NOV
017°
165°
029°
183°
003°
25 NOV

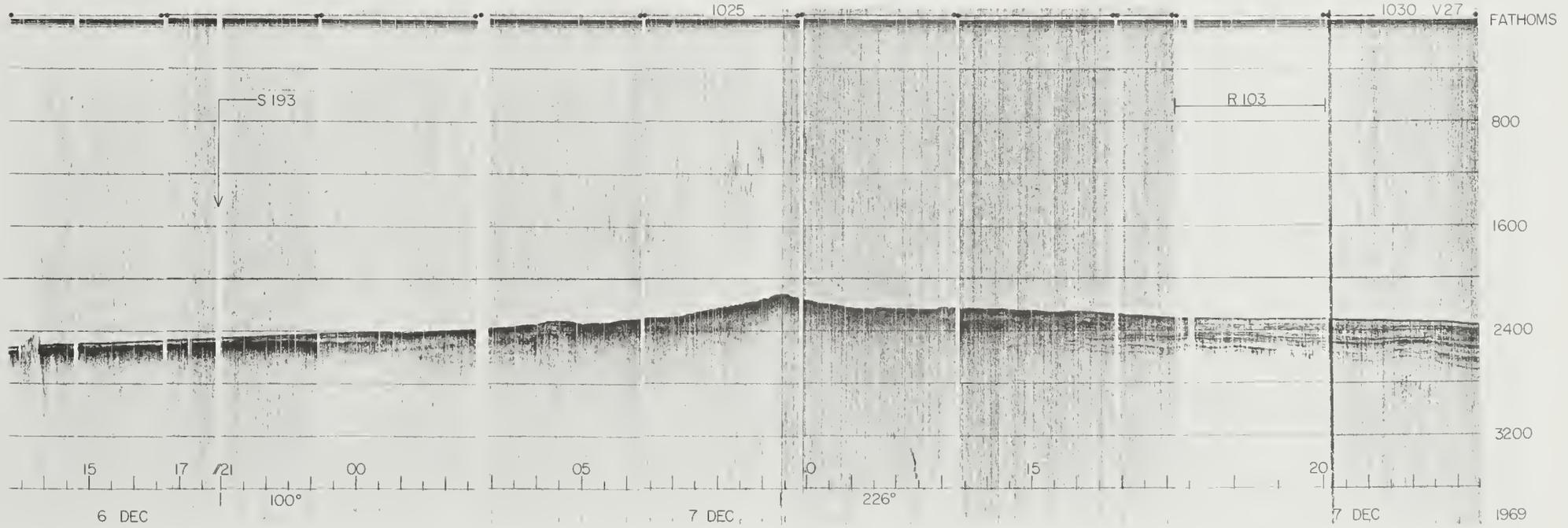

V27
975
980
SECONDS
2
4
6
8
S 184
S 185
08
// 12
15
20
22 // 23
00
05
10
13
// 17
19
// 20
1969
019°
27 NOV
015°
107°
117°
27 NOV
260°
123°
248°
152°
178°
271°
28 NOV
28 NOV

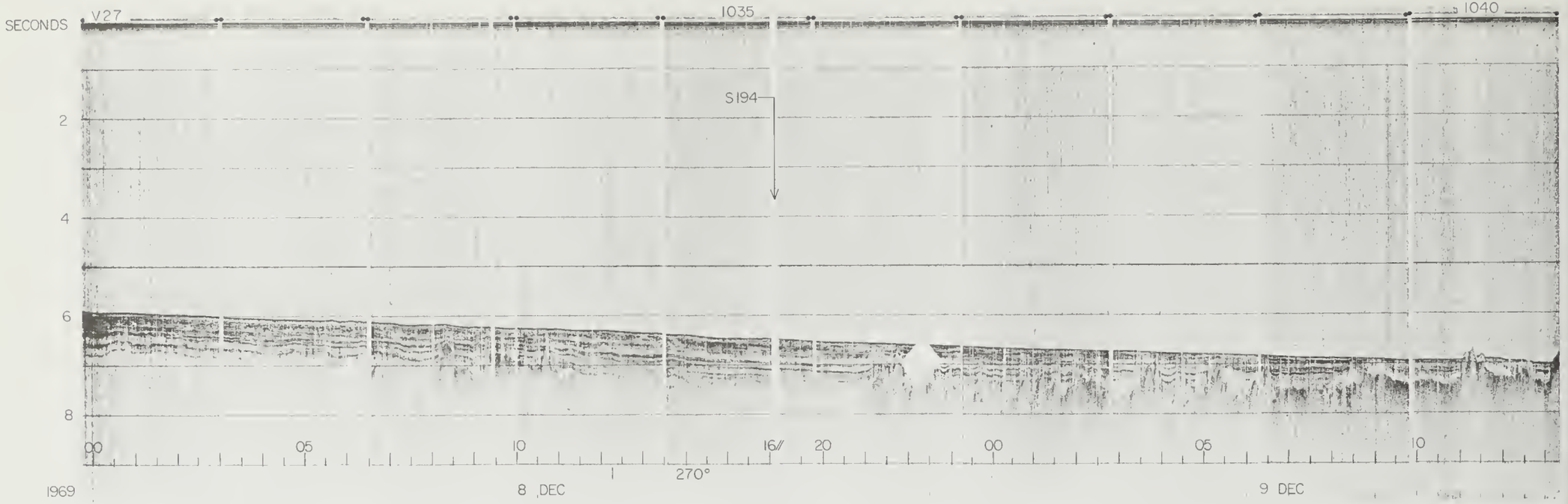

965
970 V27
FATHOMS
S180
S181
S182
S183
800
1600
2400
3200
1969
188°
027°
021°
003°
137°
025°
065°
020°
166°
170°
015°
177°
25 NOV
26 NOV
27 NOV

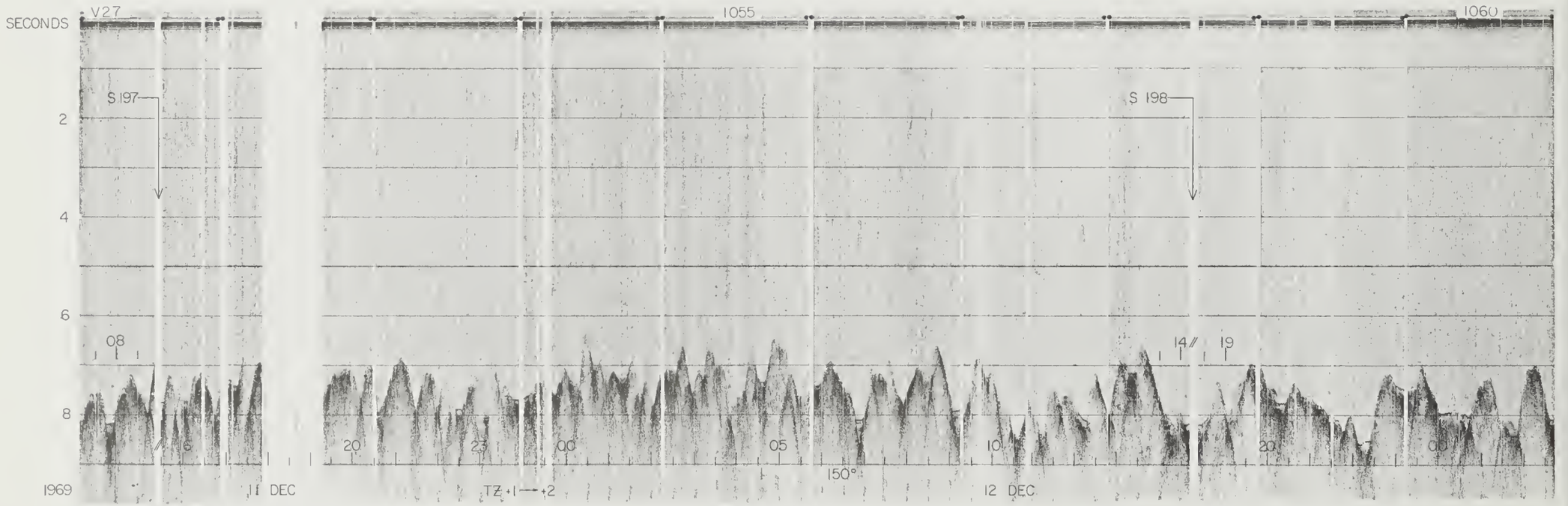

985
990 V27
FATHOMS
S186
S187
S188
S189
800
1600
2400
3200
1969
273°
142°
131°
245°
330°
345°
284°
29 NOV
30 NOV

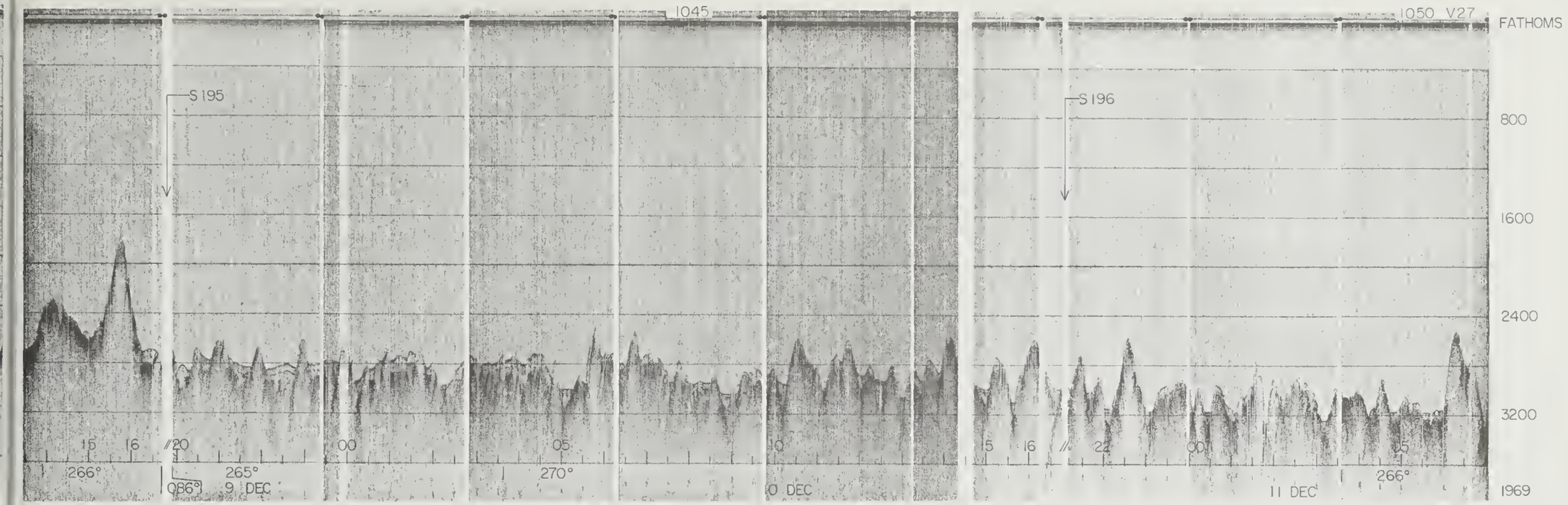

V27
995
1000
SECONDS
2
4
6
8
S190
R101
19// 20
00
05
09// 12
15
20
00
05
294°
265°
197°
216°
100°
095°
1003°
1969
30 NOV
1 DEC
2 DEC
PORTO DO FUNCHAL, MADEIRA ISLANDS
V27
1015
1020
SECONDS
R102
S192
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15
17
21
23
00
05
10
180°
270°
105°
1969
5 DEC
TZ GMT
6 DEC

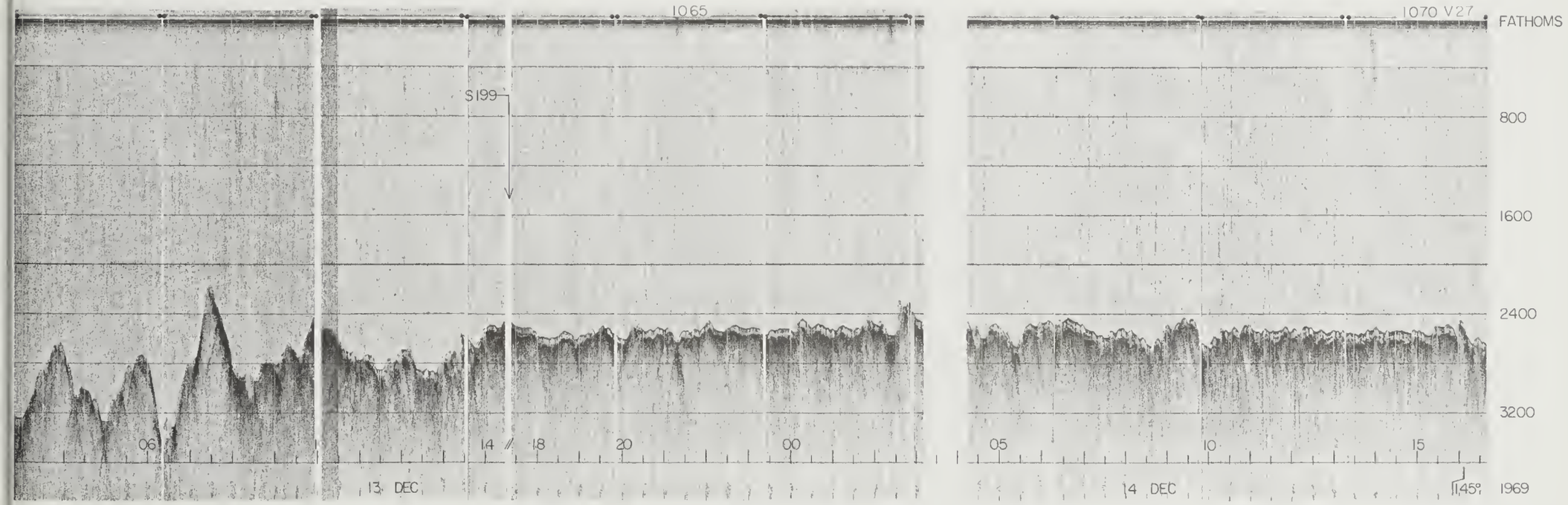

1005
1010 V27
FATHOMS
S 191
800
1600
2400
3200
1969
15
20
22
00
05
07
11
15
17
21
00
291°
305°
048°
099°
094°
160°
270°
314°
198°
180°
3 DEC
4 DEC

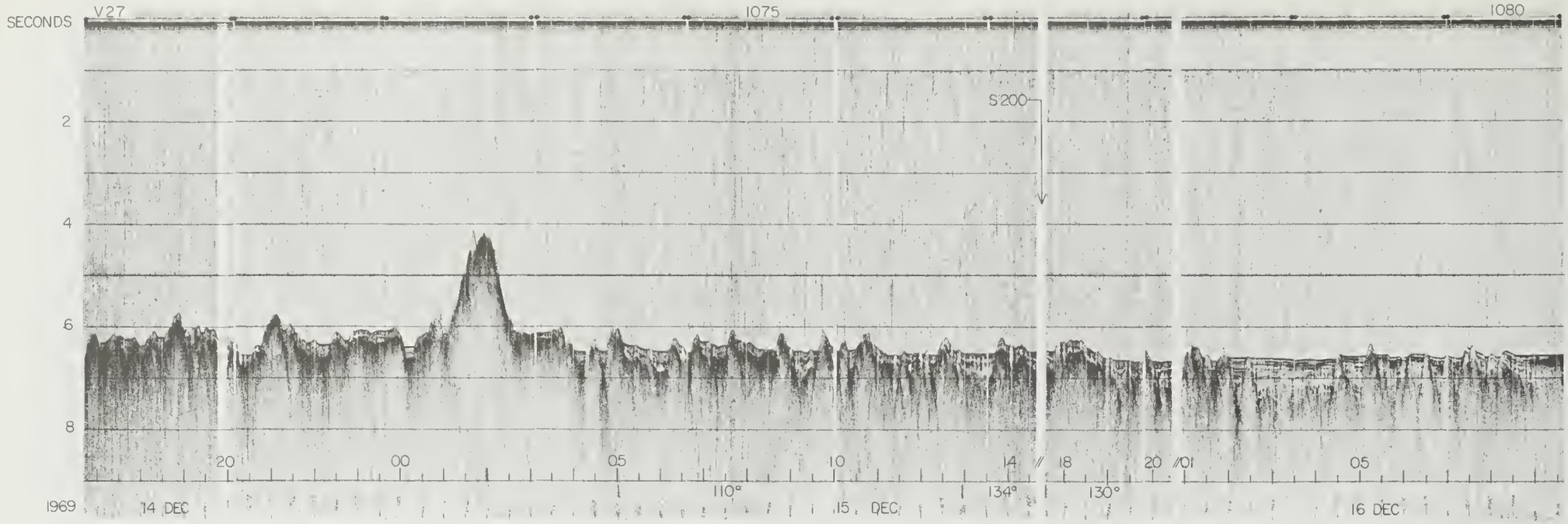

1025
1030 V27
FATHOMS
S 193
R 103
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3200
1969
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21
00
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15
20
100°
226°
6 DEC
7 DEC
7 DEC

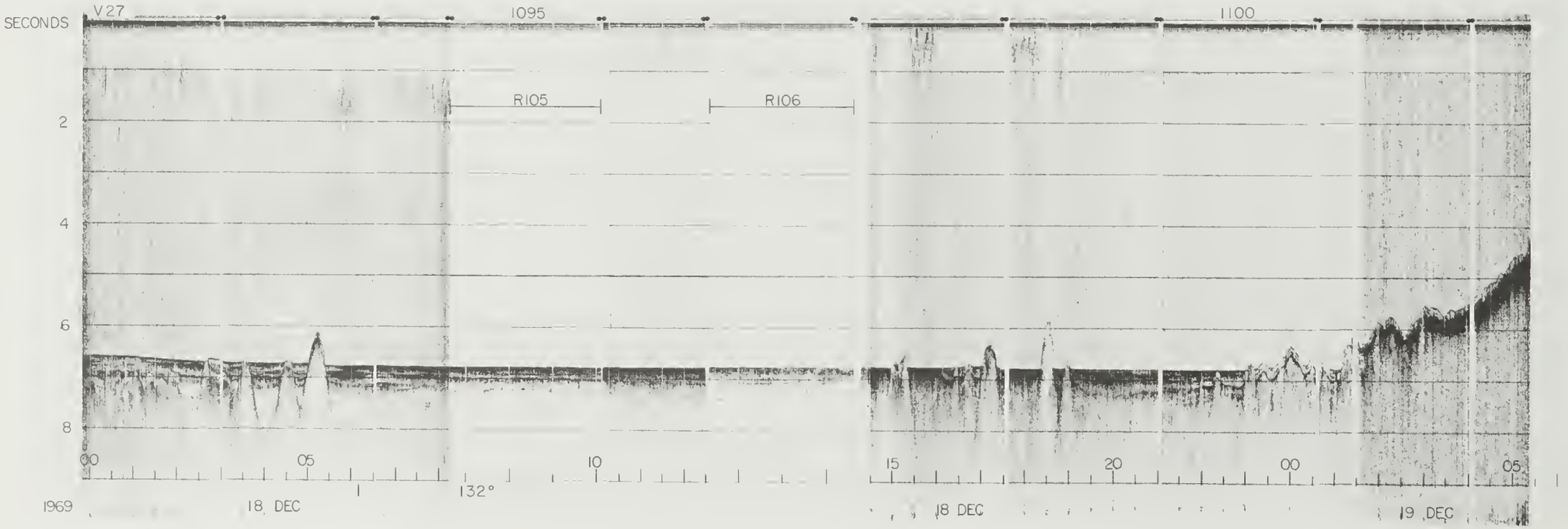

SECONDS
V27
1035
1040
S194
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4
6
8
00
05
10
16//
20
00
05
10
270°
1969
8 DEC
9 DEC

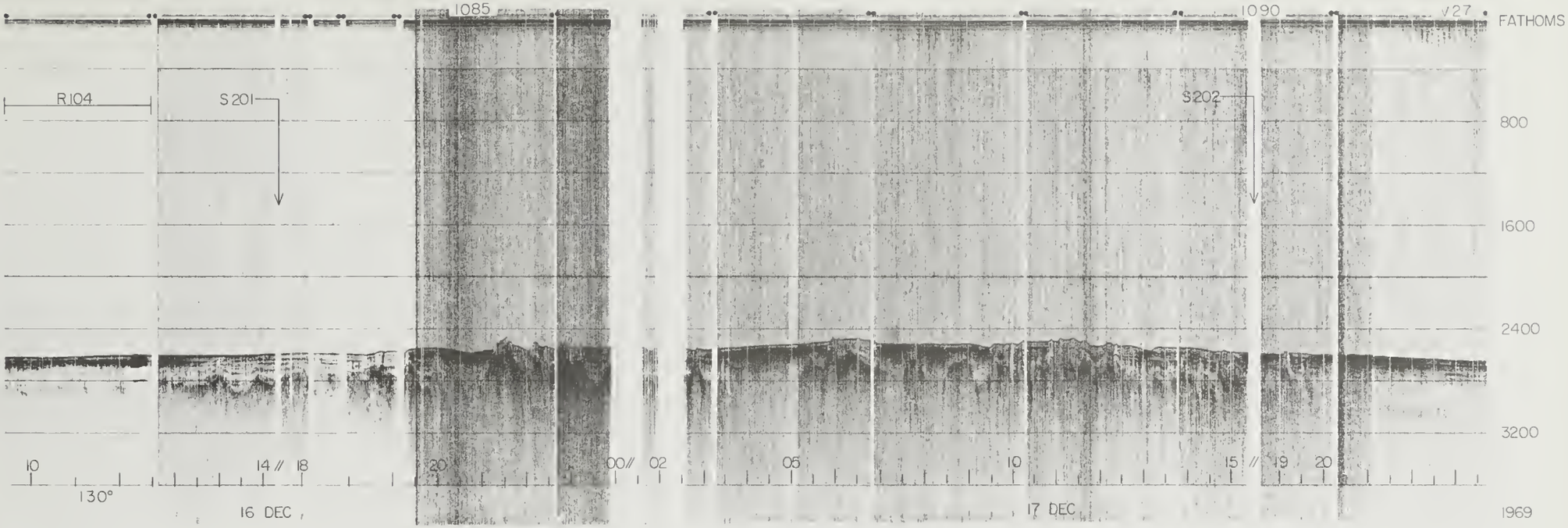

SECONDS
V27
1055
1060
S 197
S 198
2
4
6
8
08
14//
19
20
23
00
05
10
20
00
150°
1969
11 DEC
TZ+1→+2
12 DEC

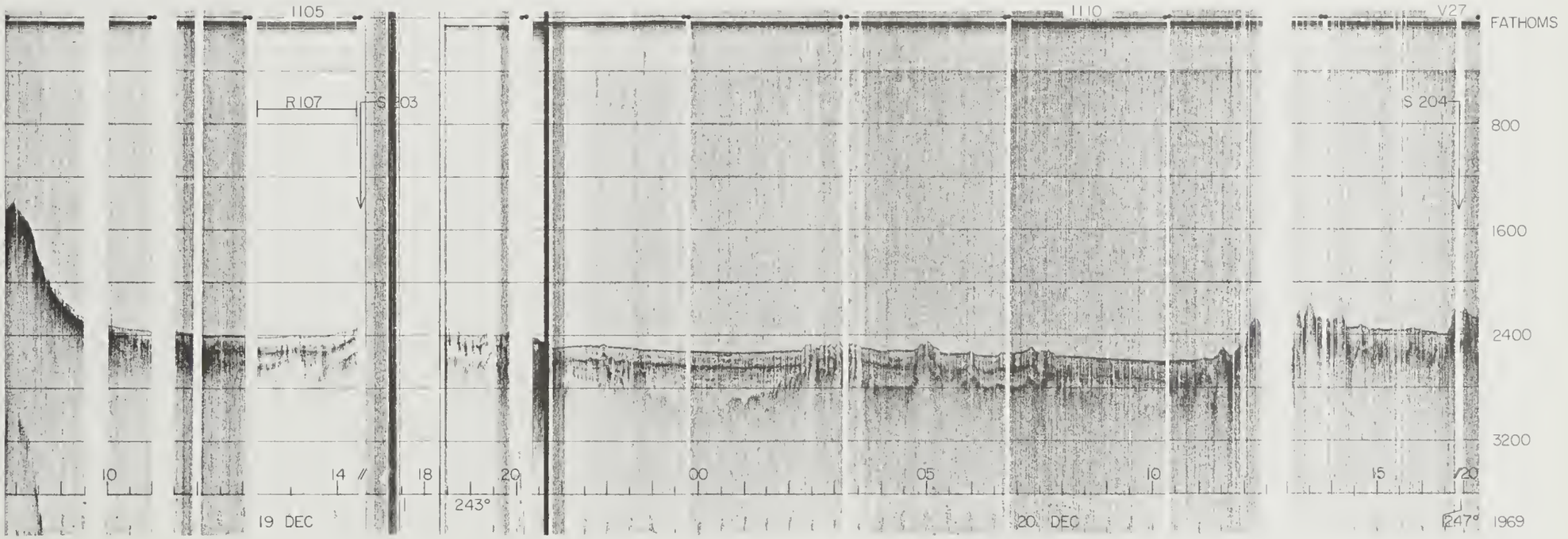

1045
S 195
15
16
20
00
05
10
266°
086°
265°
270°
9 DEC
10 DEC
1050 V27
FATHOMS
S 196
800
1600
2400
3200
1969
15
16
22
00
05
266°
11 DEC

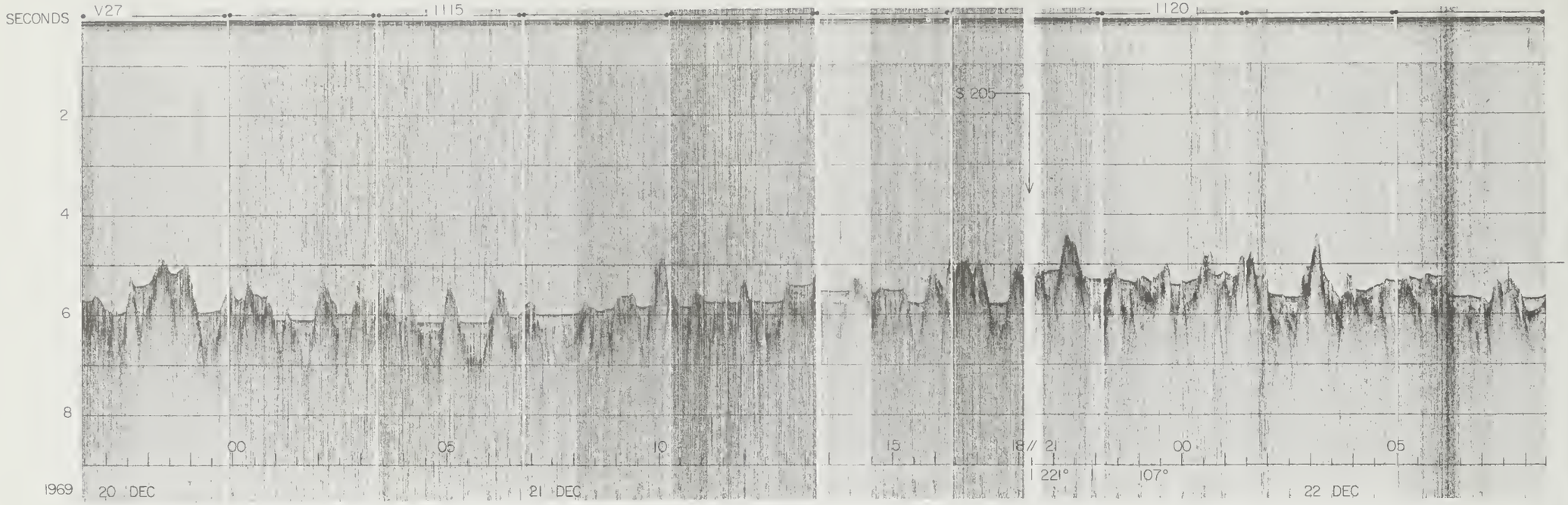

1065
S 199
06
14
18
20
00
13 DEC
1070 V27
FATHOMS
800
1600
2400
3200
05
10
15
14 DEC
145°
1969

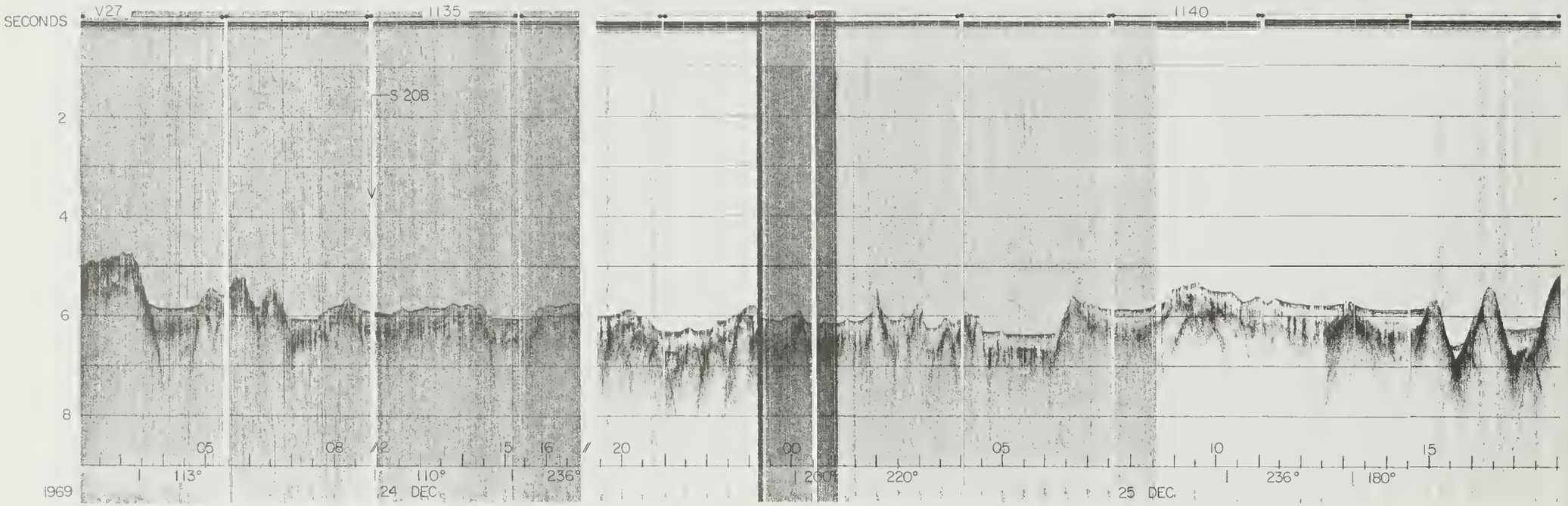

SECONDS
V27
1075
1080
S200
2
4
6
8
20
00
05
10
14
18
20
01
05
110°
134°
130°
1969
14 DEC
15 DEC
16 DEC

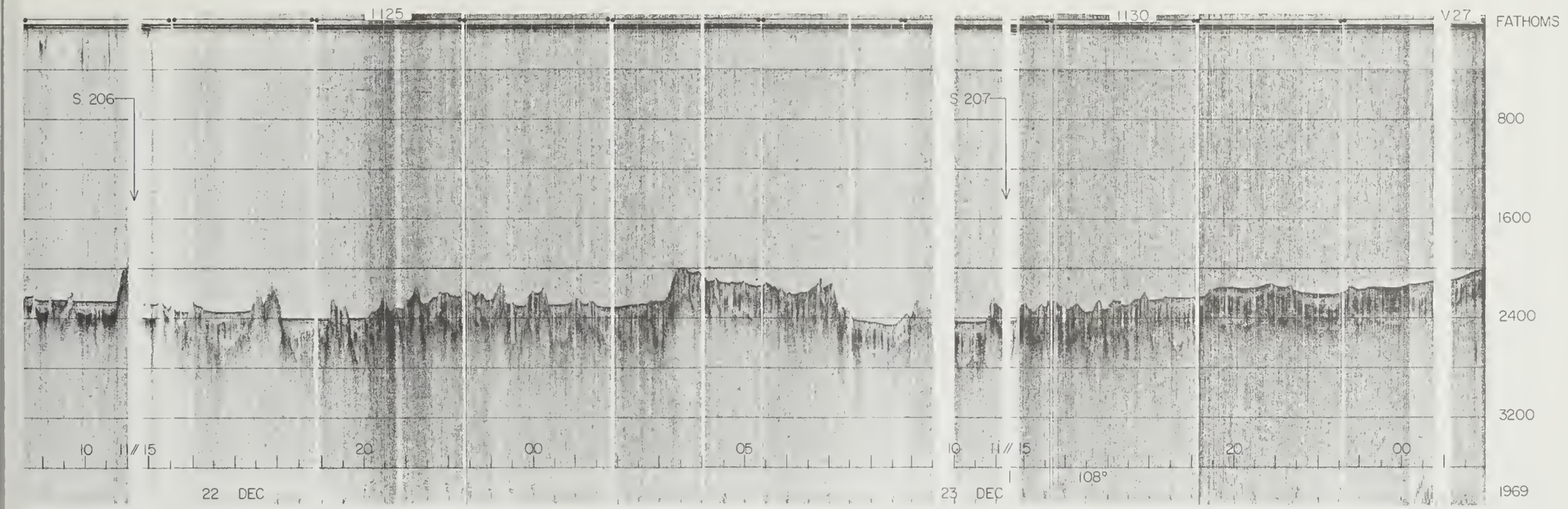

SECONDS
V27
1095
1100
R105
R106
2
4
6
8
00
05
10
15
20
00
05
132°
1969
18 DEC
18 DEC
19 DEC

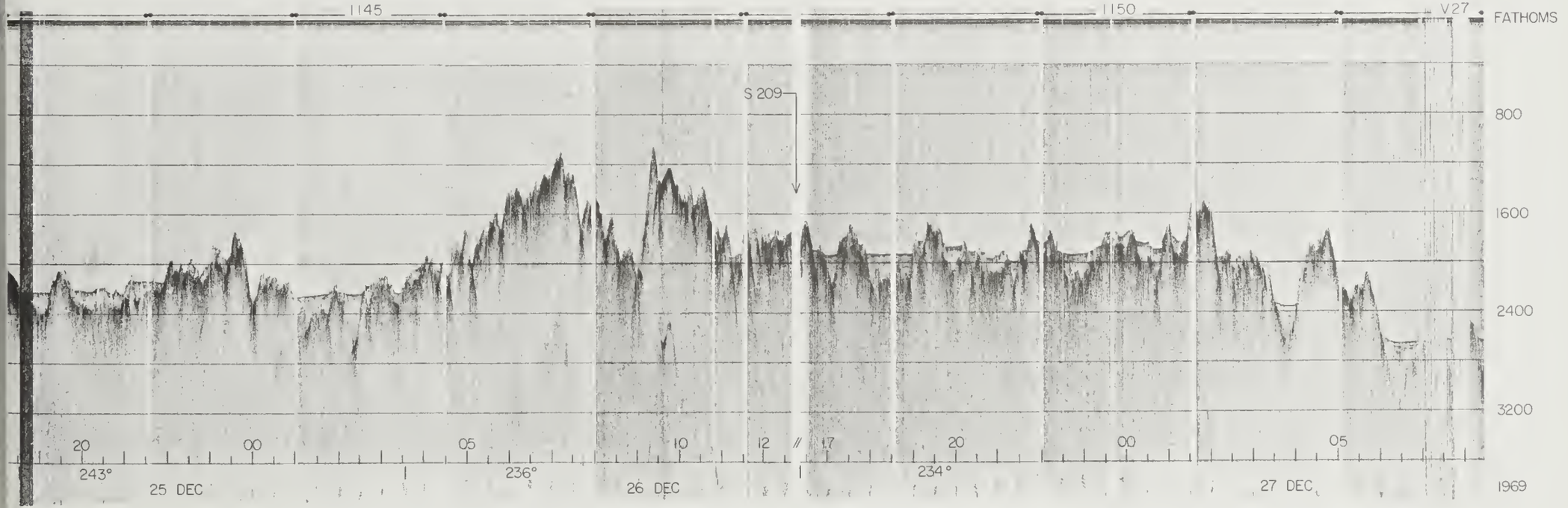

1085
1090
V27
FATHOMS
R104
S201
S202
800
1600
2400
3200
1969
10
14 // 18
20
00 // 02
05
10
15 // 19
20
130°
16 DEC
17 DEC

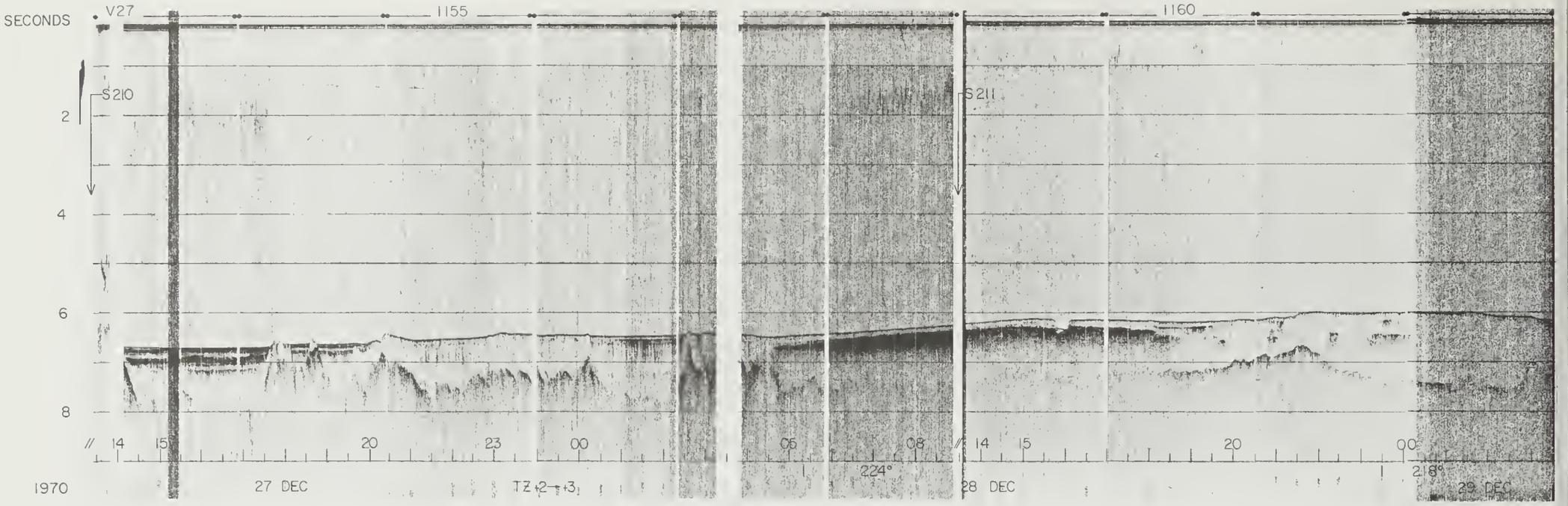

1105
1110
V27
FATHOMS
R107
S203
S 204
800
1600
2400
3200
1969
10
14 //
18
20
00
05
10
15
20
243°
247°
19 DEC
20 DEC

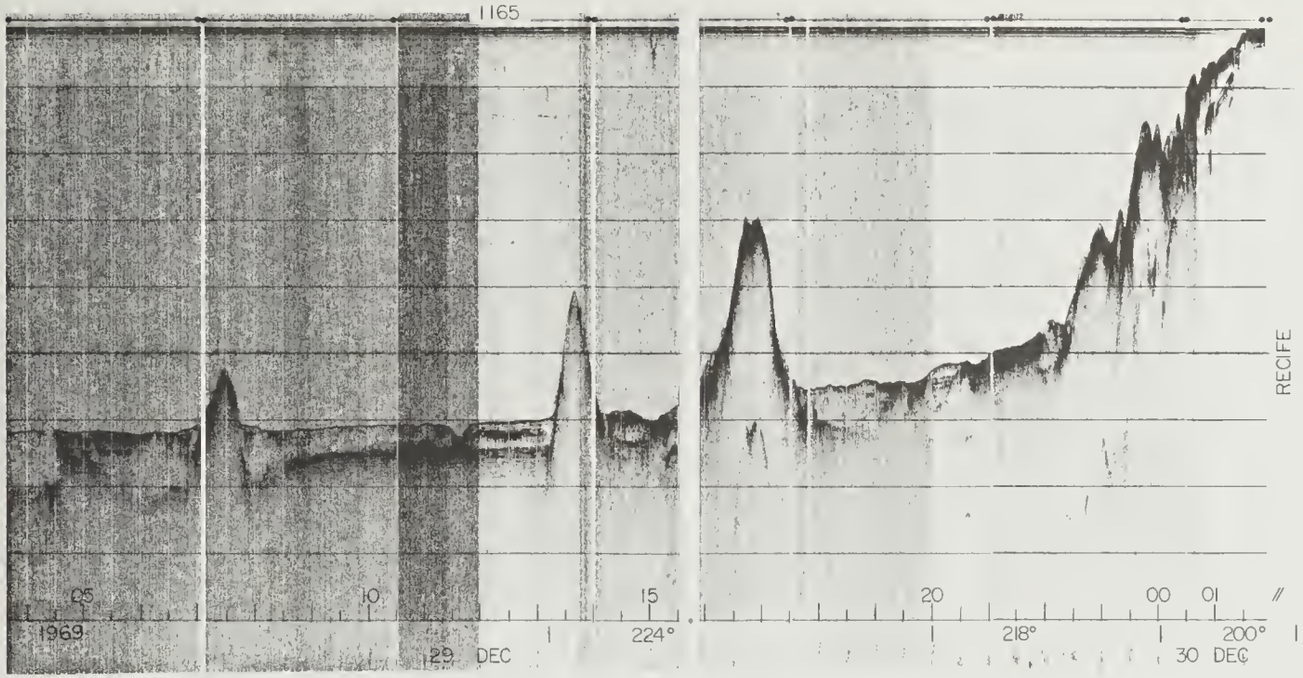

SECONDS
V27
1115
1120
S 205
2
4
6
8
00
05
10
15
18
21
00
05
1969
20 DEC
21 DEC
221°
107°
22 DEC

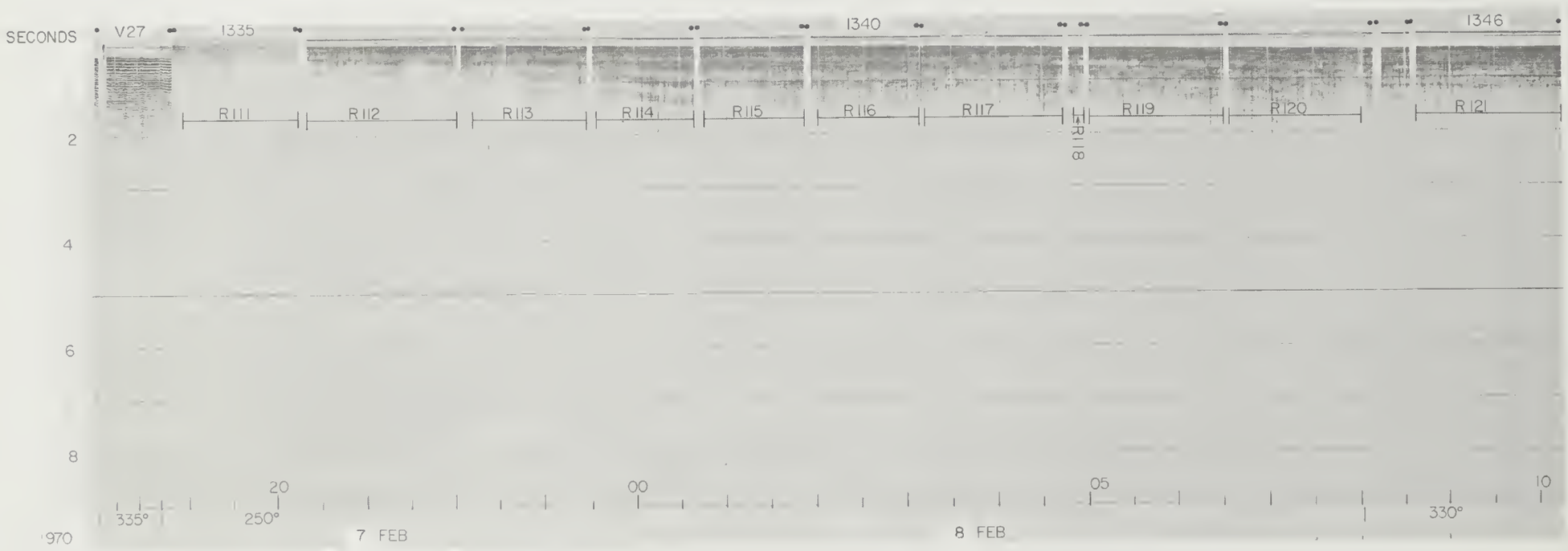

SECONDS
V27
1135
1140
S 208
2
4
6
8
05
08
12
15
16
20
00
05
10
15
1969
113°
110°
236°
24 DEC
200°
220°
236°
180°
25 DEC

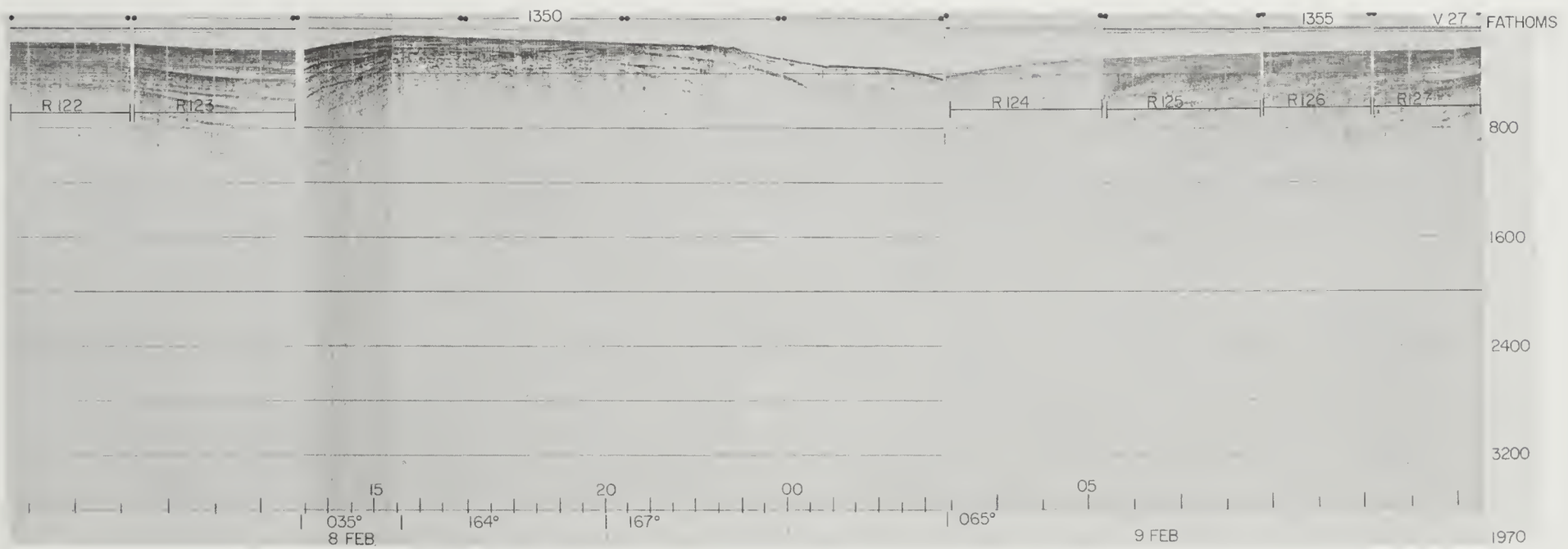

1125
1130
V27
FATHOMS
S 206
S 207
800
1600
2400
3200
1969
10
11 // 15
20
00
05
22 DEC
23 DEC
108°

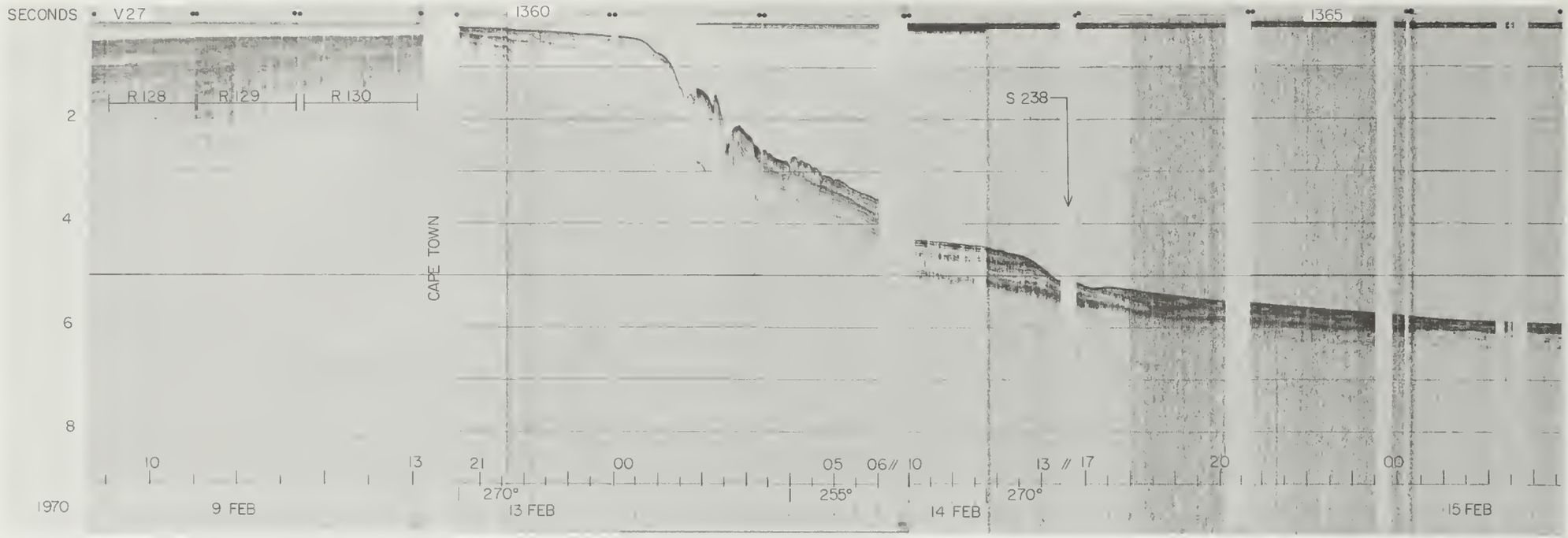

1145
1150
V27
FATHOMS
S 209
800
1600
2400
3200
1969
20
00
05
10
12 // 17
20
00
05
243°
236°
234°
25 DEC
26 DEC
27 DEC

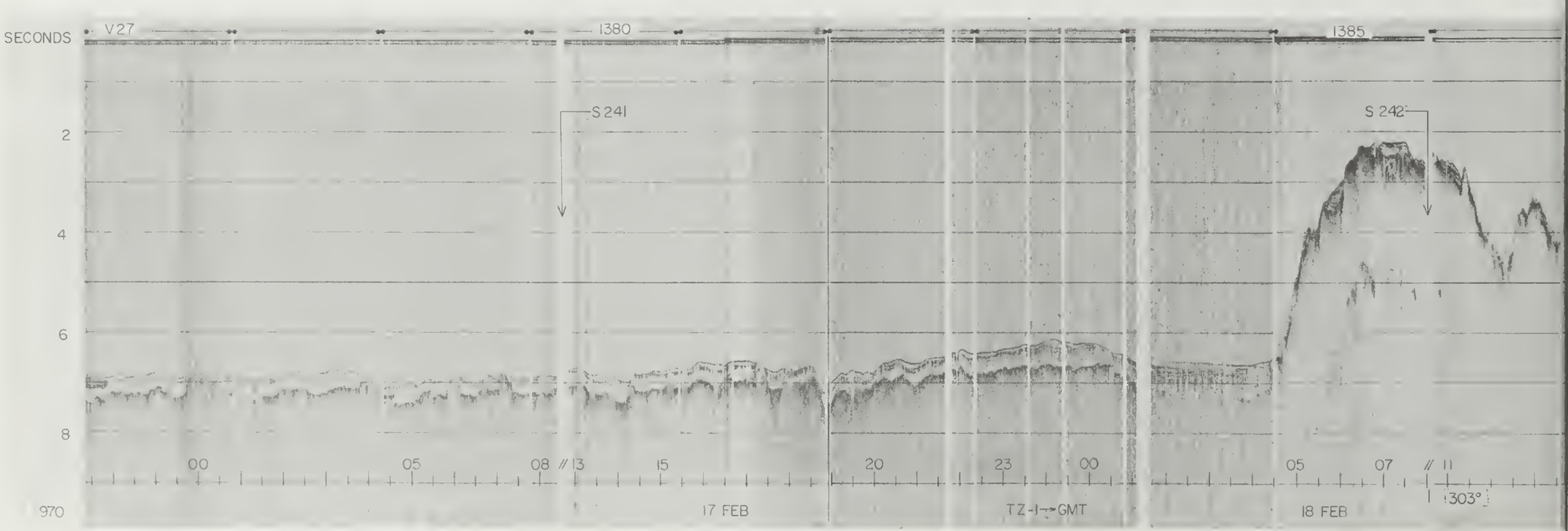

SECONDS
V27
1155
1160
S210
S211
2
4
6
8
14
15
20
23
00
05
08
14
15
20
00
224°
218°
1970
27 DEC
TZ +2 → +3
28 DEC
29 DEC

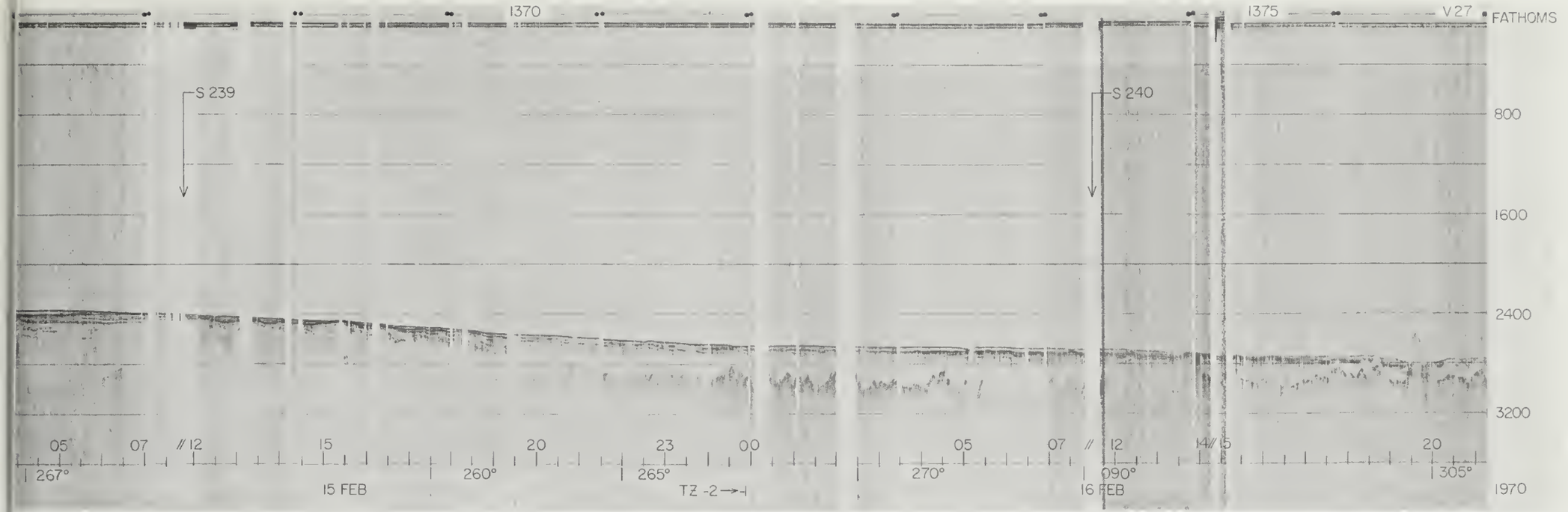

1165
RECIFE
05
10
15
20
00
01
1969
224°
218°
200°
29 DEC
30 DEC

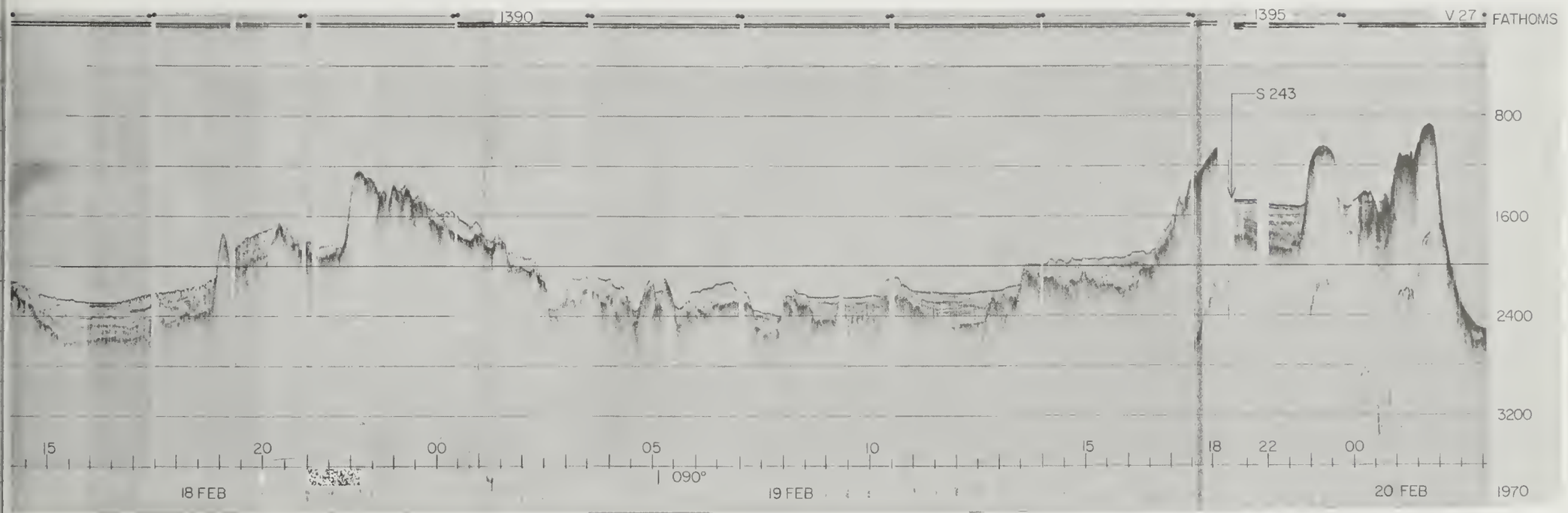

SECONDS
V27
1335
1340
1346
R111
R112
R113
R114
R115
R116
R117
R118
R119
R120
R121
2
4
6
8
20
00
05
10
335°
250°
330°
970
7 FEB
8 FEB

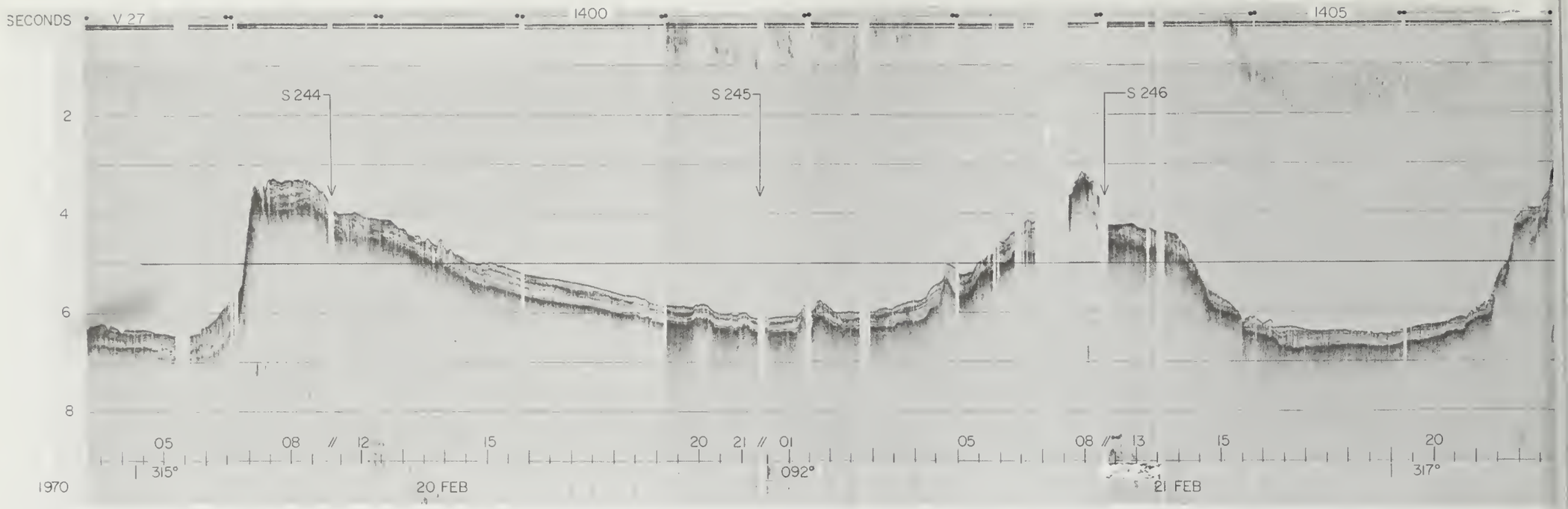

1350
1355
V 27
FATHOMS
R 122
R 123
R 124
R 125
R 126
R 127
800
1600
2400
3200
1970
15
20
00
05
035°
164°
167°
065°
8 FEB
9 FEB

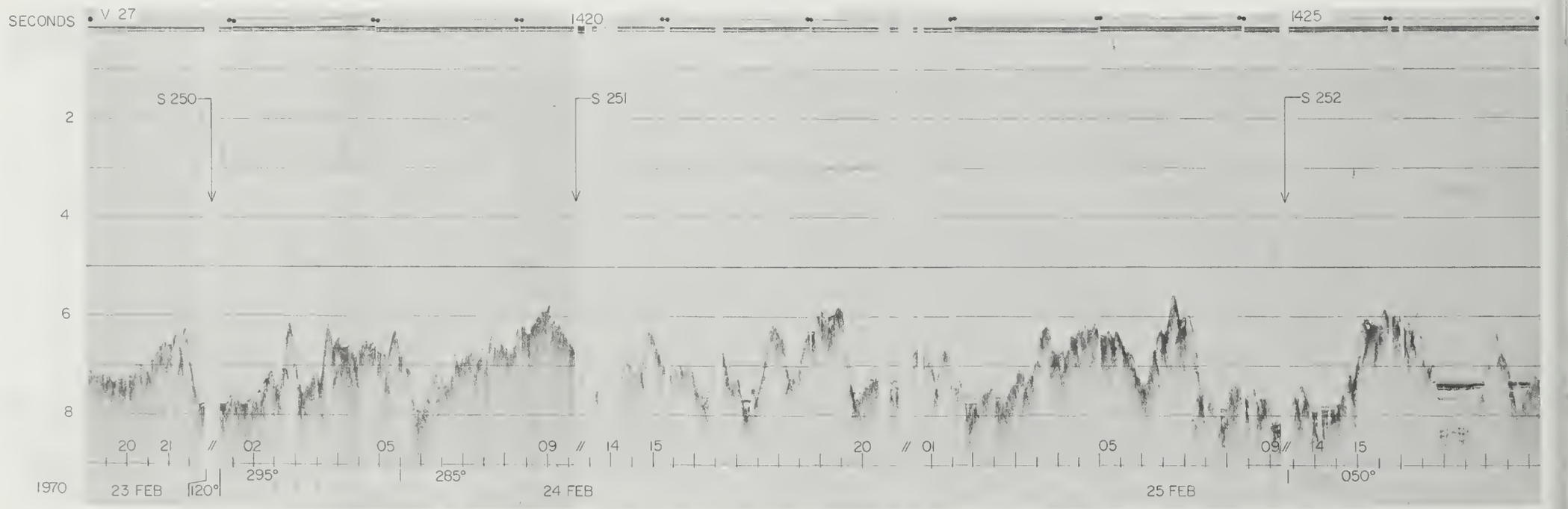

SECONDS
V27
1360
1365
R 128
R 129
R 130
S 238
2
4
6
8
CAPE TOWN
10
13
21
00
05
06// 10
13 // 17
20
00
270°
255°
270°
1970
9 FEB
13 FEB
14 FEB
15 FEB

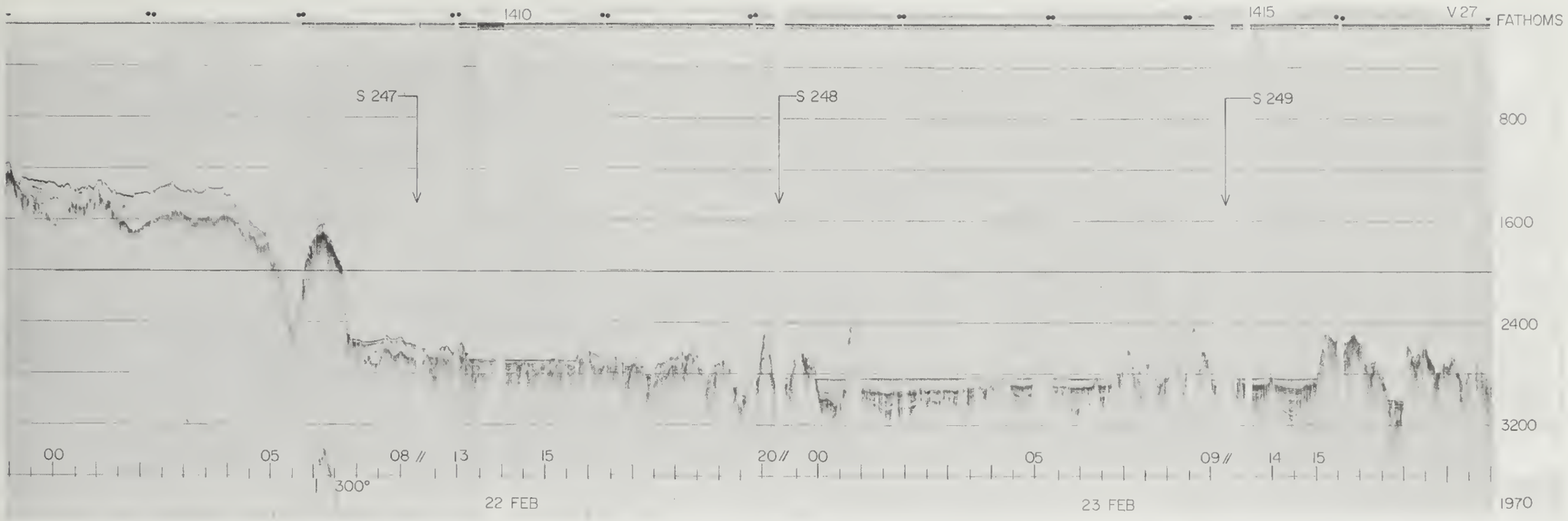

SECONDS
V27
1380
1385
S 241
S 242
2
4
6
8
00
05
08 // 13
15
20
23
00
05
07
// 11
303°
970
17 FEB
TZ-1→GMT
18 FEB

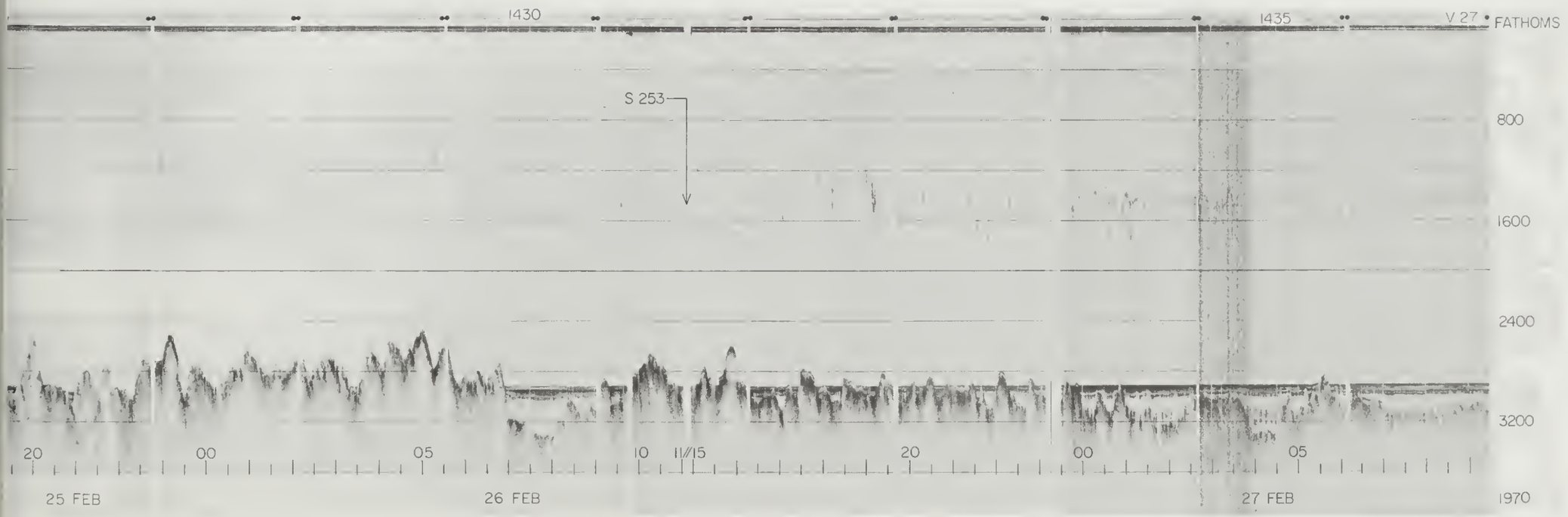

1370
1375
V 27
FATHOMS
S 239
S 240
800
1600
2400
3200
1970
05
07
12
15
20
23
00
05
07
12
14
15
20
267°
260°
265°
270°
090°
305°
15 FEB
TZ -2
16 FEB

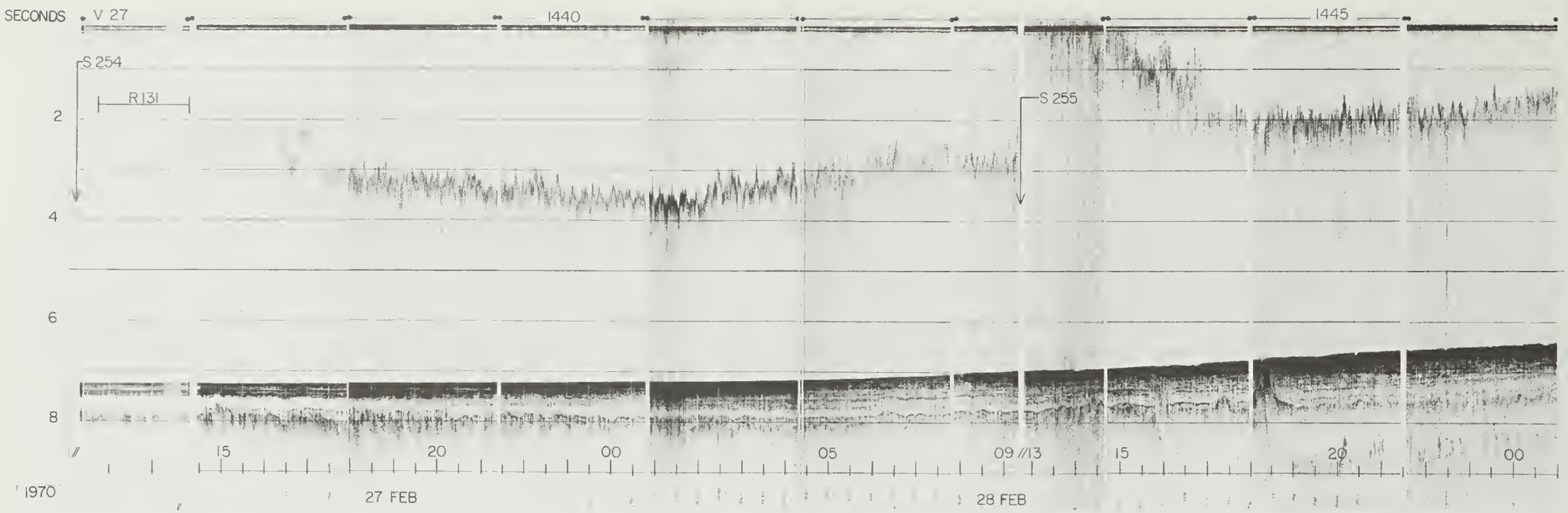

1390
1395
V 27
FATHOMS
S 243
800
1600
2400
3200
1970
15
20
00
05
10
15
18
22
00
090°
18 FEB
19 FEB
20 FEB

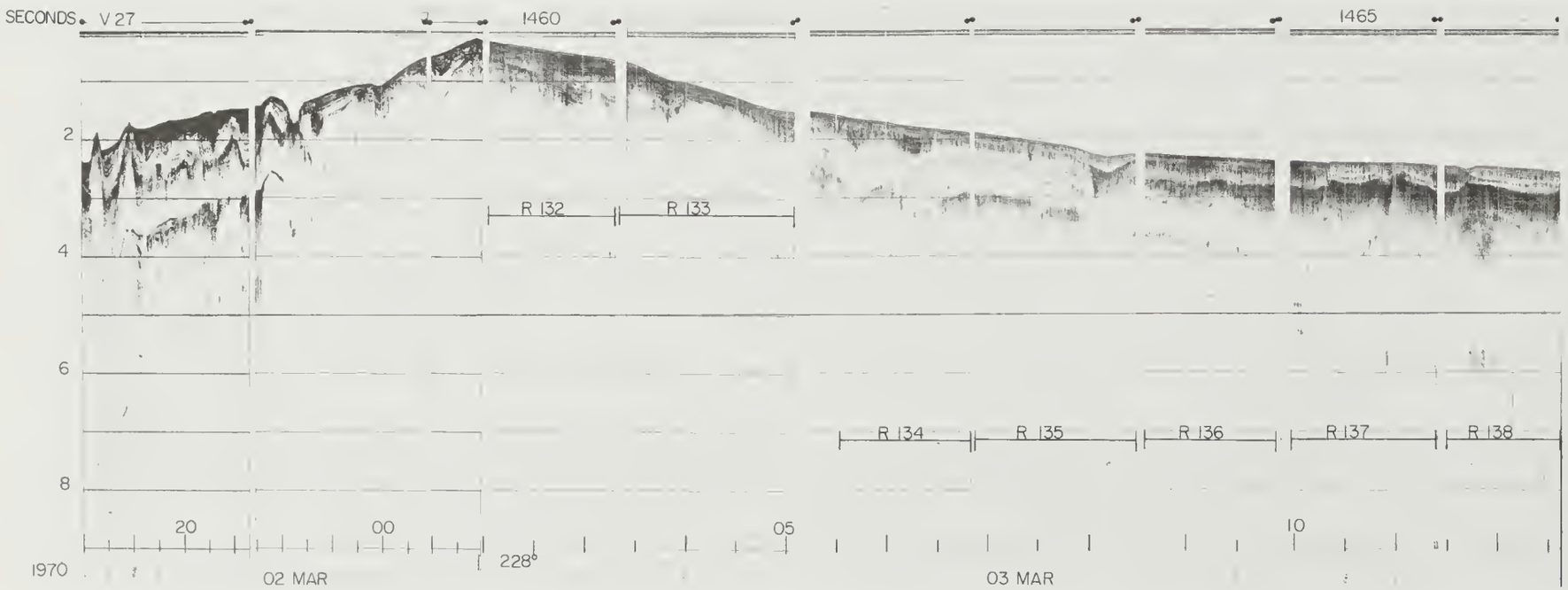

SECONDS
V 27
1400
1405
S 244
S 245
S 246
2
4
6
8
05
08
12
15
20
21
01
05
08
13
15
20
315°
092°
317°
1970
20 FEB
21 FEB

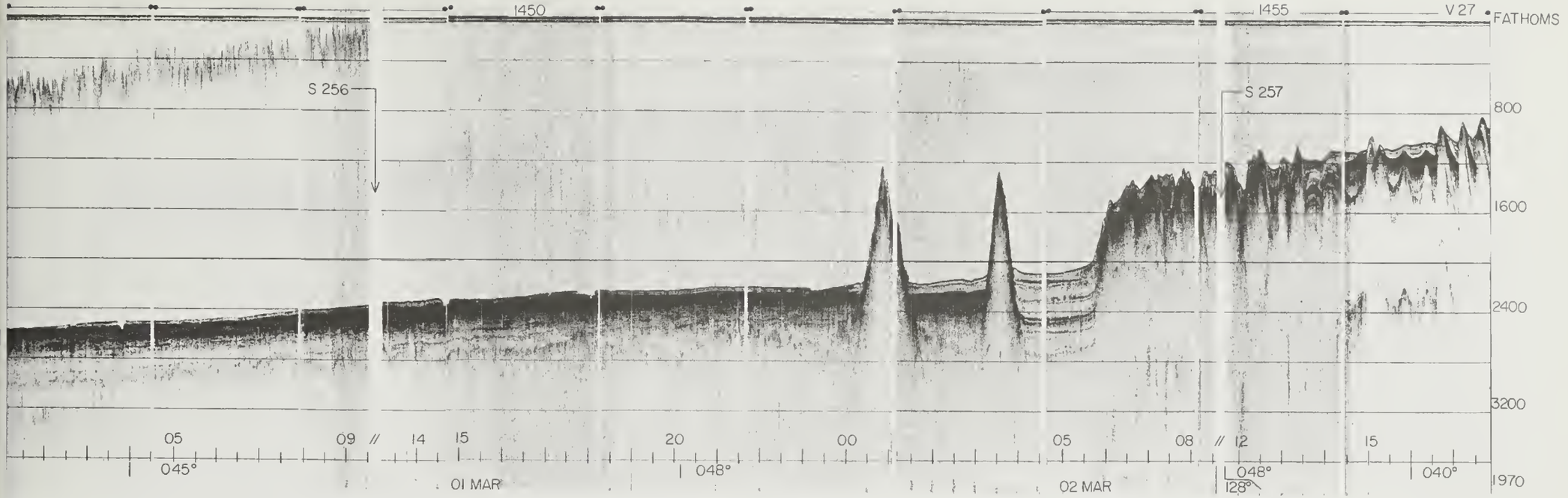

SECONDS
V 27
1420
1425
S 250
S 251
S 252
2
4
6
8
20
21
02
05
09
14
15
20
01
05
09
14
15
295°
285°
050°
120°
1970
23 FEB
24 FEB
25 FEB

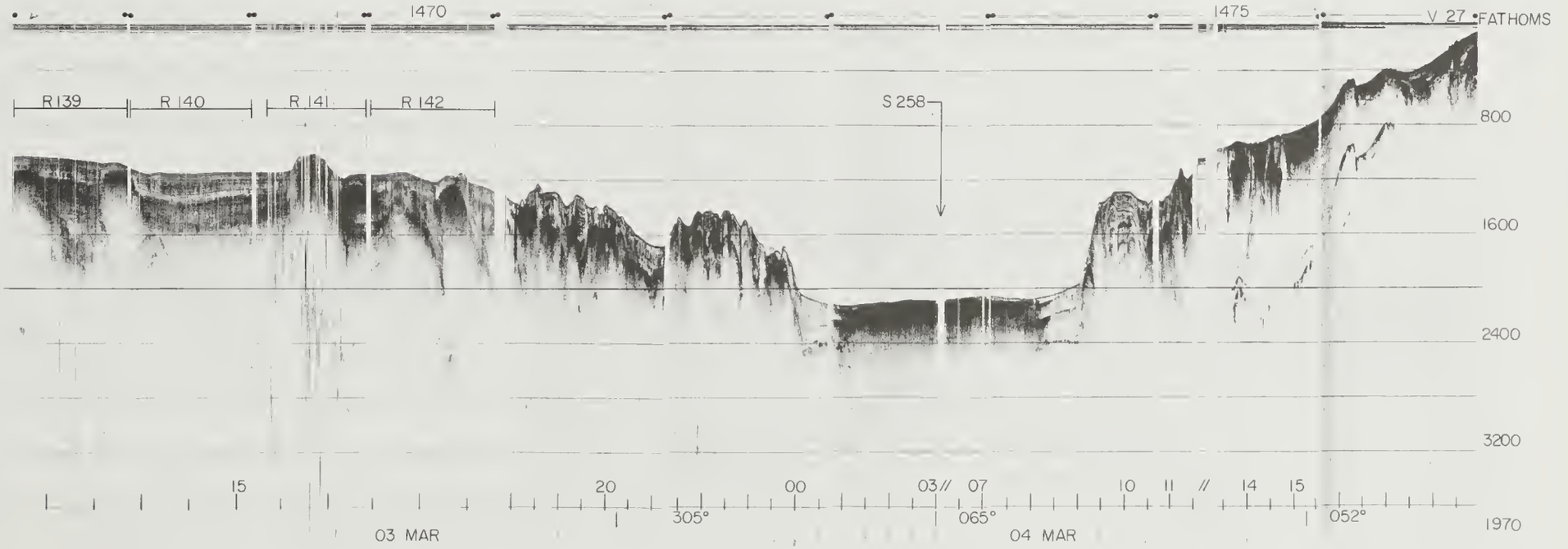

1410
1415
V 27
FATHOMS
S 247
S 248
S 249
800
1600
2400
3200
1970
00
05
08 //
13
15
20 //
00
05
09 //
14
15
300°
22 FEB
23 FEB

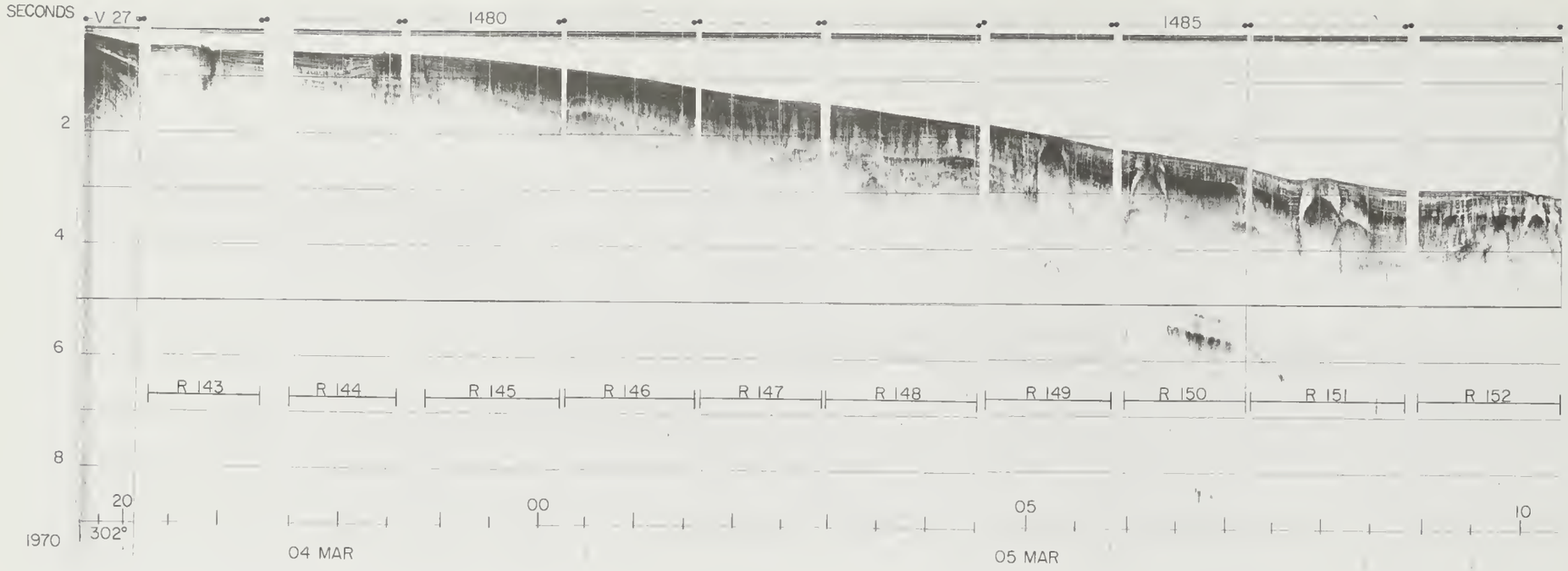

1430
1435
V 27
FATHOMS
S 253
800
1600
2400
3200
1970
20
00
05
10
11//15
20
00
05
25 FEB
26 FEB
27 FEB

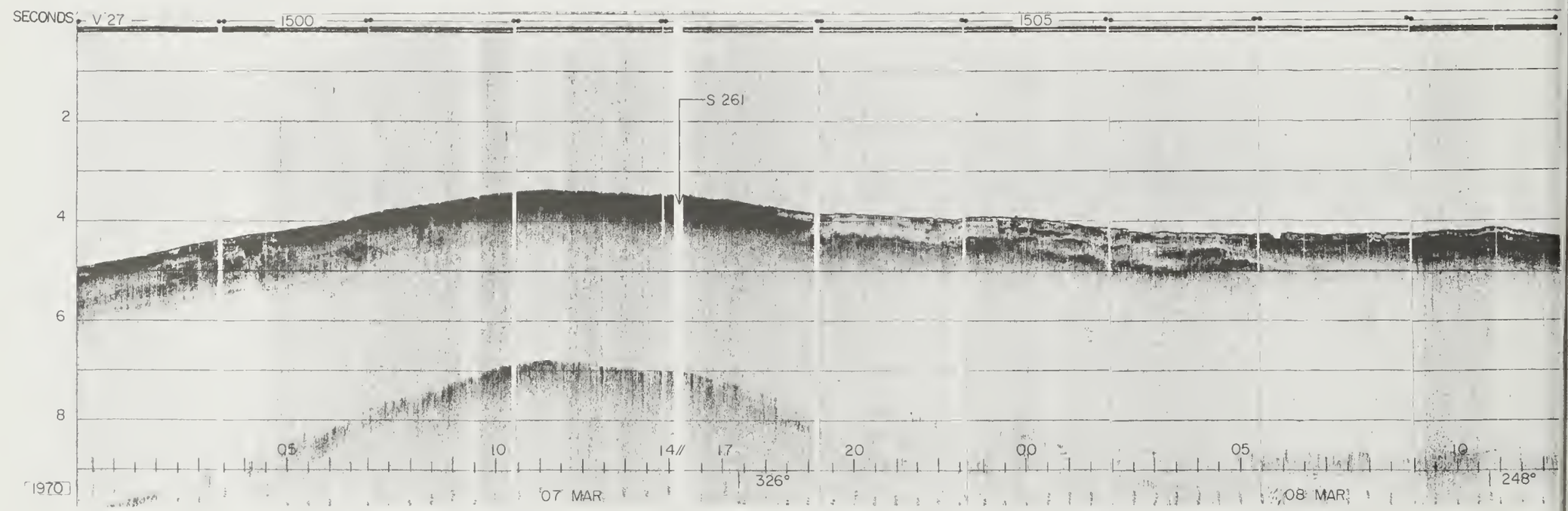

SECONDS
V 27
1440
1445
S 254
R 131
S 255
2
4
6
8
15
20
00
05
09 // 13
15
20
00
1970
27 FEB
28 FEB

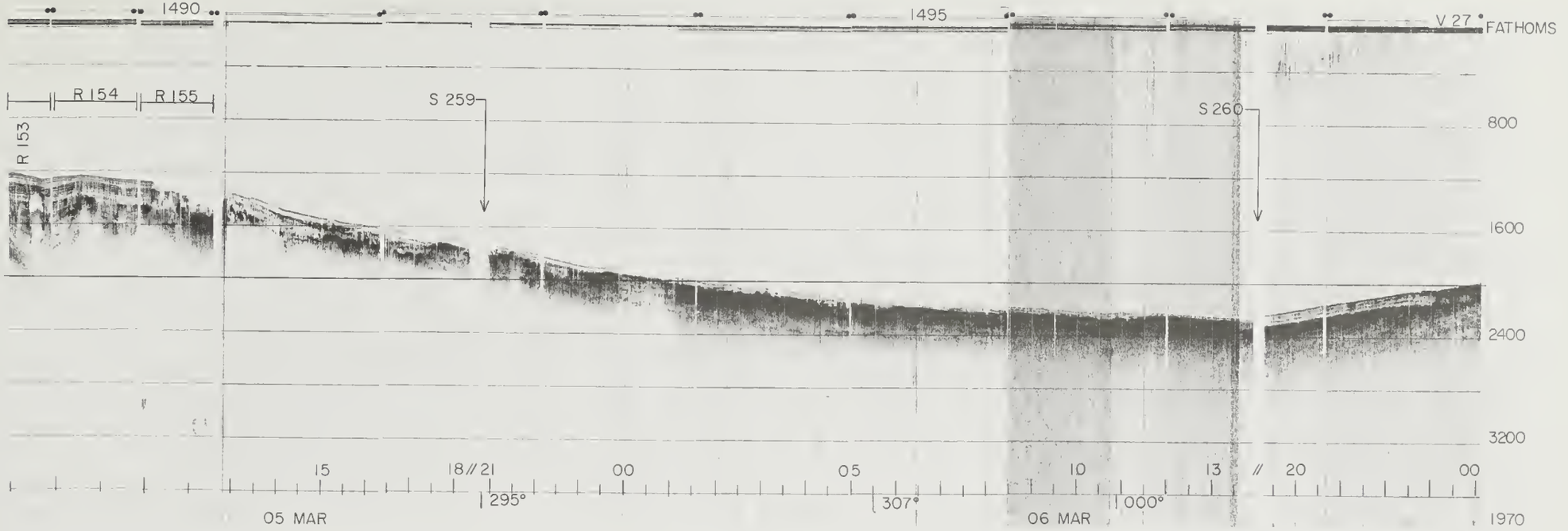

SECONDS
V 27
1460
1465
2
4
6
8
R 132
R 133
R 134
R 135
R 136
R 137
R 138
20
00
05
10
228°
1970
02 MAR
03 MAR

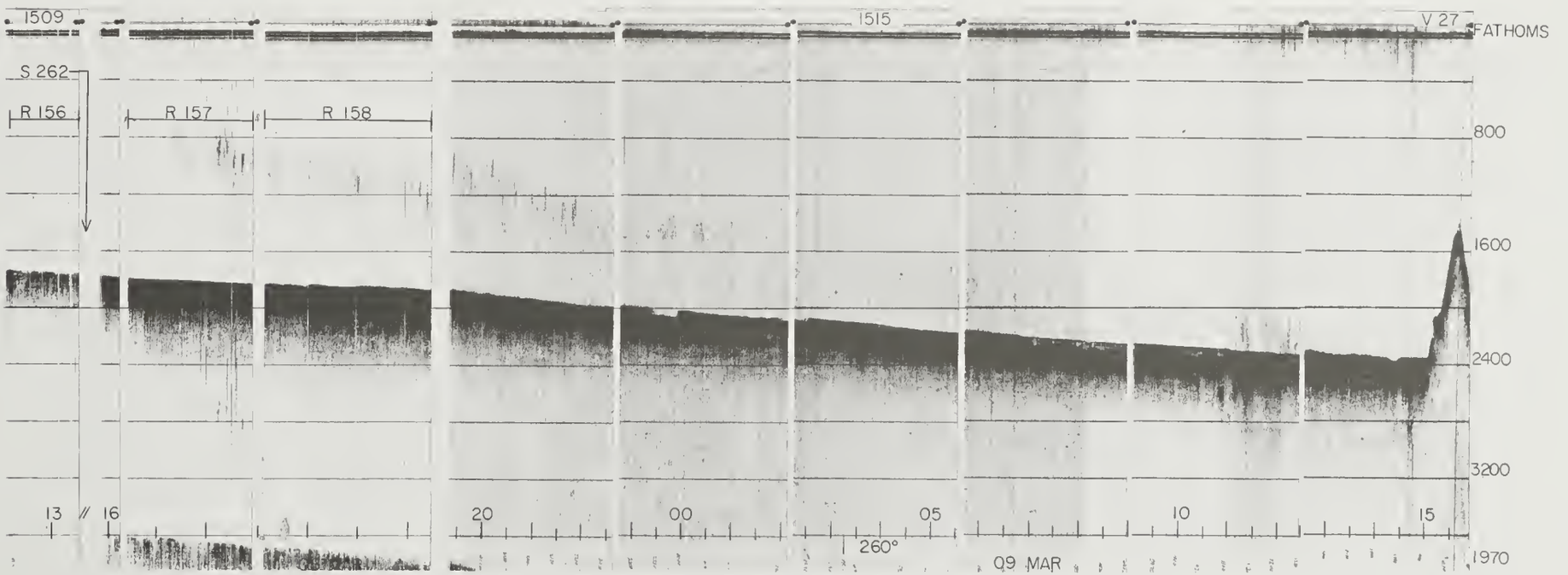

1450
1455
V 27
FATHOMS
S 256
S 257
800
1600
2400
3200
1970
05
09
//
14
15
20
00
05
08
//
12
15
045°
048°
040°
048°
128°
01 MAR
02 MAR

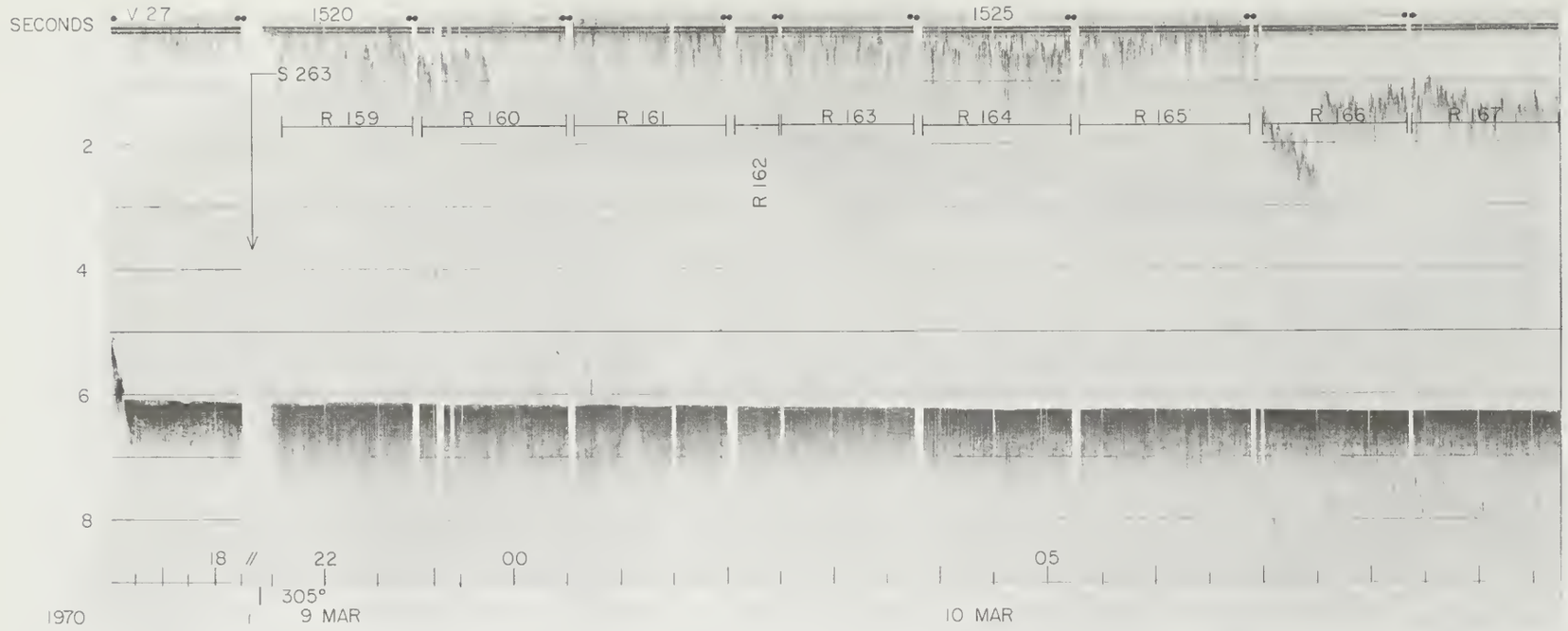

1470
1475
V 27
FATHOMS
R 139
R 140
R 141
R 142
S 258
800
1600
2400
3200
1970
15
20
00
03//
07
10
11
//
14
15
305°
065°
052°
03 MAR
04 MAR

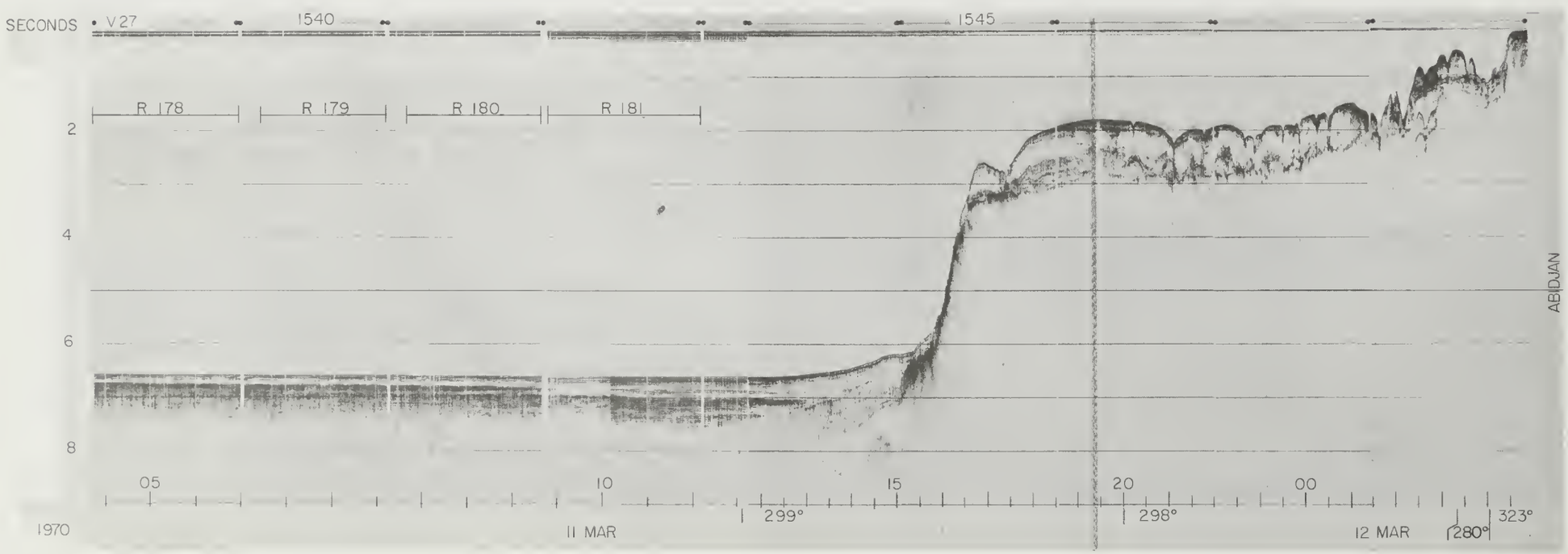

SECONDS
V 27
1480
1485
2
4
6
8
R 143
R 144
R 145
R 146
R 147
R 148
R 149
R 150
R 151
R 152
20
00
05
10
1970
302°
04 MAR
05 MAR

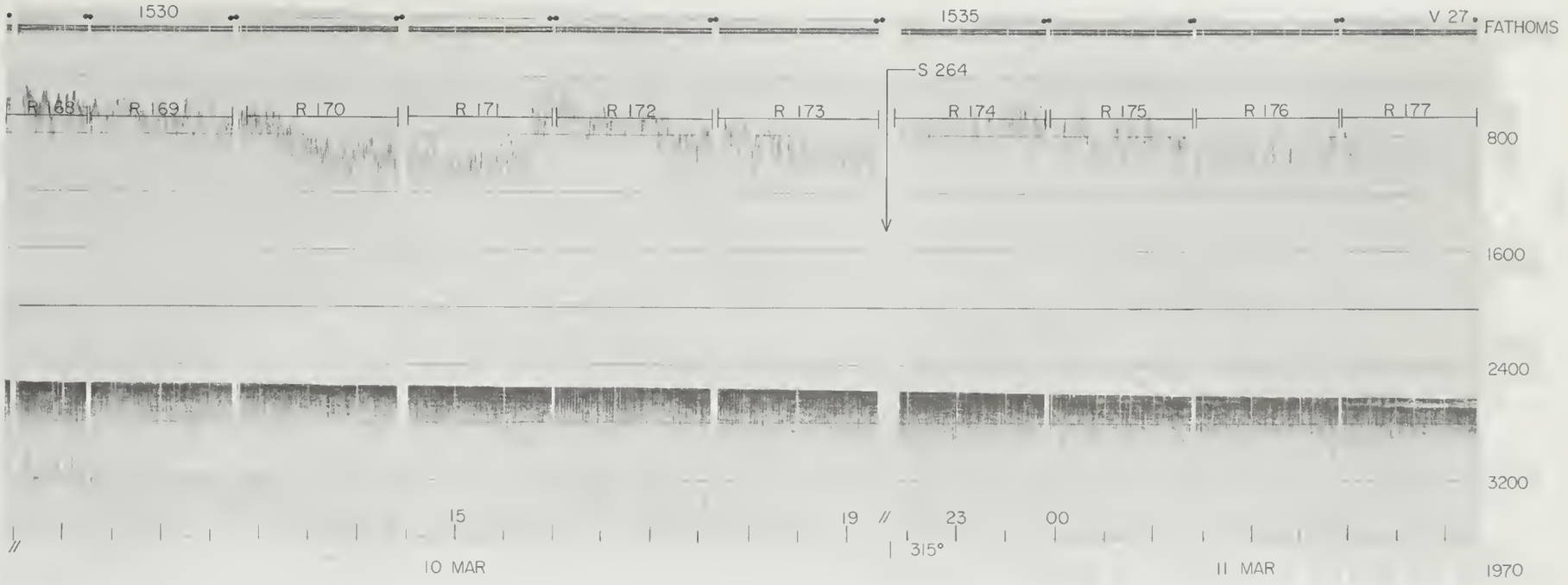

SECONDS
V 27
1500
1505
S 261
2
4
6
8
05
10
14//
17
20
00
05
10
1970
326°
248°
07 MAR
08 MAR

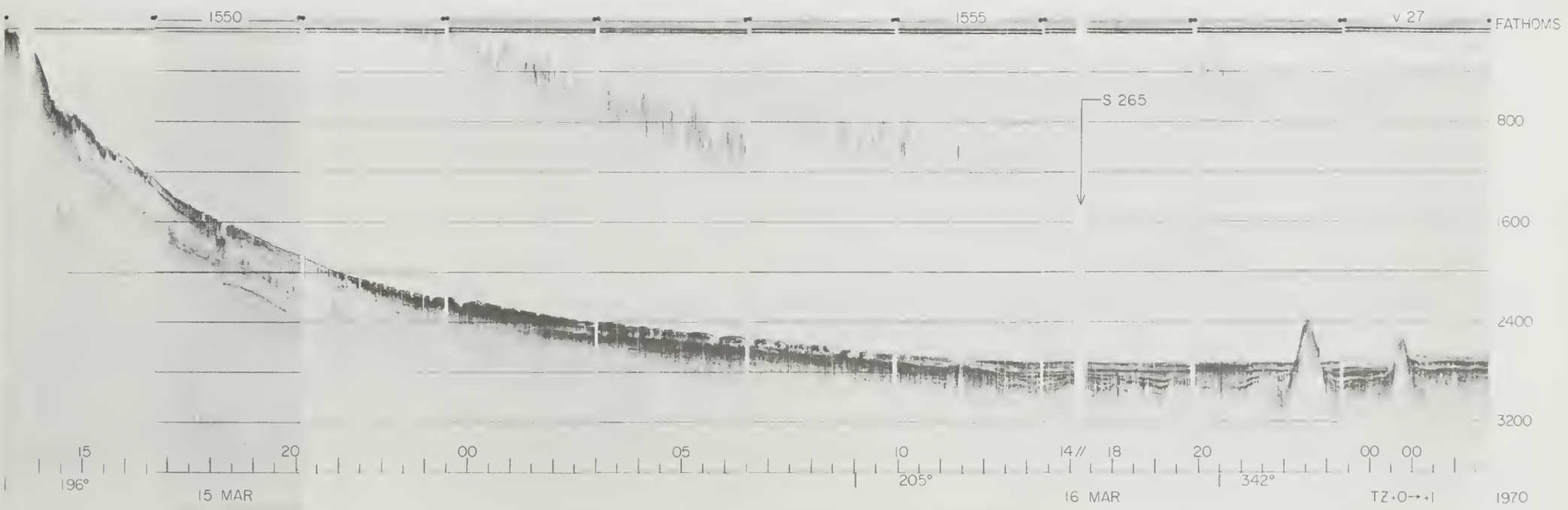

1490
1495
V 27
FATHOMS
R 153
R 154
R 155
S 259
S 260
800
1600
2400
3200
15
18//21
00
05
10
13 // 20
00
295°
307°
000°
05 MAR
06 MAR
1970

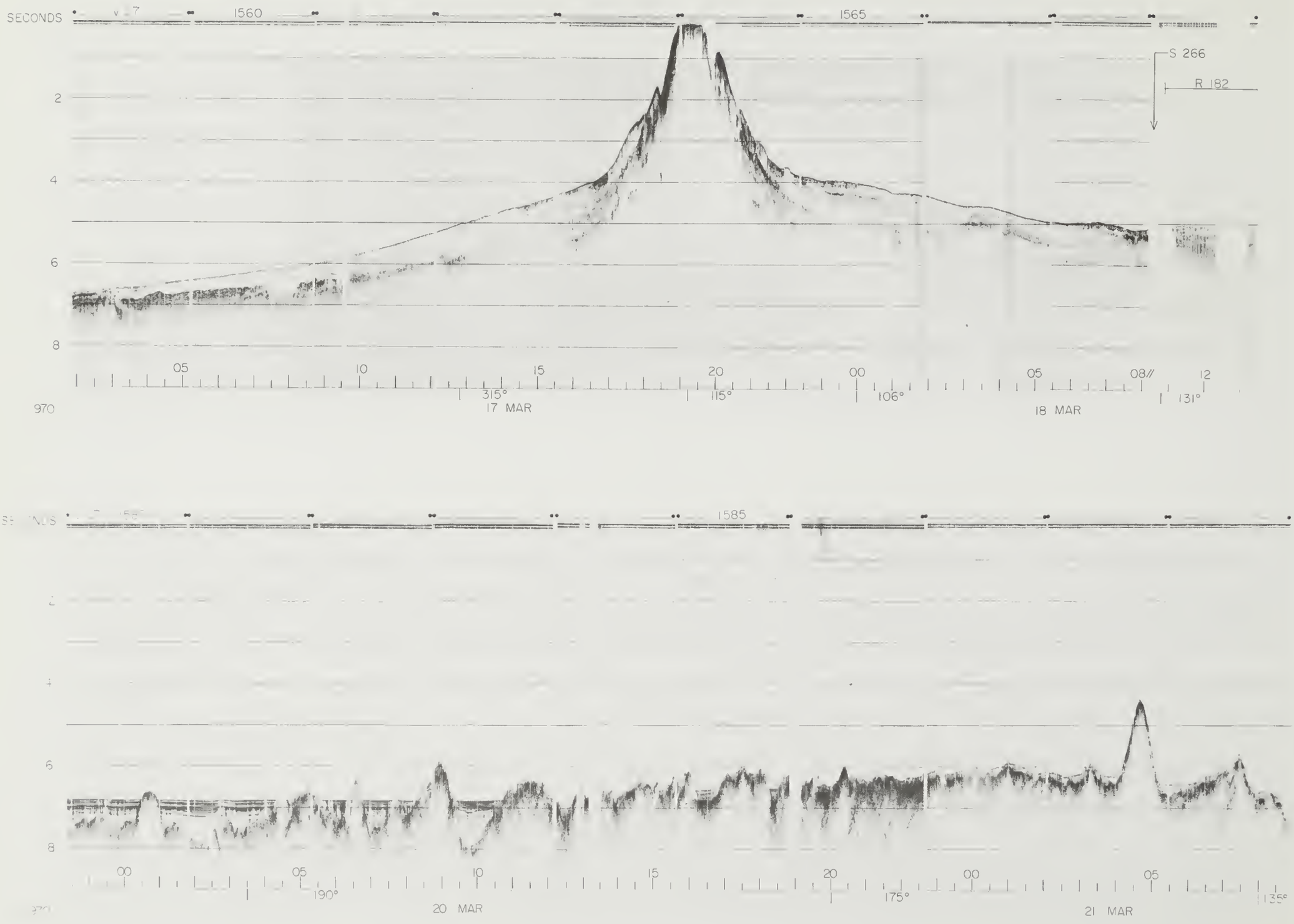

1509
1515
V 27
FATHOMS
S 262
R 156
R 157
R 158
800
1600
2400
3200
13 // 16
20
00
05
10
15
260°
09 MAR
1970

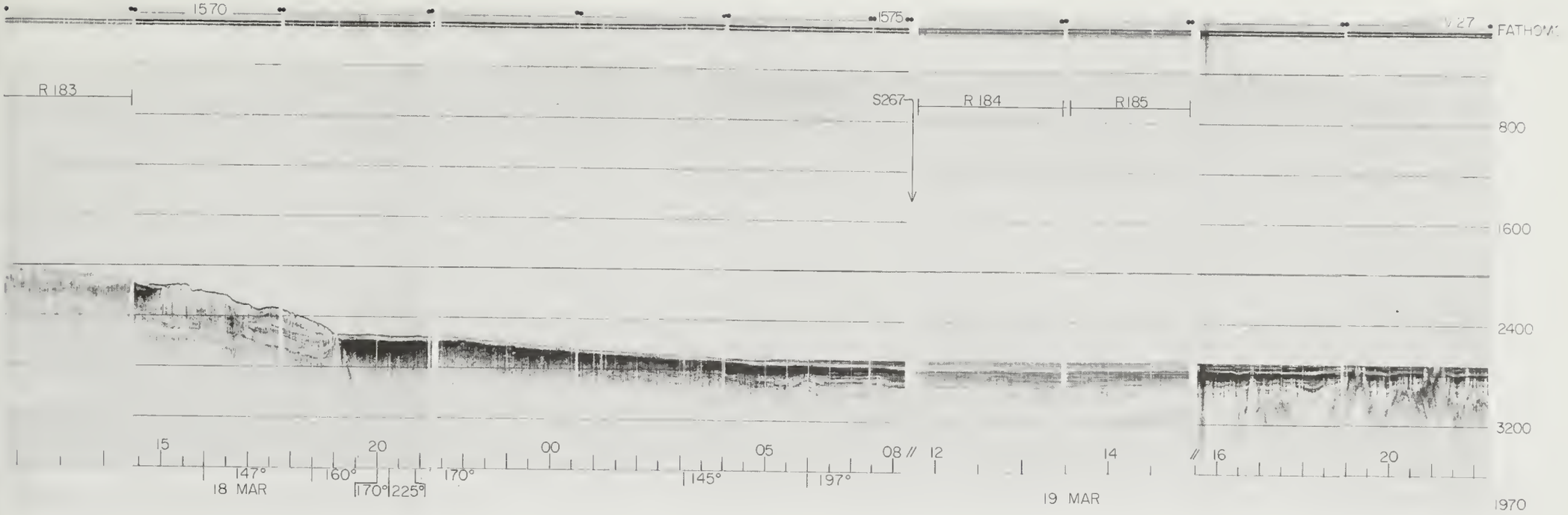

SECONDS
V 27
1520
1525
S 263
R 159
R 160
R 161
R 163
R 164
R 165
R 166
R 167
R 162
2
4
6
8
18
22
00
05
305°
1970
9 MAR
10 MAR

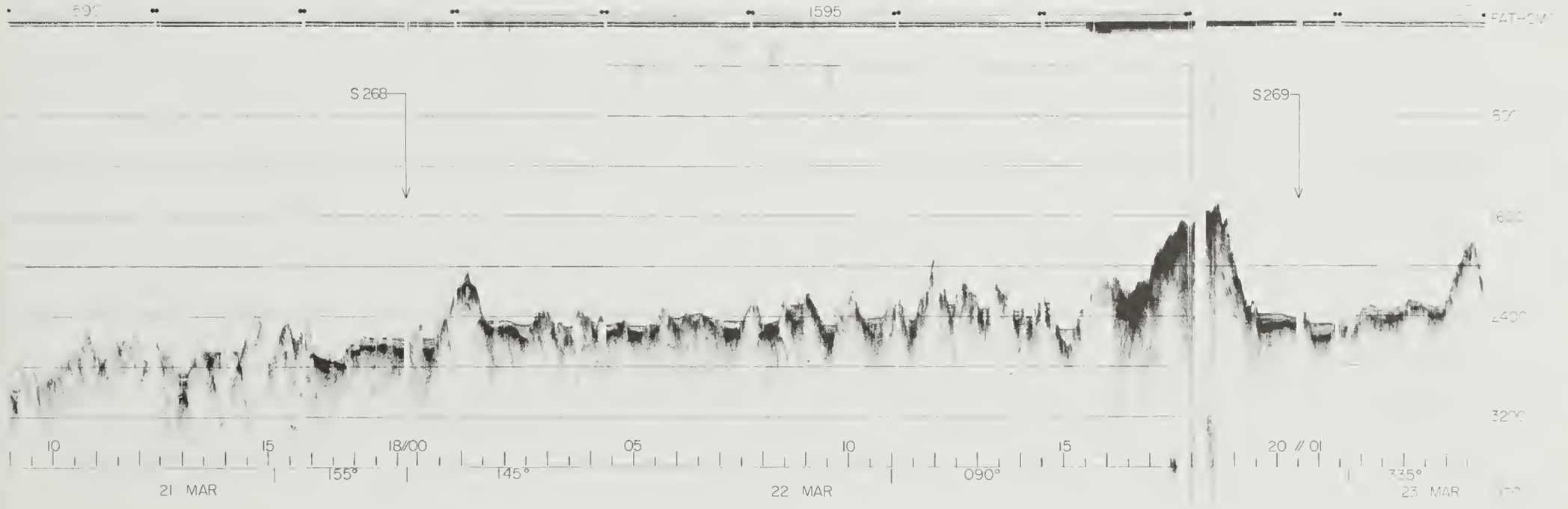

SECONDS
V 27
1540
1545
R 178
R 179
R 180
R 181
2
4
6
8
05
10
15
20
00
299°
298°
323°
280°
1970
11 MAR
12 MAR
ABIDJAN

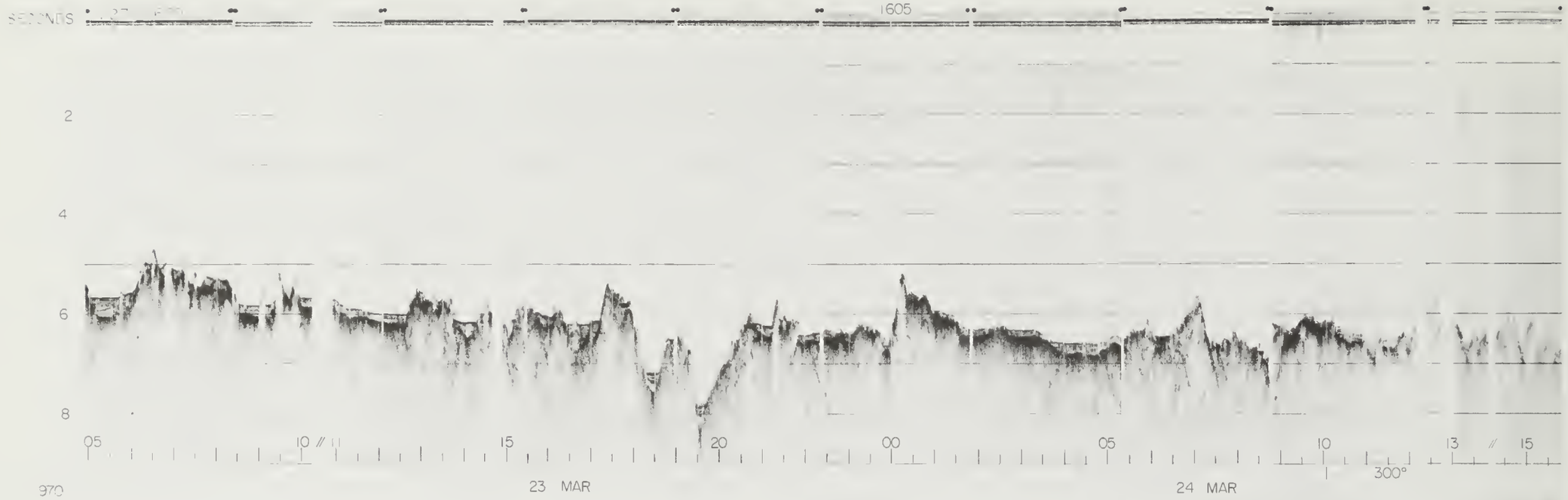

1530
1535
V 27
FATHOMS
S 264
R 168
R 169
R 170
R 171
R 172
R 173
R 174
R 175
R 176
R 177
800
1600
2400
3200
1970
15
19
23
00
315°
10 MAR
11 MAR

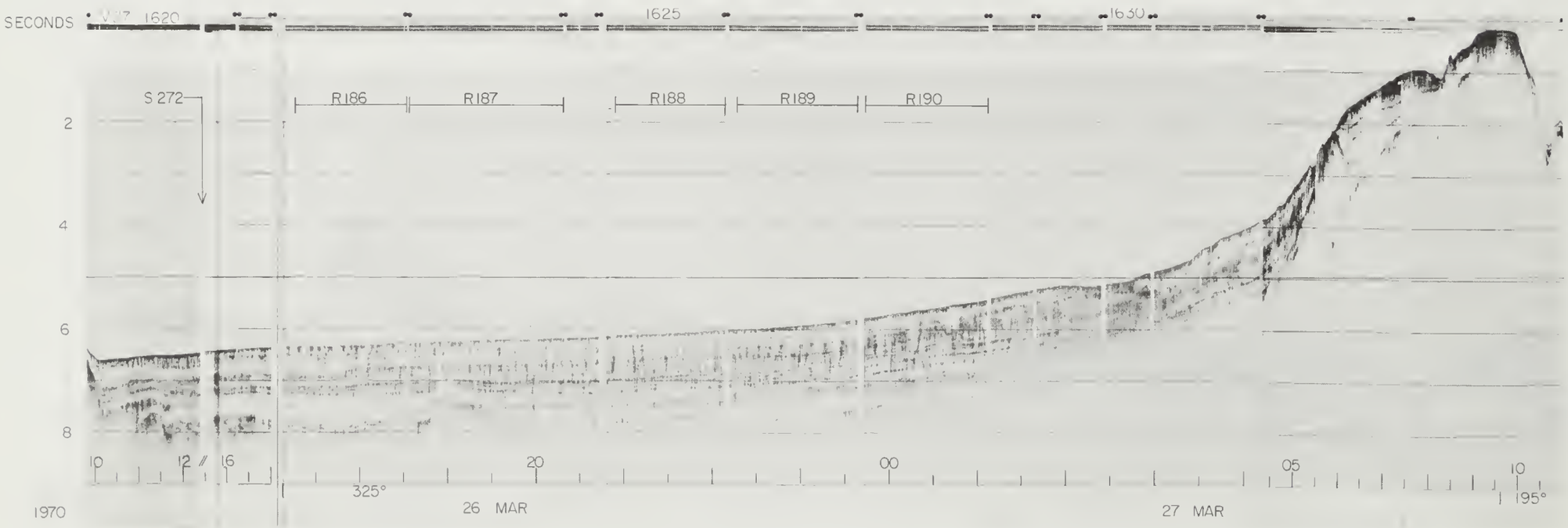

1550
1555
V 27
FATHOMS
S 265
800
1600
2400
3200
1970
15
20
00
05
10
14
18
20
00
00
196°
205°
342°
15 MAR
16 MAR
TZ+0→+1

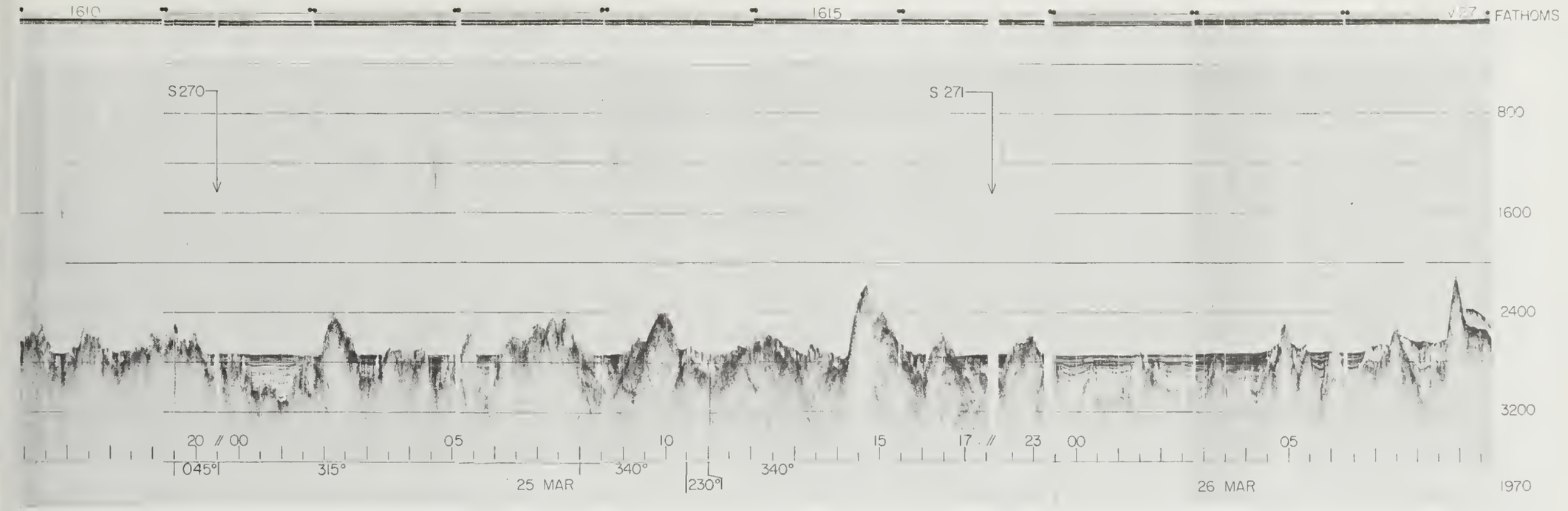

SECONDS
1560
1565
S 266
R 182
2
4
6
8
05
10
15
20
00
05
08//
12
315°
115°
106°
131°
17 MAR
18 MAR
970
1585
00
05
10
15
20
00
05
190°
175°
20 MAR
21 MAR

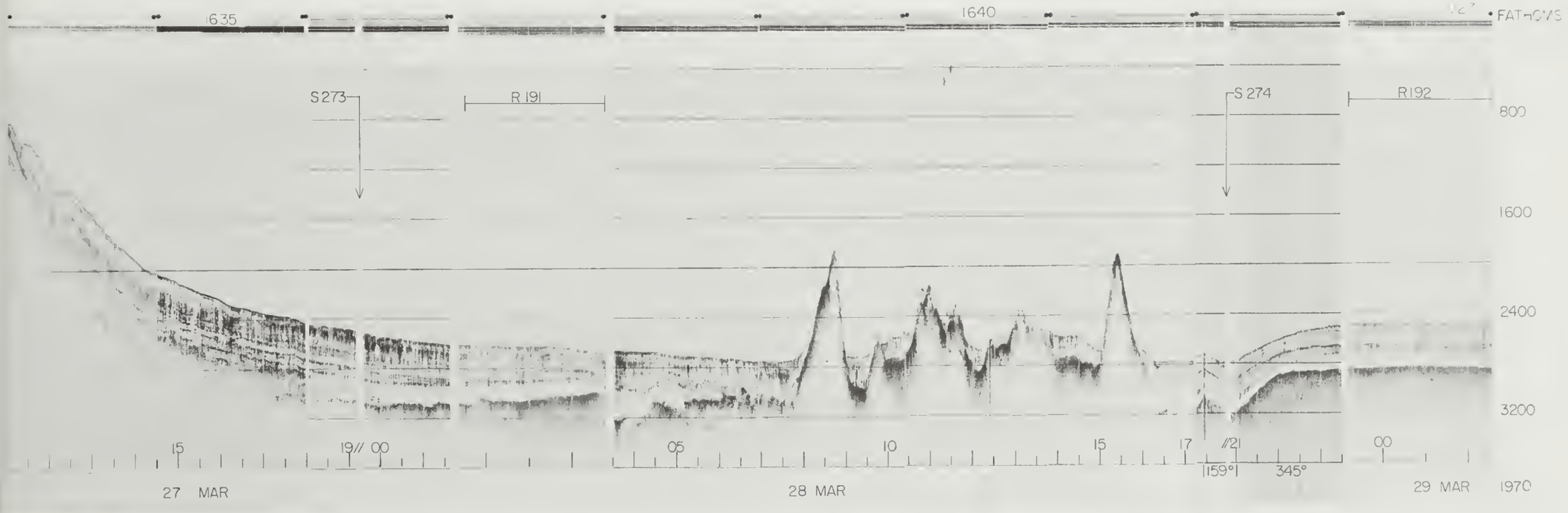

1570
1575
V 27
FATHOMS
R 183
S267
R 184
R 185
800
1600
2400
3200
1970
15
20
00
05
08 // 12
14
// 16
20
147°
160°
170°
170°
225°
145°
197°
18 MAR
19 MAR

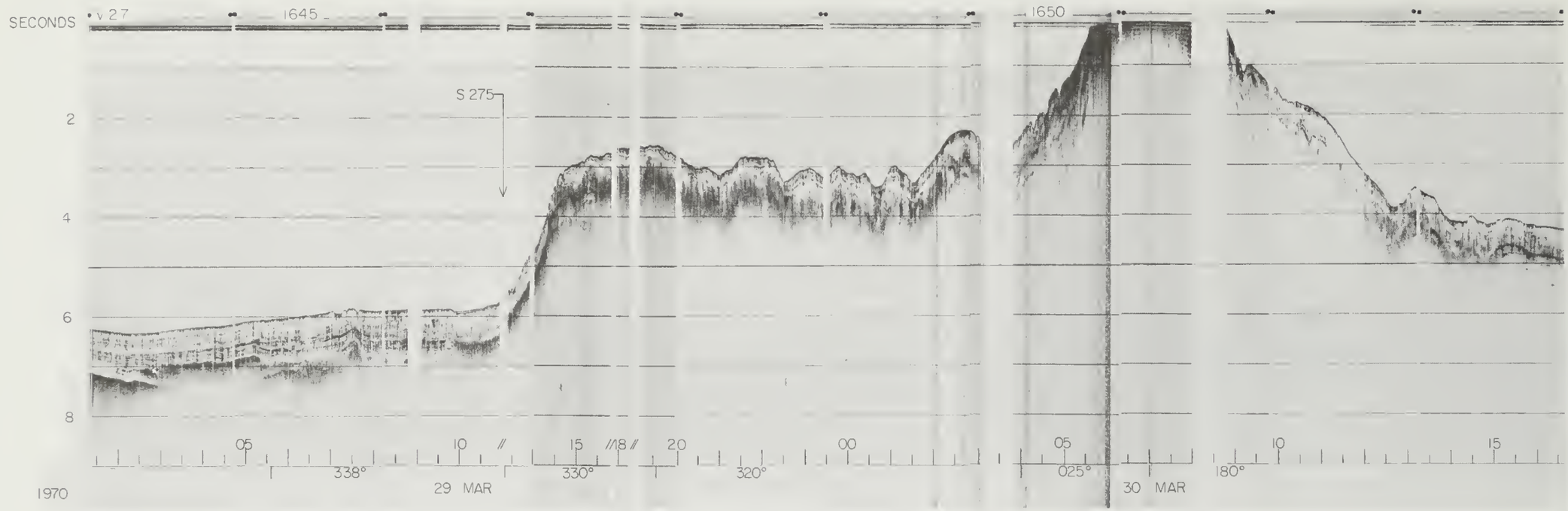

1595
FATHOMS
S 268
S 269
10
15
18//00
05
10
15
20 // 01
155°
145°
090°
335°
21 MAR
22 MAR
23 MAR

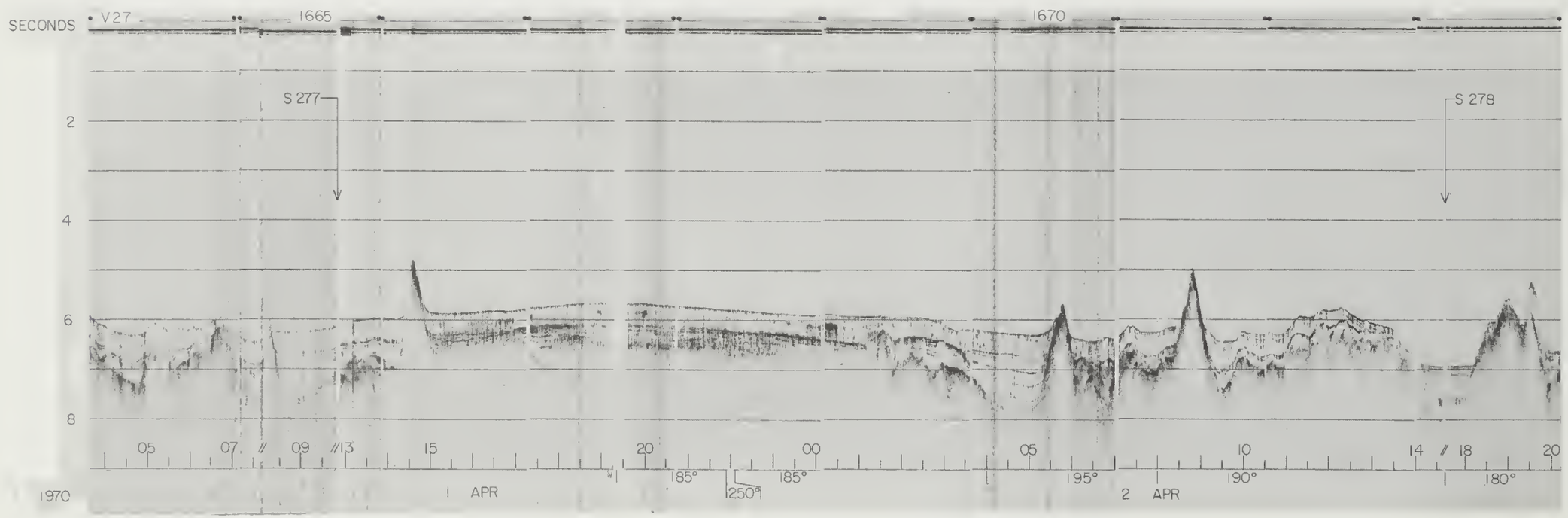

SECONDS
1605
2
4
6
8
05
10
15
20
00
05
10
13
15
300°
970
23 MAR
24 MAR

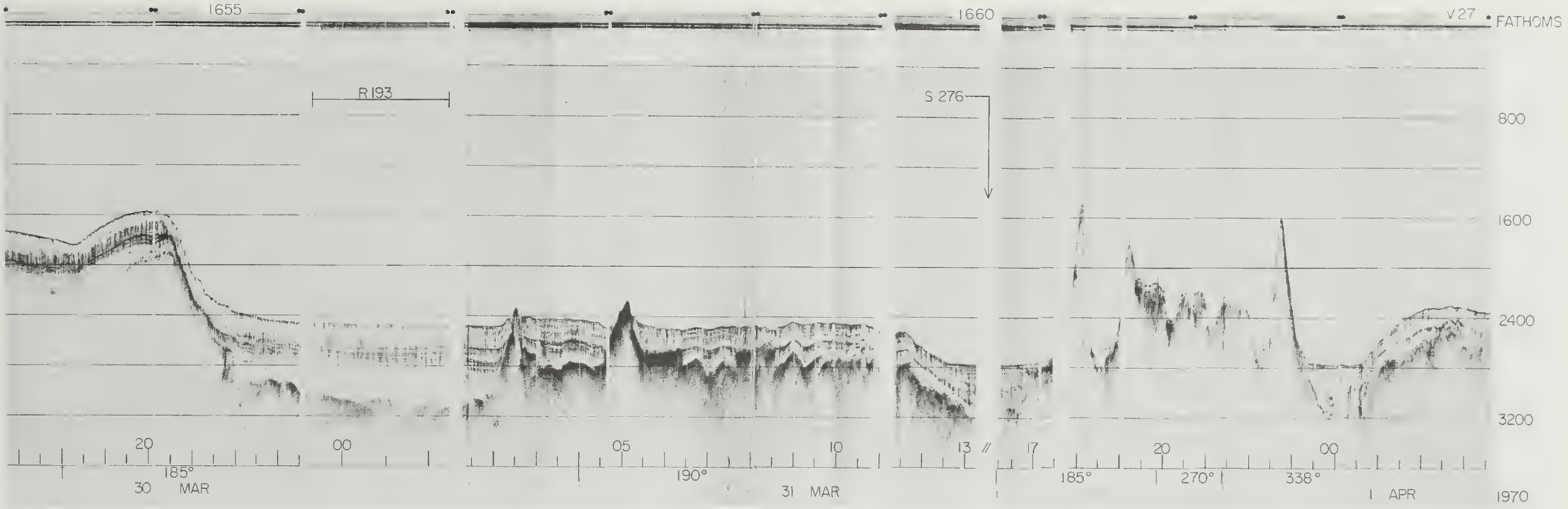

SECONDS
1620
1625
1630
S 272
R186
R187
R188
R189
R190
2
4
6
8
10
12
16
20
00
05
10
325°
195°
1970
26 MAR
27 MAR

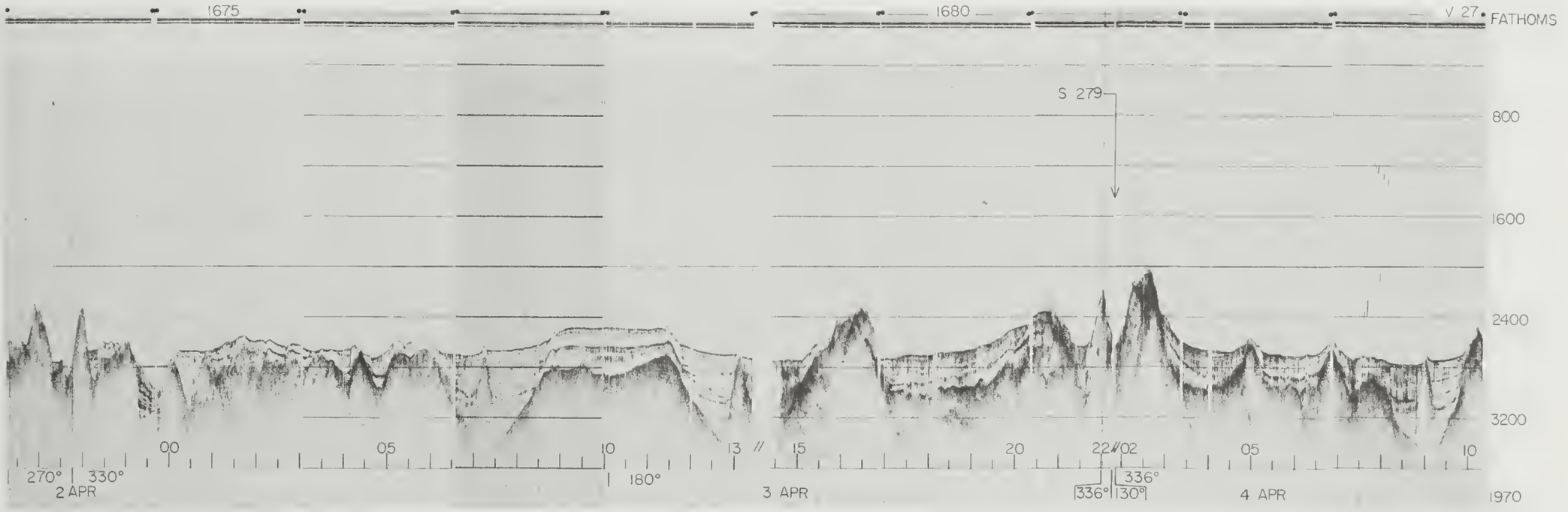

1610
1615
FATHOMS
S270
S 271
800
1600
2400
3200
1970
20 // 00
05
10
15
17 // 23
00
05
045°
315°
340°
230°
340°
25 MAR
26 MAR

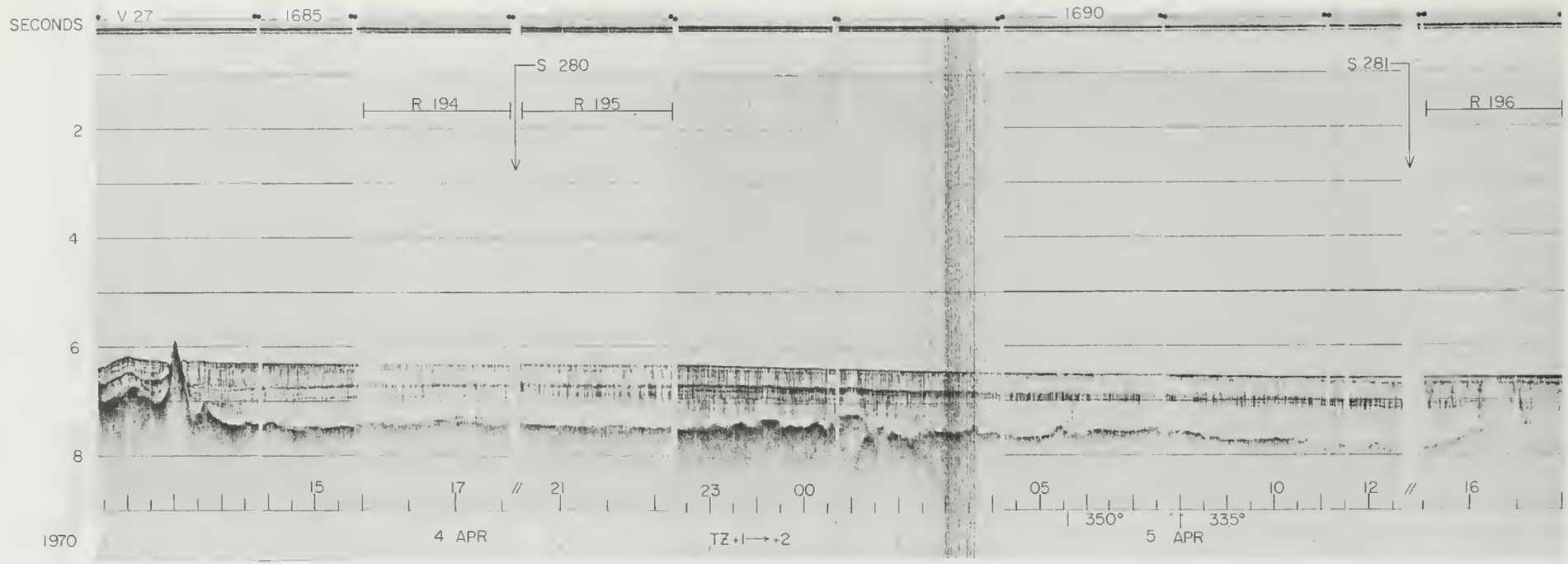

1635
1640
FATHOMS
S273
R 191
S 274
R192
800
1600
2400
3200
1970
15
19// 00
05
10
15
17
//21
00
159°
345°
27 MAR
28 MAR
29 MAR

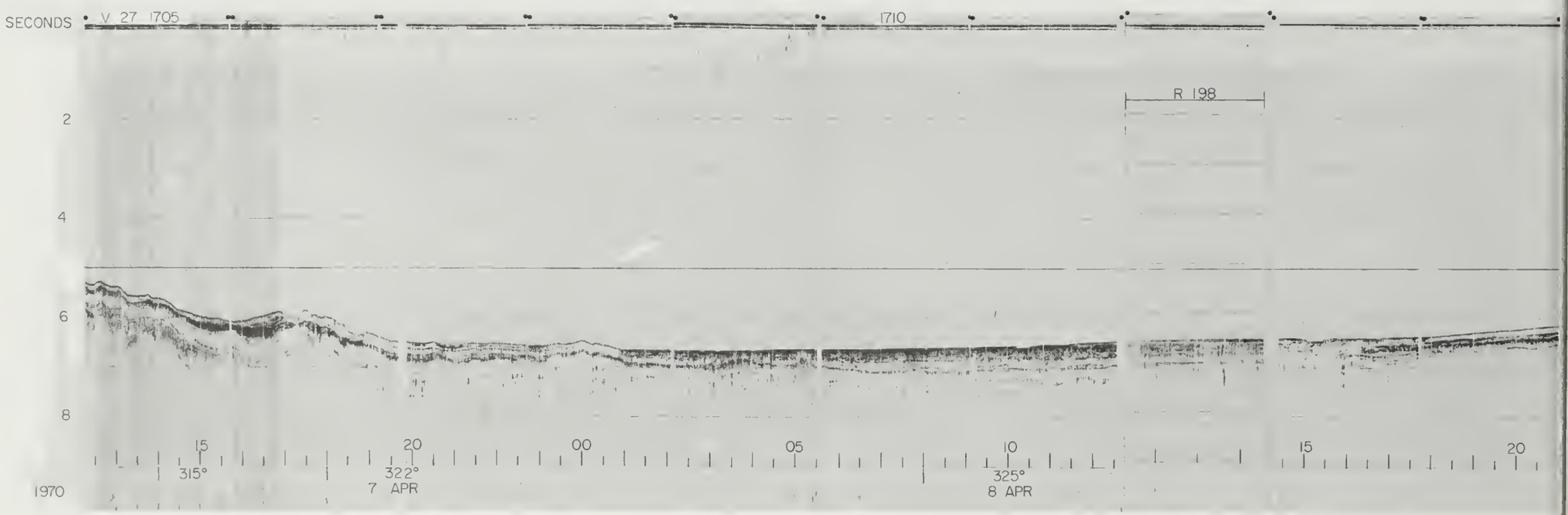

SECONDS
V 27
1645
1650
S 275
2
4
6
8
05
10
15
18
20
00
05
10
15
338°
330°
320°
025°
180°
1970
29 MAR
30 MAR

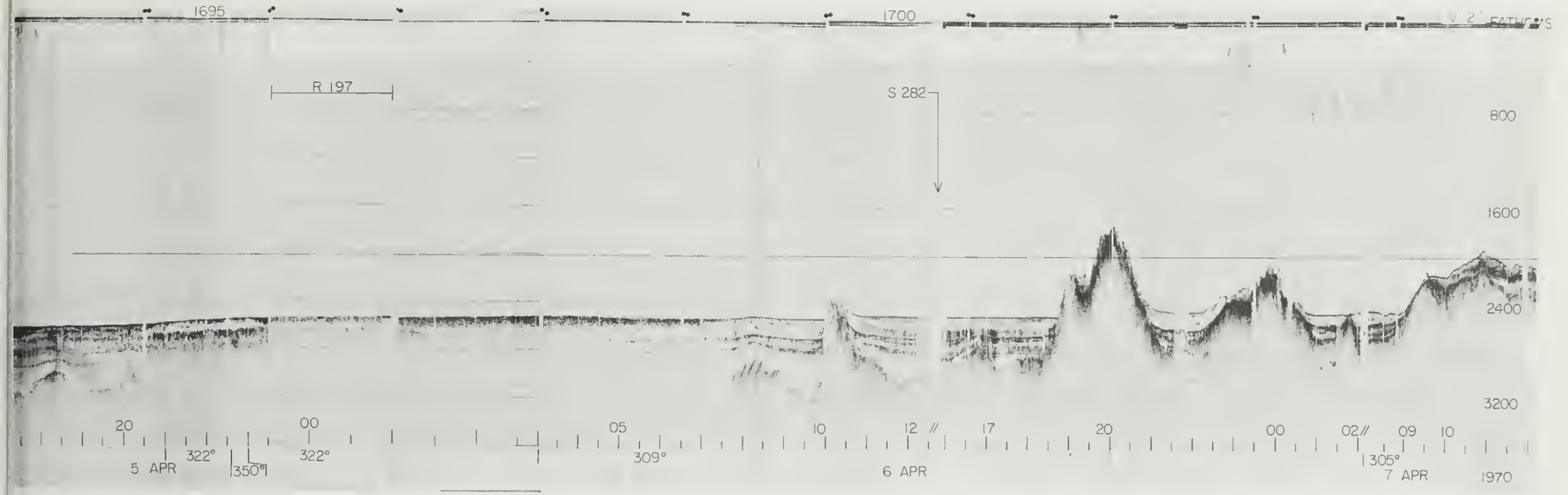

SECONDS
V27
1665
1670
S 277
S 278
2
4
6
8
05
07
09
13
15
20
00
05
10
14
18
20
185°
250°
185°
195°
190°
180°
1970
1 APR
2 APR

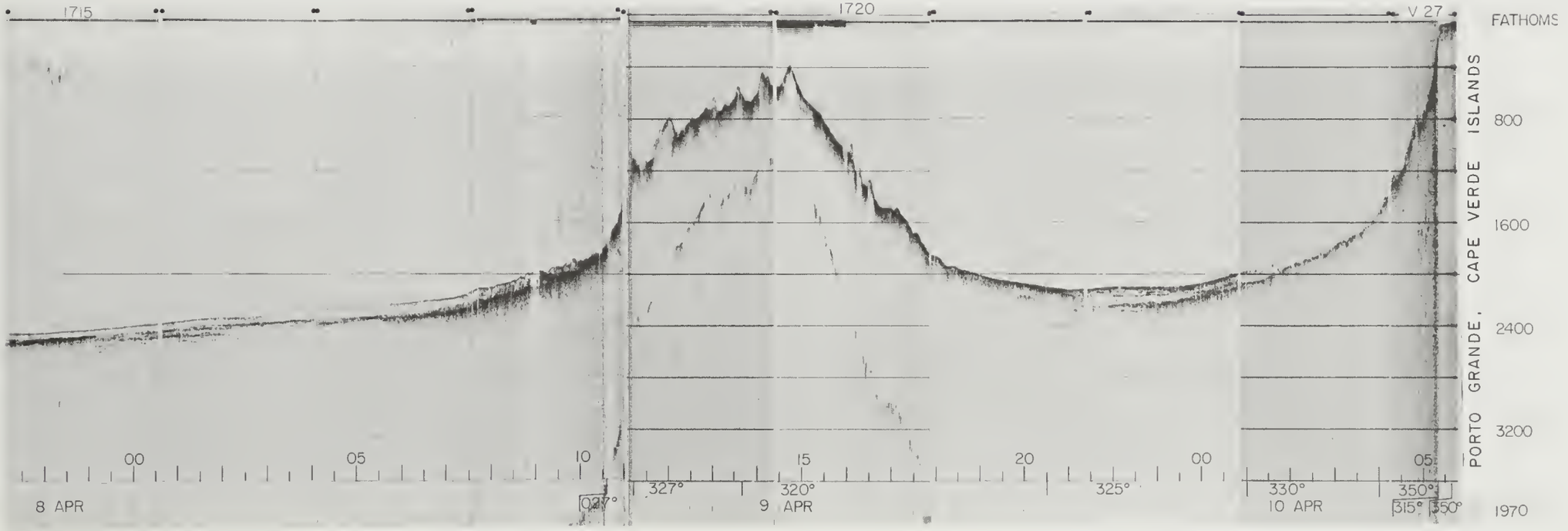

1655
R193
1660
S 276
V 27
FATHOMS
800
1600
2400
3200
1970
20
00
05
10
13
17
20
00
185°
190°
185°
270°
338°
30 MAR
31 MAR
1 APR

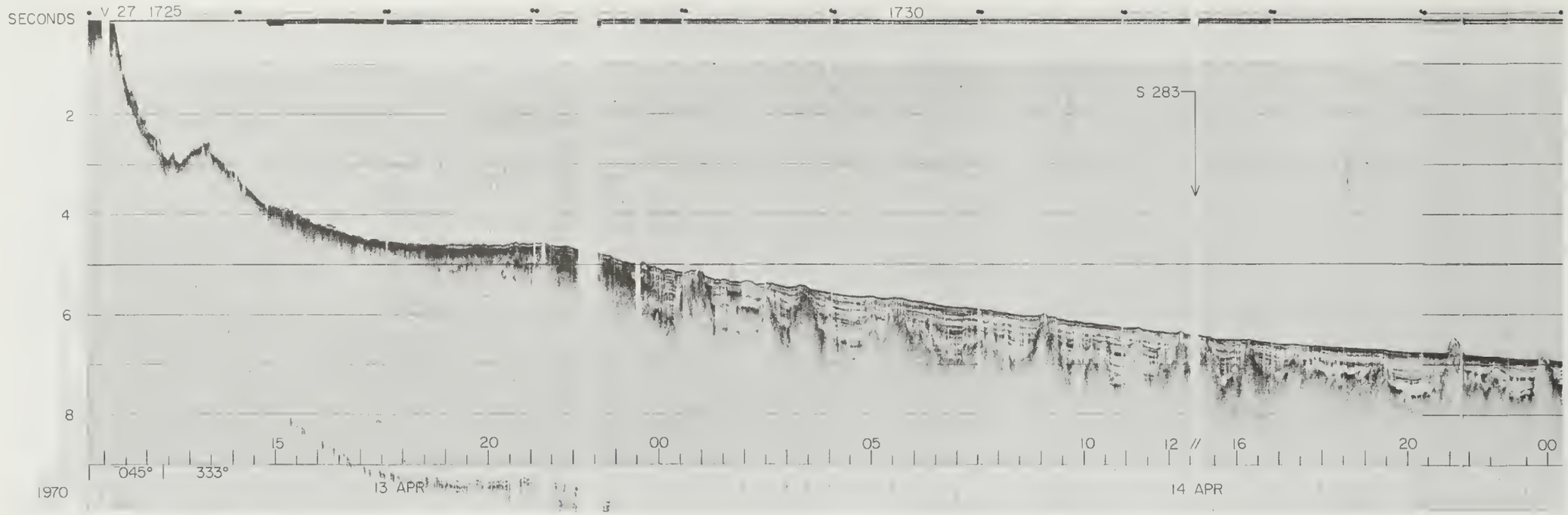

1675
1680
V 27
FATHOMS
S 279
800
1600
2400
3200
1970
00
05
10
13
15
20
22
02
05
10
270°
330°
180°
336°
336°
130°
2 APR
3 APR
4 APR

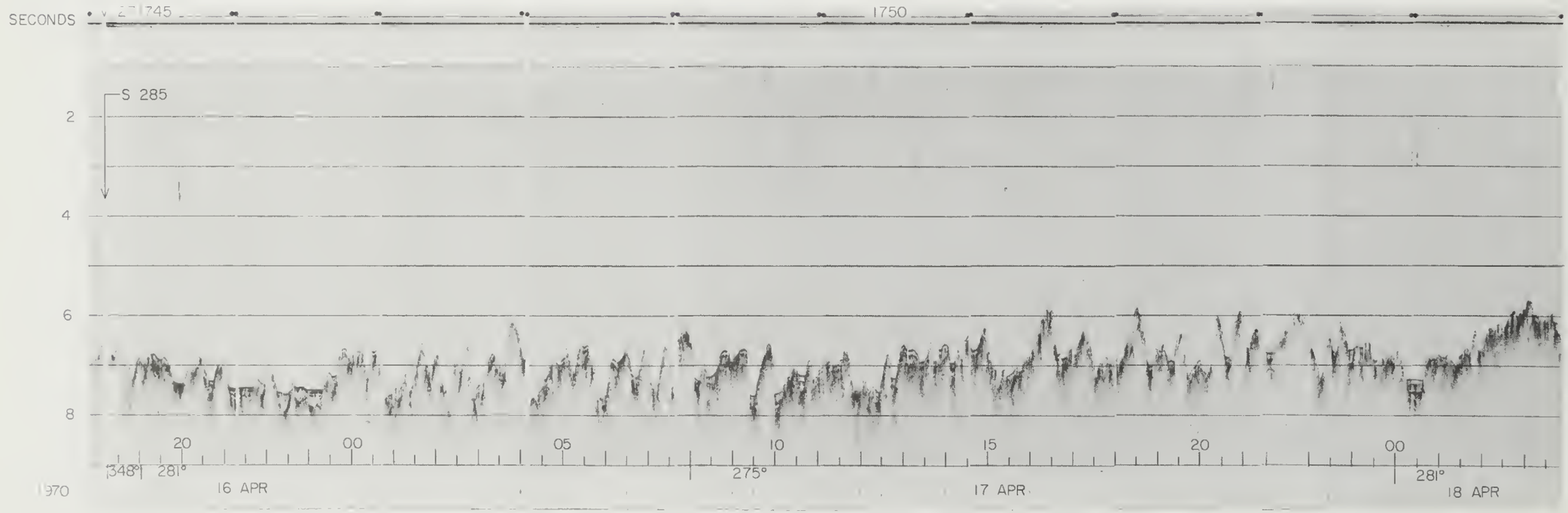

SECONDS
V 27
1685
1690
S 280
S 281
R 194
R 195
R 196
2
4
6
8
15
17
21
23
00
05
10
12
16
350°
335°
1970
4 APR
TZ+1→+2
5 APR

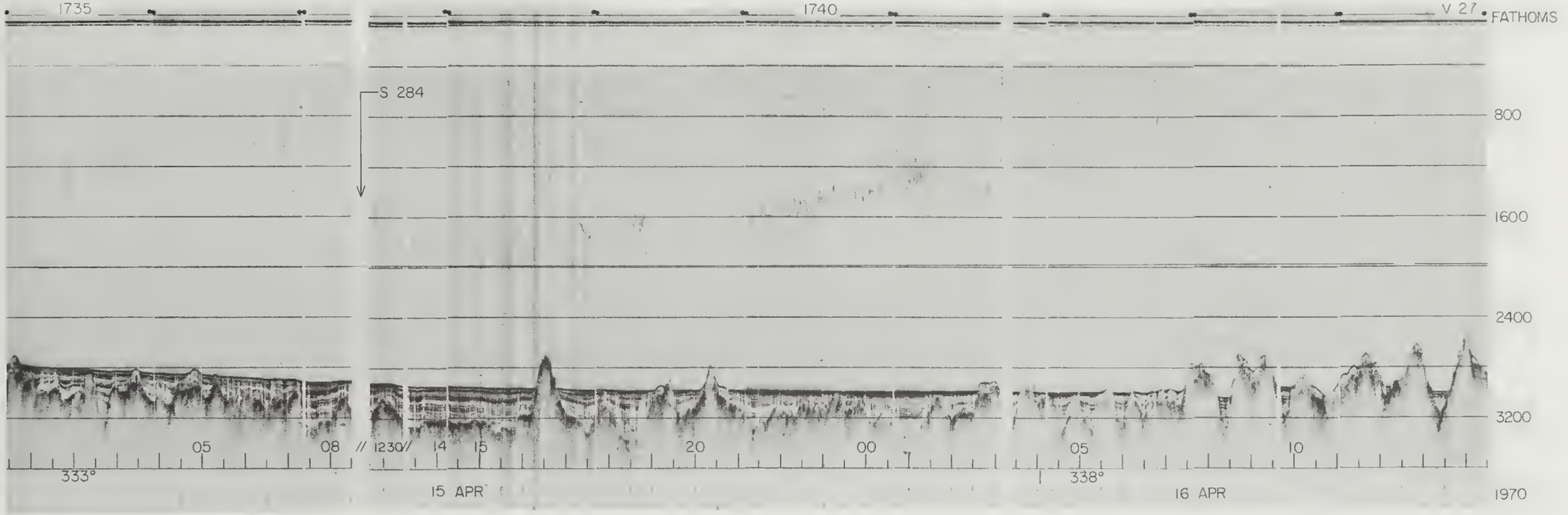

SECONDS
V 27 1705
1710
R 198
2
4
6
8
15
20
00
05
10
15
20
315°
322°
325°
1970
7 APR
8 APR

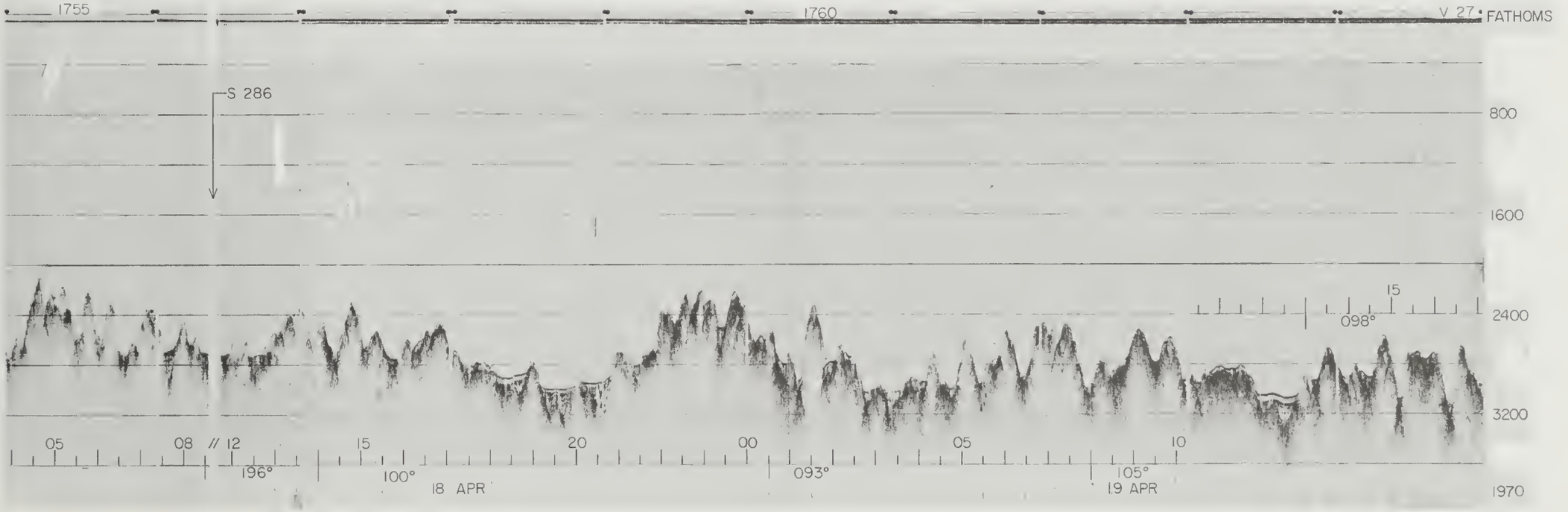

1695
1700
V 27
FATHOMS
R 197
S 282
800
1600
2400
3200
1970
20
00
05
10
12 //
17
20
00
02//
09
10
322°
322°
309°
305°
5 APR
350°
6 APR
7 APR

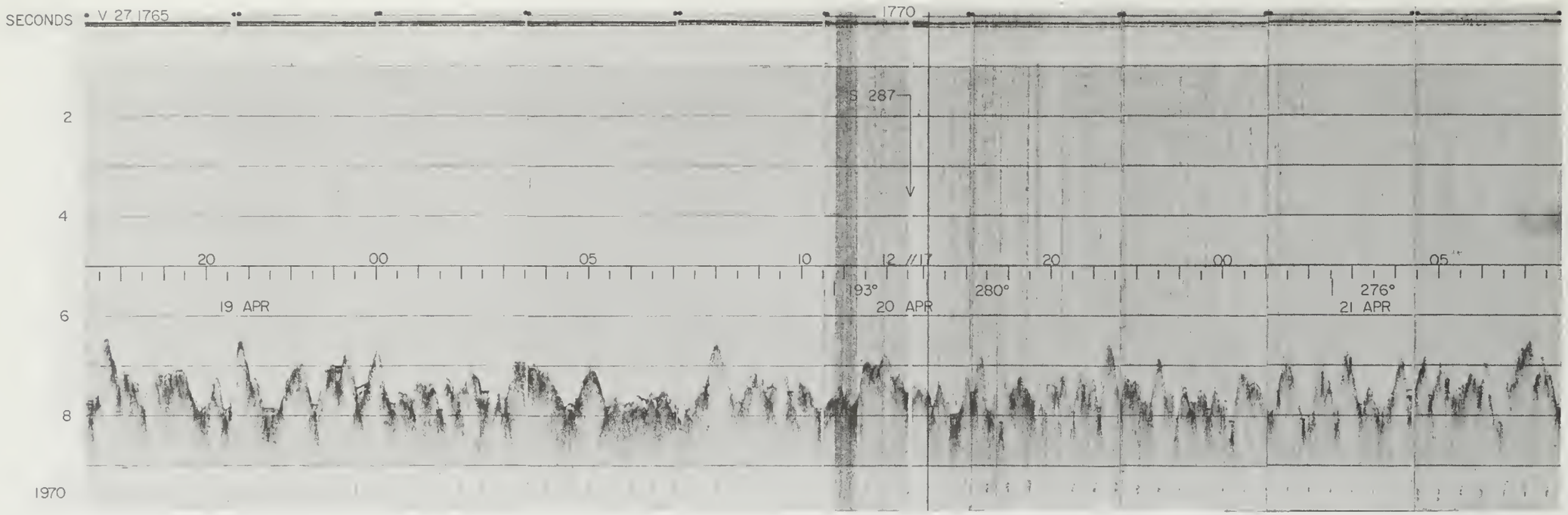

1715
1720
V 27
FATHOMS
PORTO GRANDE, CAPE VERDE ISLANDS
800
1600
2400
3200
1970
00
05
10
15
20
00
05
327°
320°
325°
330°
350°
8 APR
027°
9 APR
10 APR
315°
350°

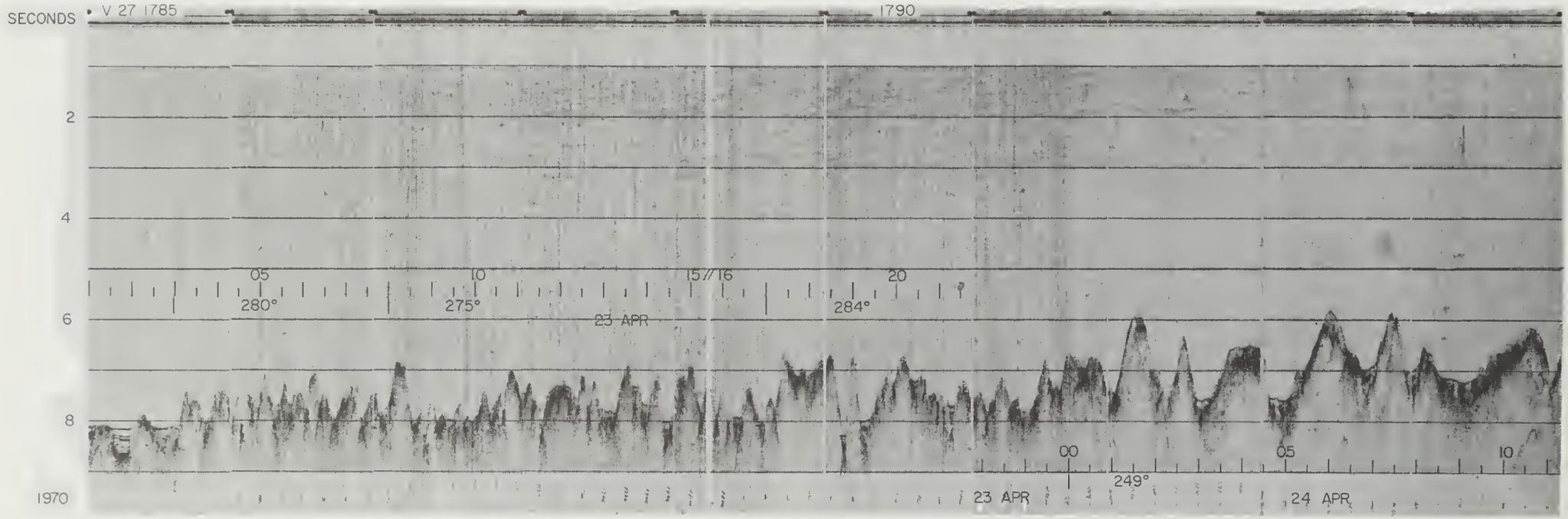

SECONDS
V 27 1725
1730
S 283
2
4
6
8
15
20
00
05
10
12
16
20
00
045°
333°
13 APR
14 APR
1970

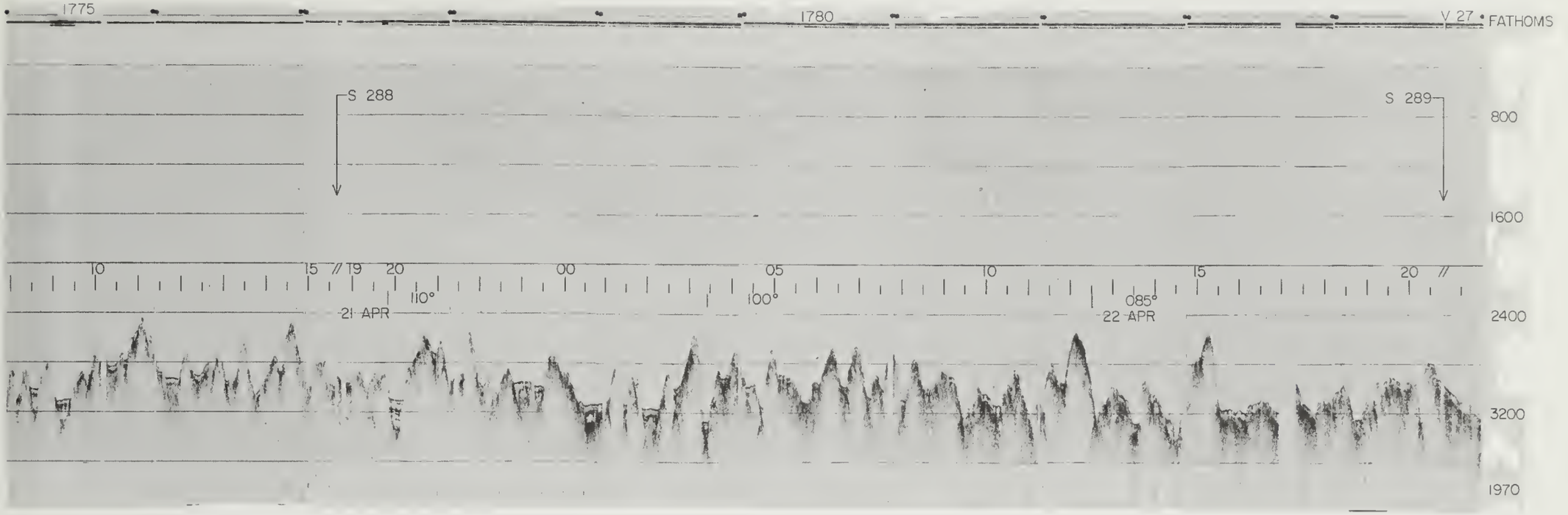

SECONDS
1750
S 285
2
4
6
8
20
00
05
10
15
20
00
348°
281°
275°
281°
16 APR
17 APR
18 APR
1970

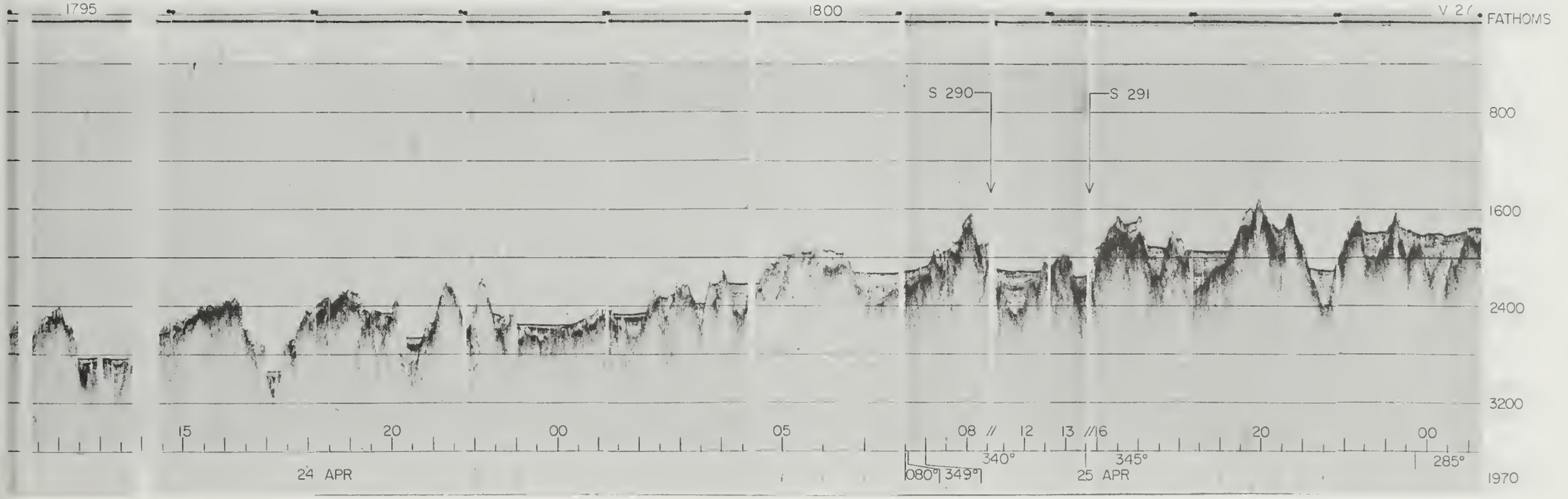

1735
1740
V 27
FATHOMS
S 284
800
1600
2400
3200
1970
05
08
// 1230 /
14
15
20
00
05
10
333°
338°
15 APR
16 APR

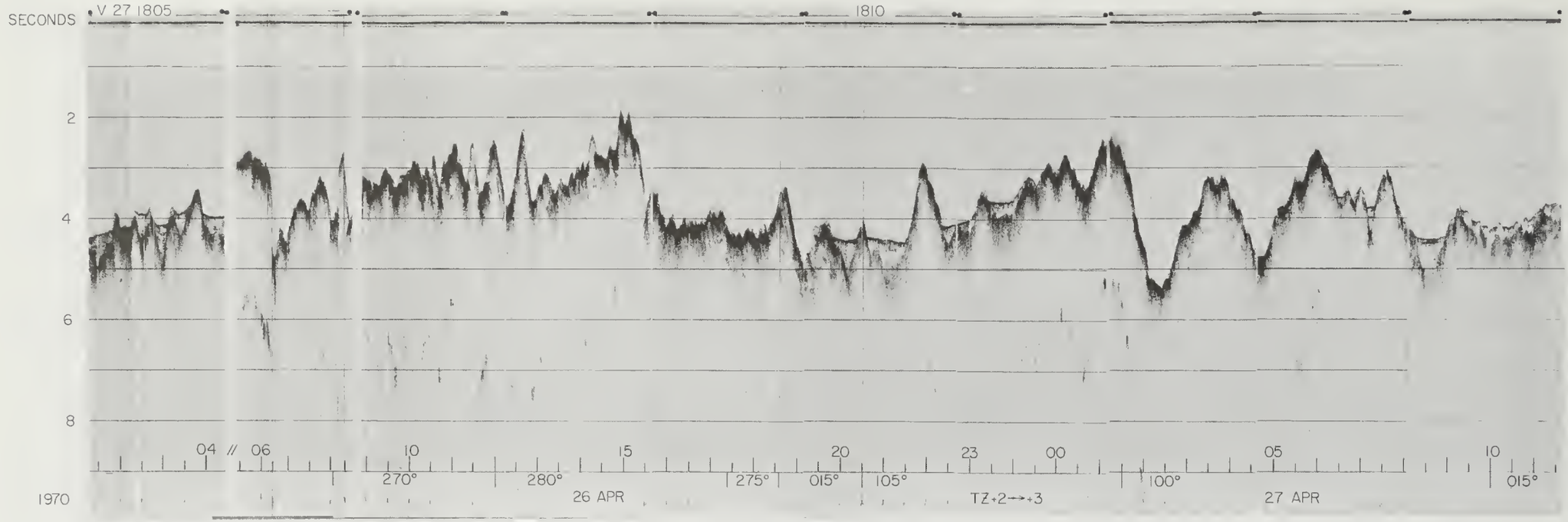

1755
1760
V 27
FATHOMS
S 286
800
1600
2400
3200
1970
15
098°
05
08
// 12
15
20
00
05
10
196°
100°
093°
105°
18 APR
19 APR

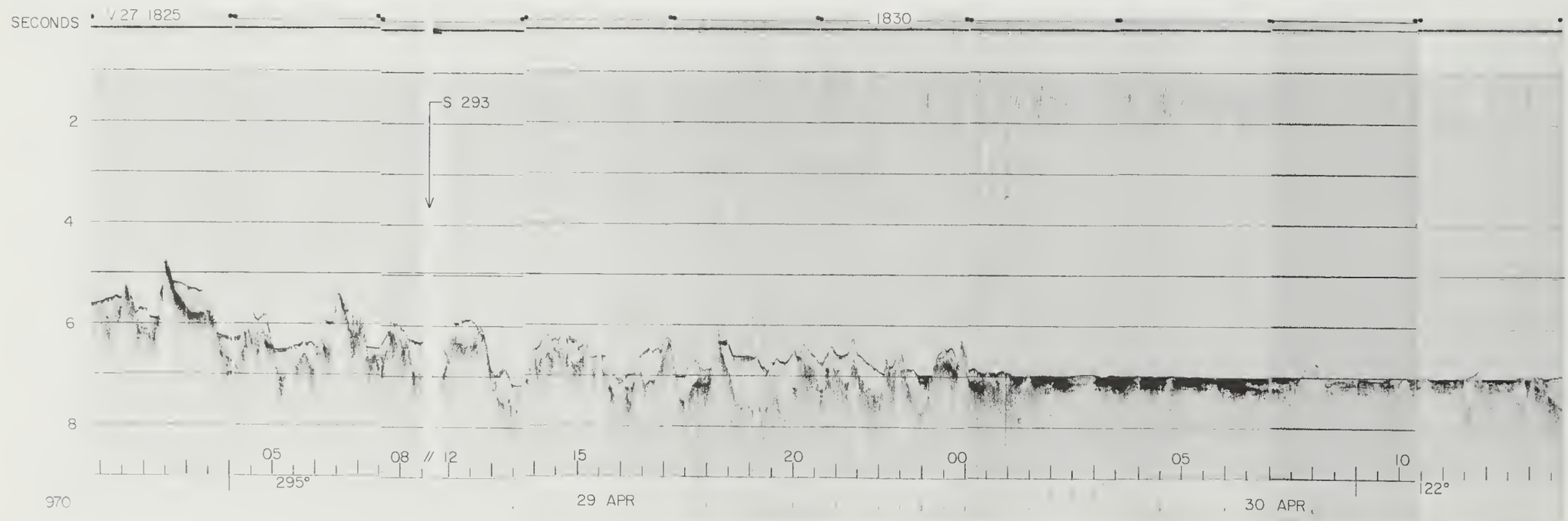

SECONDS
V 27 1765
1770
S 287
2
4
20
00
05
10
12 //17
20
00
05
193°
280°
276°
19 APR
20 APR
21 APR
6
8
1970

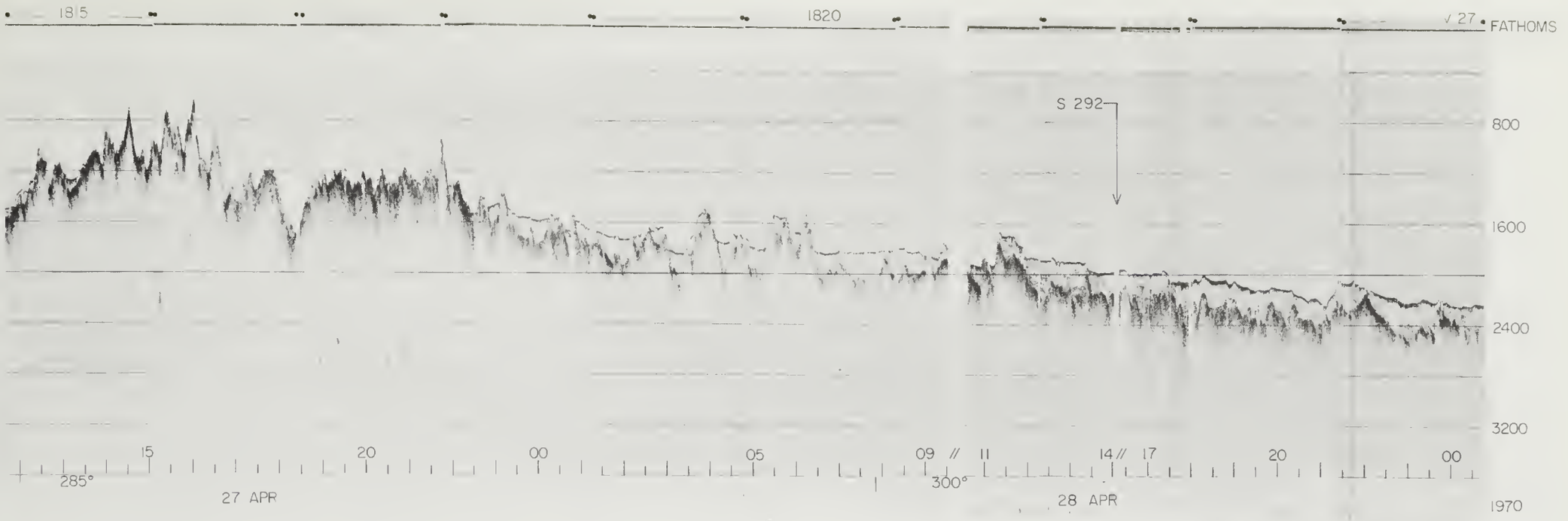

SECONDS
V 27 1785
1790
2
4
05
10
15//16
20
280°
275°
284°
23 APR
6
8
00
05
10
249°
1970
23 APR
24 APR

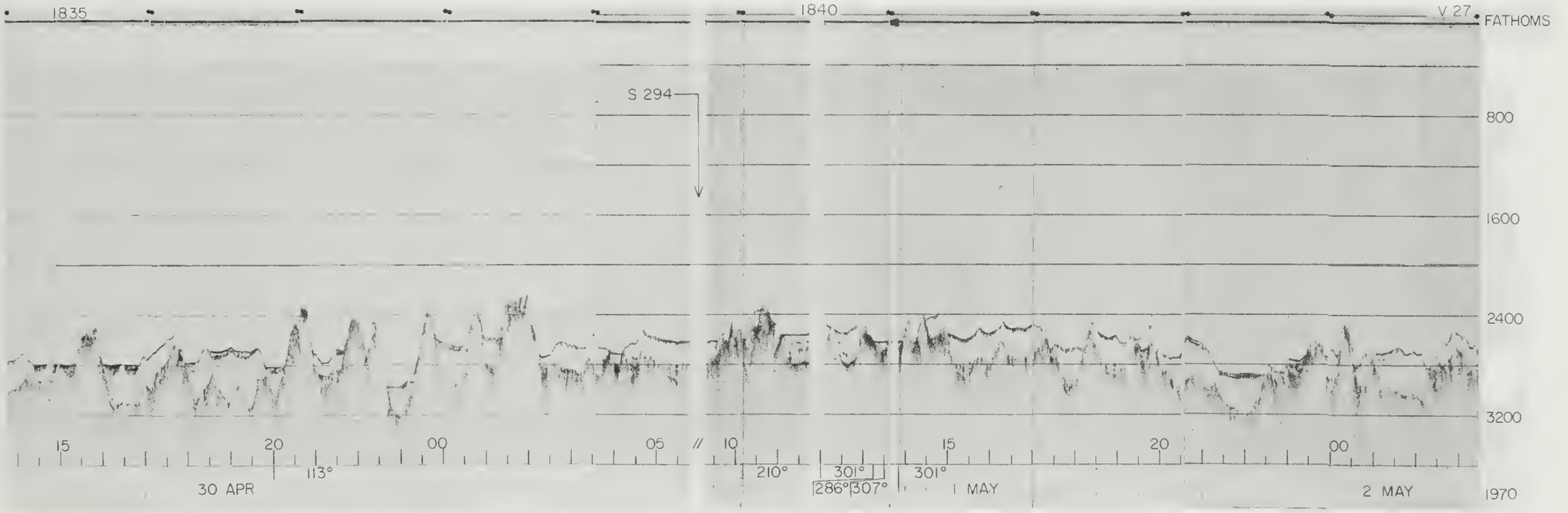

1775
1780
V 27
FATHOMS
S 288
S 289
800
1600
10
15
19
20
00
05
10
15
20
110°
100°
085°
21 APR
22 APR
2400
3200
1970

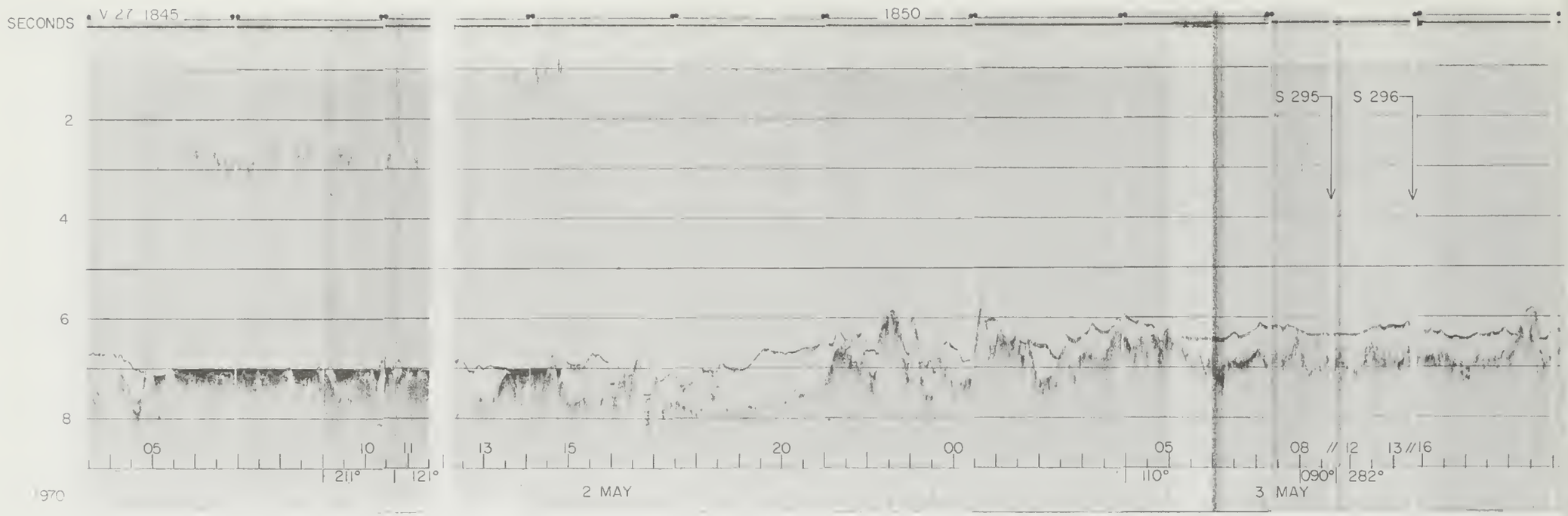

1795
1800
V 27
FATHOMS
S 290
S 291
800
1600
2400
3200
15
20
00
05
08
12
13
16
20
00
340°
345°
285°
080°
349°
24 APR
25 APR
1970

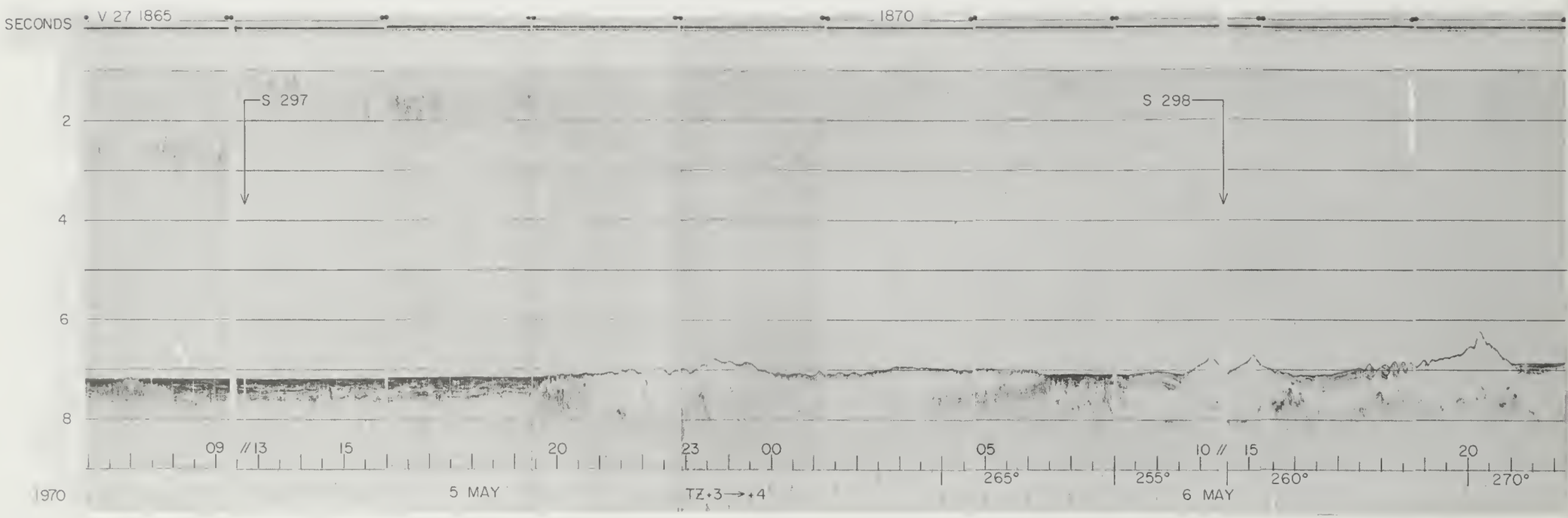

SECONDS
V 27 1805
1810
2
4
6
8
04 // 06
10
15
20
23
00
05
10
270°
280°
275°
015°
105°
100°
015°
1970
26 APR
TZ+2→+3
27 APR

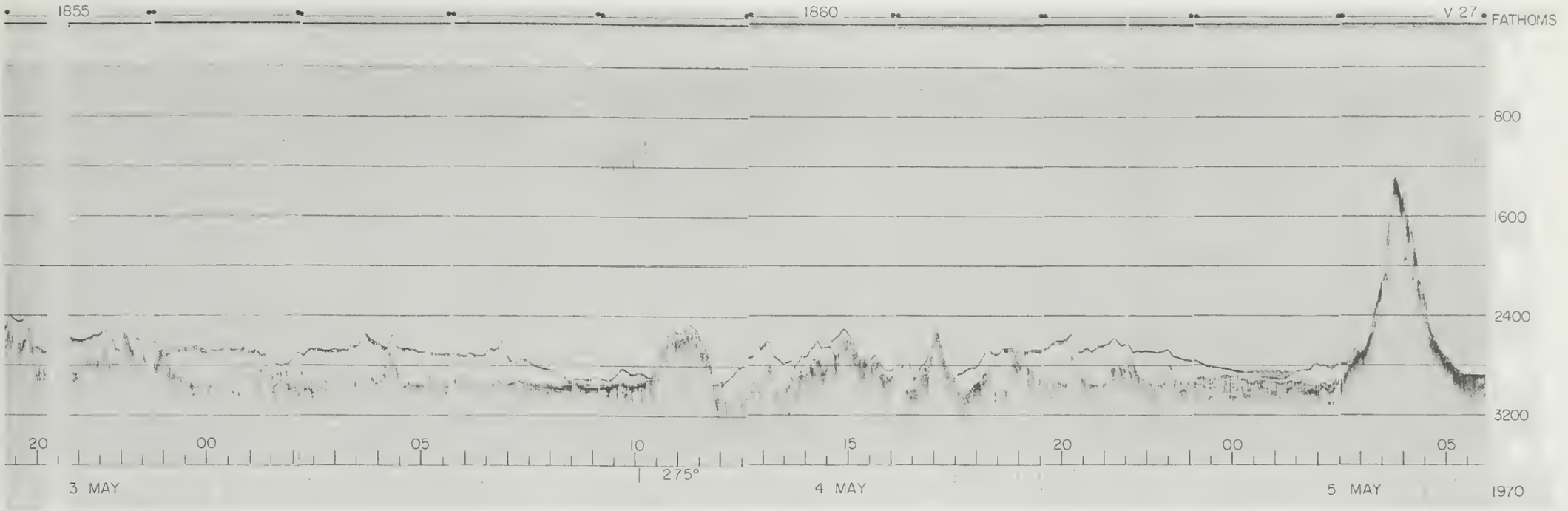

SECONDS
V 27 1825
1830
S 293
2
4
6
8
05
08 // 12
15
20
00
05
10
295°
122°
970
29 APR
30 APR

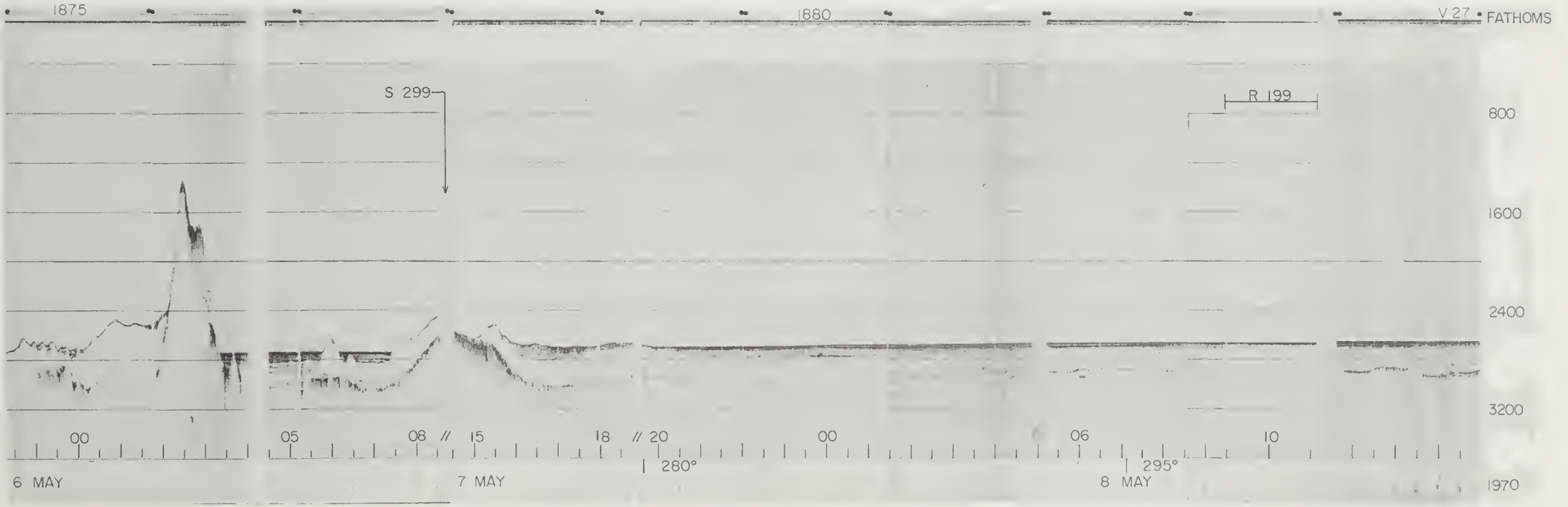

1815
1820
V 27
FATHOMS
S 292
800
1600
2400
3200
1970
15
20
00
05
09 // 11
14 // 17
20
00
285°
300°
27 APR
28 APR

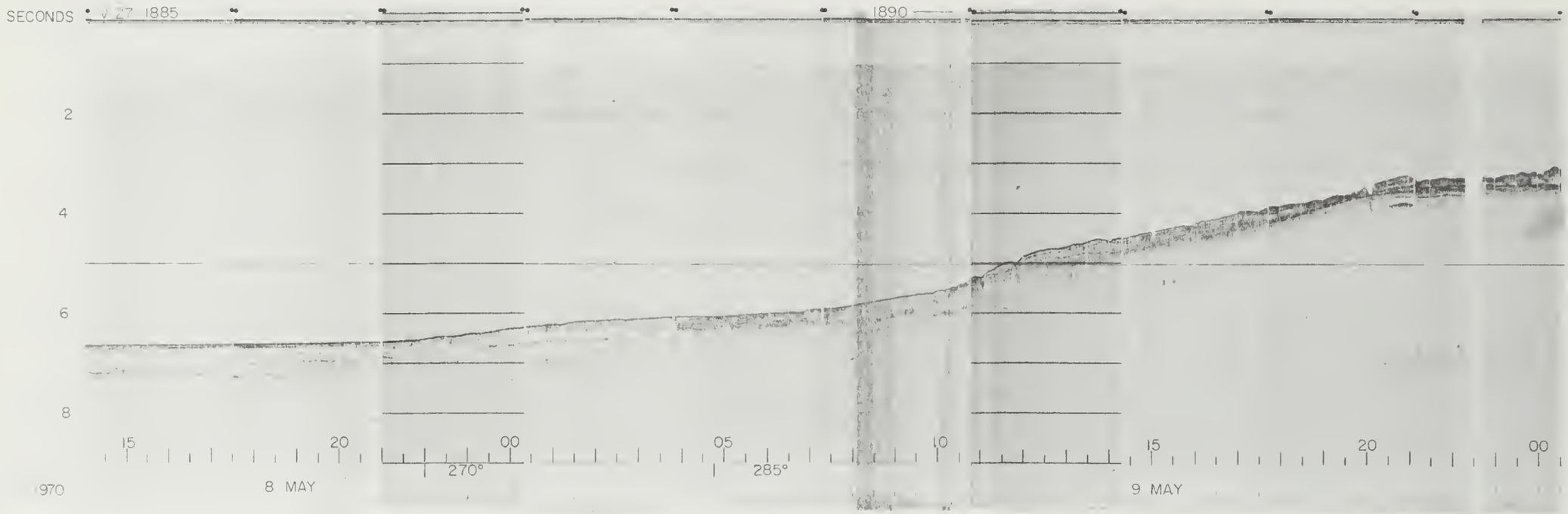

1835
1840
V 27
FATHOMS
S 294
800
1600
2400
3200
1970
15
20
00
05 // 10
15
20
00
113°
210°
301°
286°
307°
301°
30 APR
1 MAY
2 MAY

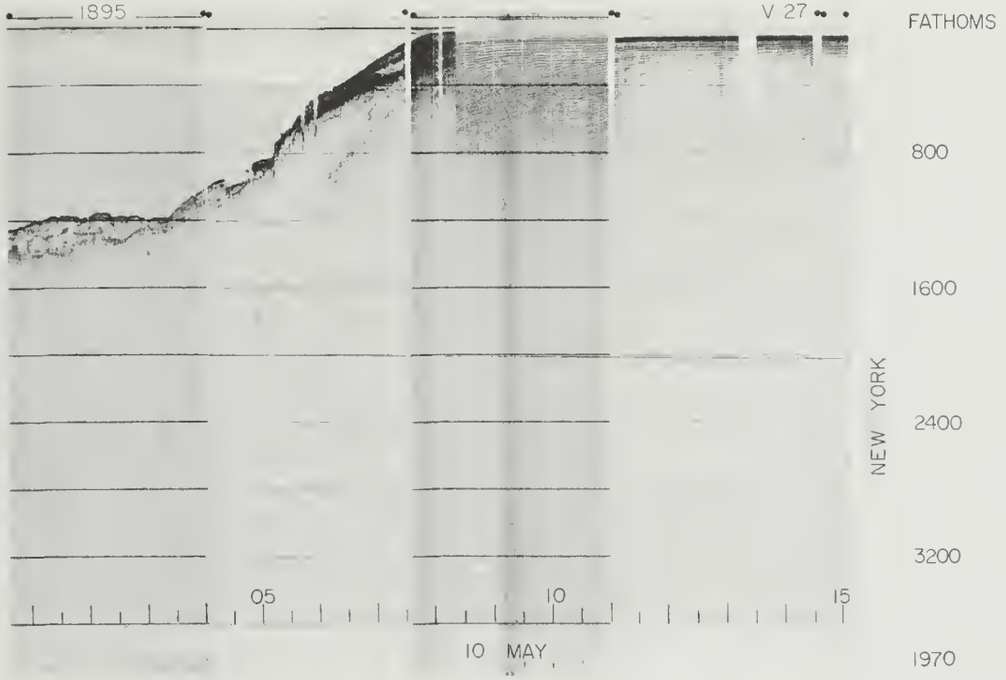

SECONDS
V 27 1845
1850
2
4
6
8
S 295
S 296
05
10
11
13
15
20
00
05
08
12
13
16
211°
121°
110°
090°
282°
1970
2 MAY
3 MAY

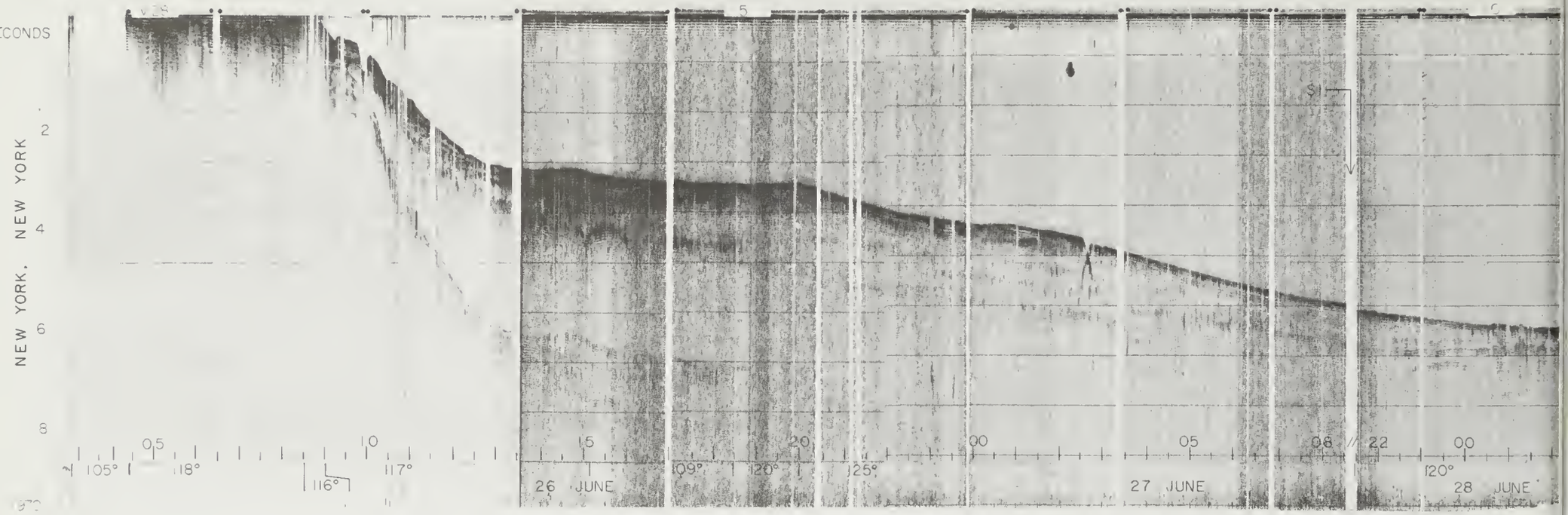

SECONDS
V 27 1865
1870
2
4
6
8
S 297
S 298
09
13
15
20
23
00
05
10
15
20
265°
255°
260°
270°
1970
5 MAY
TZ+3→+4
6 MAY

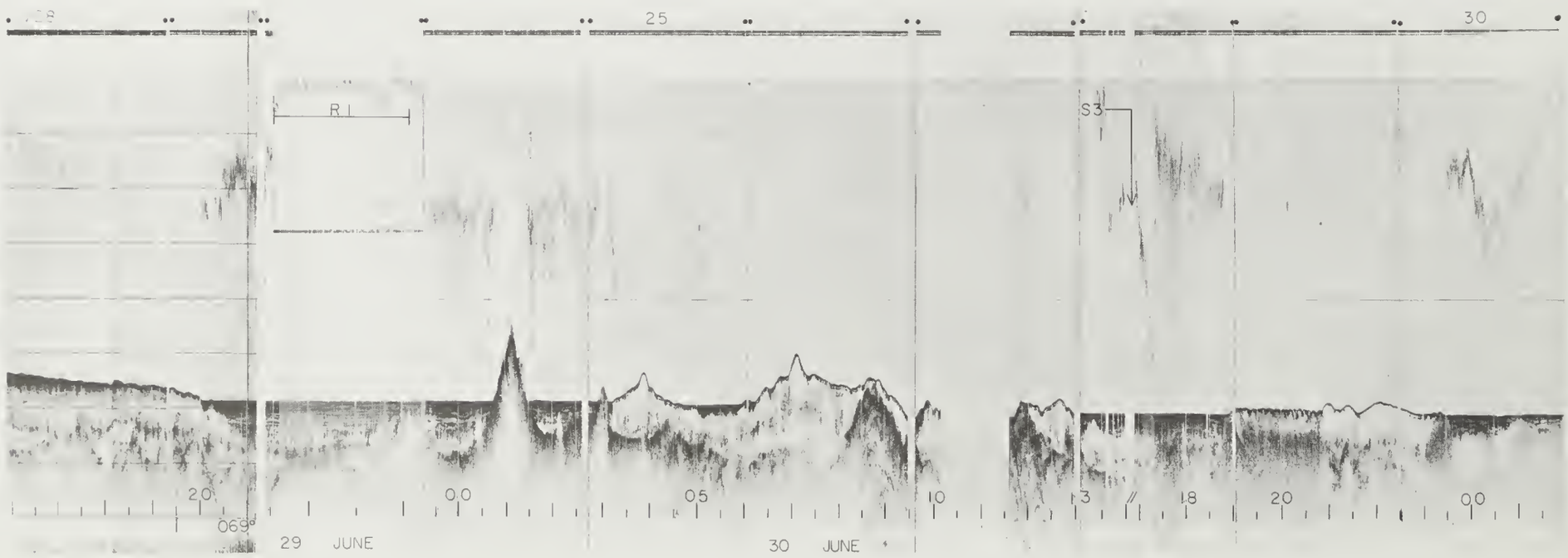

1855
1860
V 27
FATHOMS
800
1600
2400
3200
1970
20
00
05
10
15
20
00
05
275°
3 MAY
4 MAY
5 MAY

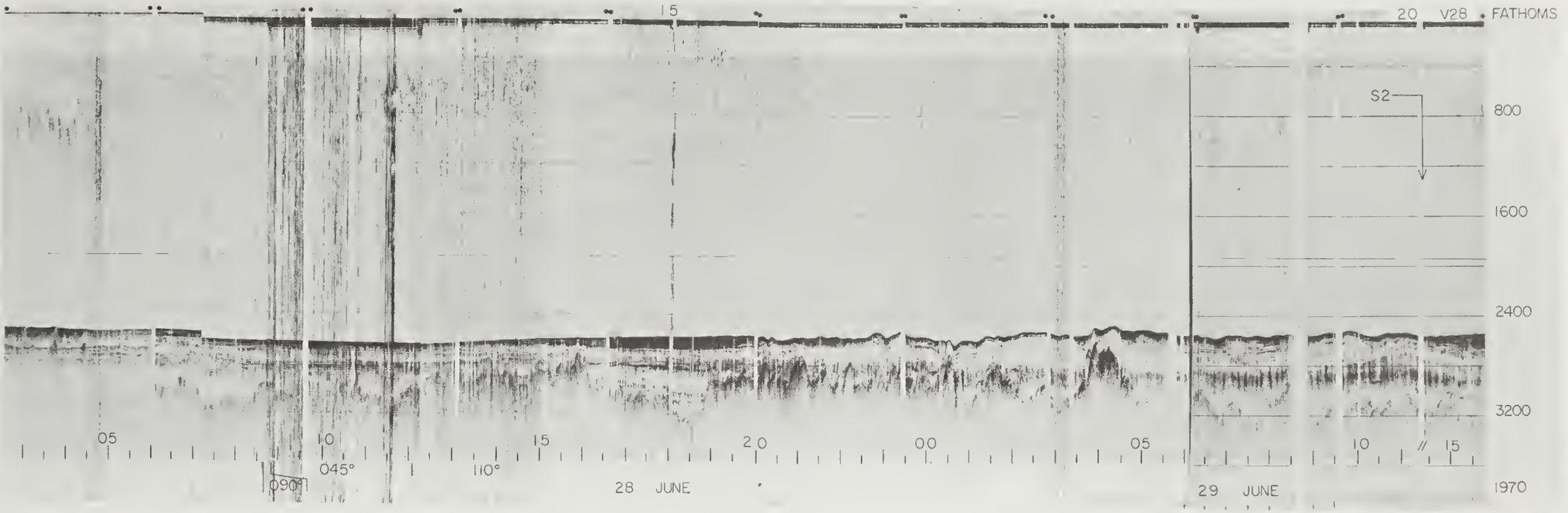

1875
1880
V 27
FATHOMS
S 299
R 199
800
1600
2400
3200
1970
00
05
08 // 15
18 // 20
00
06
10
280°
295°
6 MAY
7 MAY
8 MAY

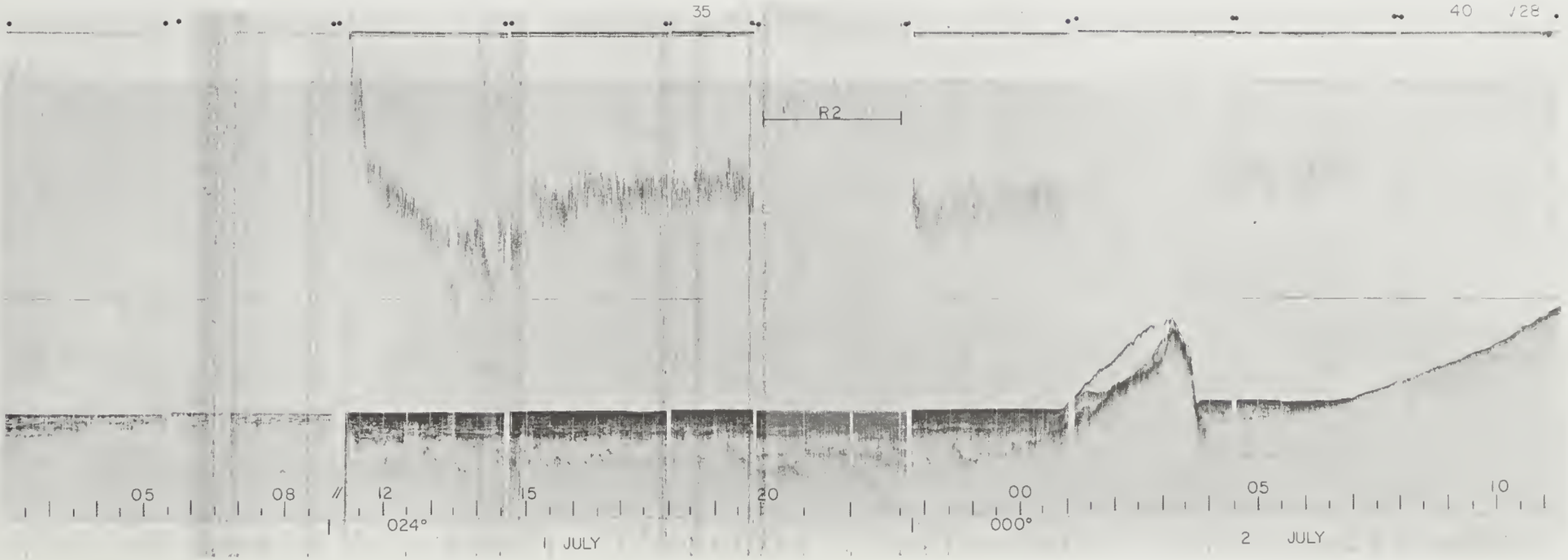

SECONDS
V 27 1885
1890
2
4
6
8
15
20
00
05
10
15
20
00
270°
285°
970
8 MAY
9 MAY

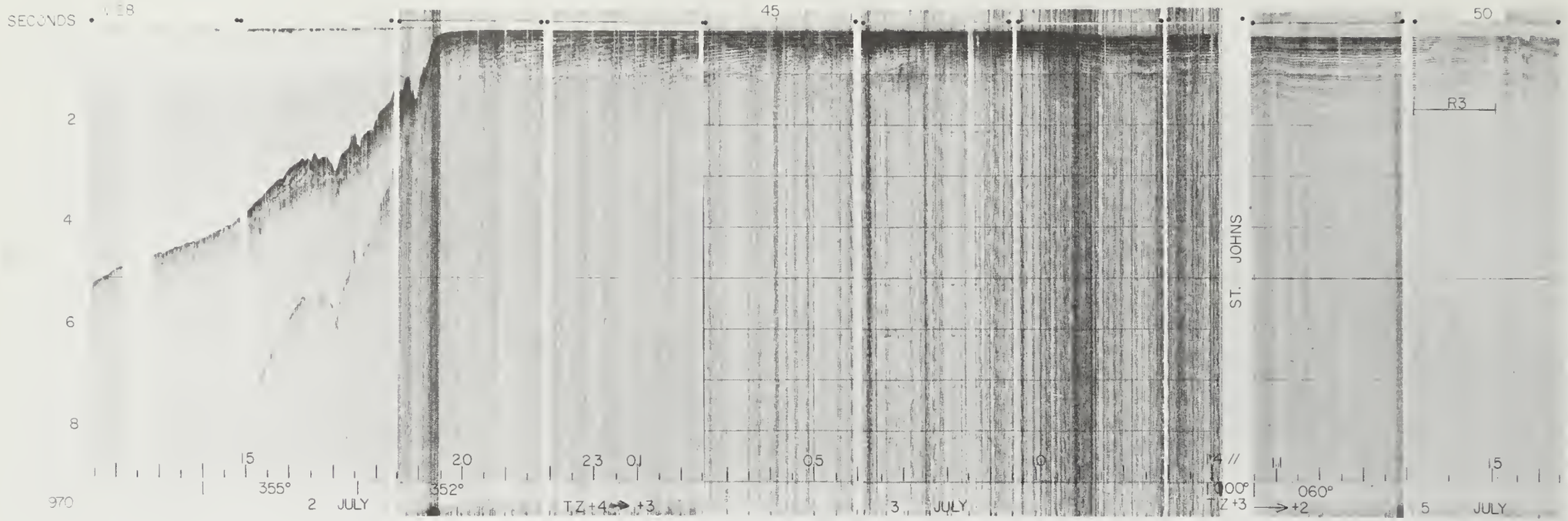

1895
V 27
FATHOMS
800
1600
2400
3200
1970
NEW YORK
05
10
15
10 MAY

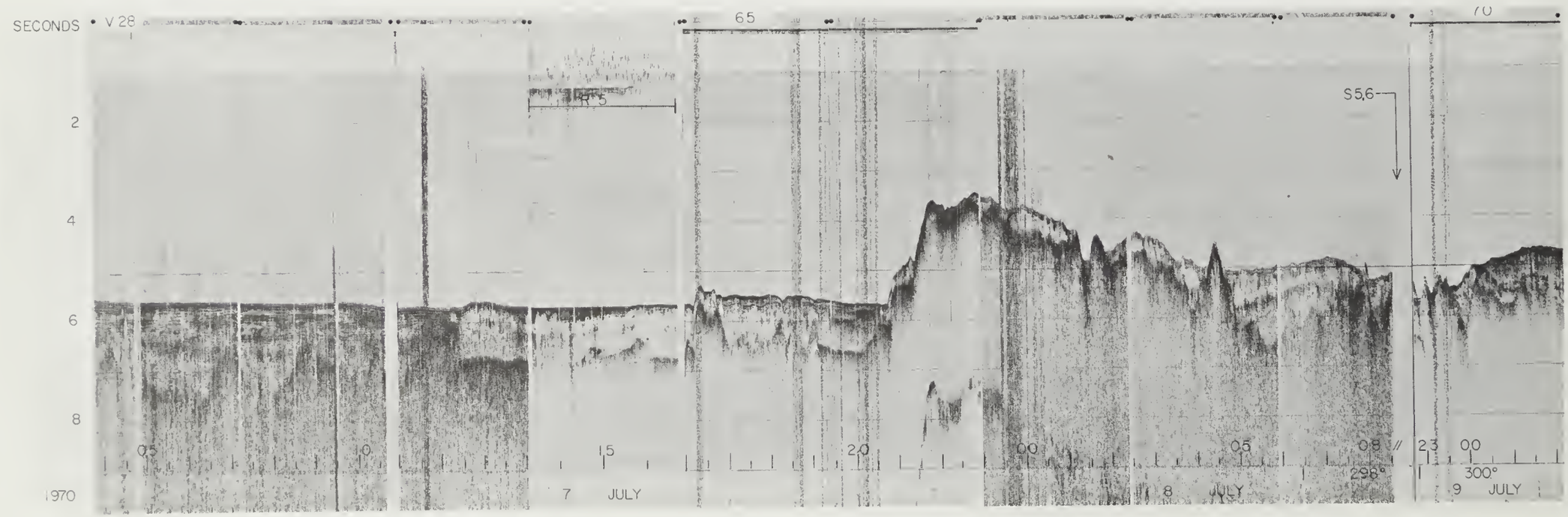

SECONDS
NEW YORK, NEW YORK
2
4
6
8
0.5
1.0
1.5
2.0
0.0
0.5
S1
105°
118°
116°
117°
109°
120°
125°
120°
26 JUNE
27 JUNE
28 JUNE

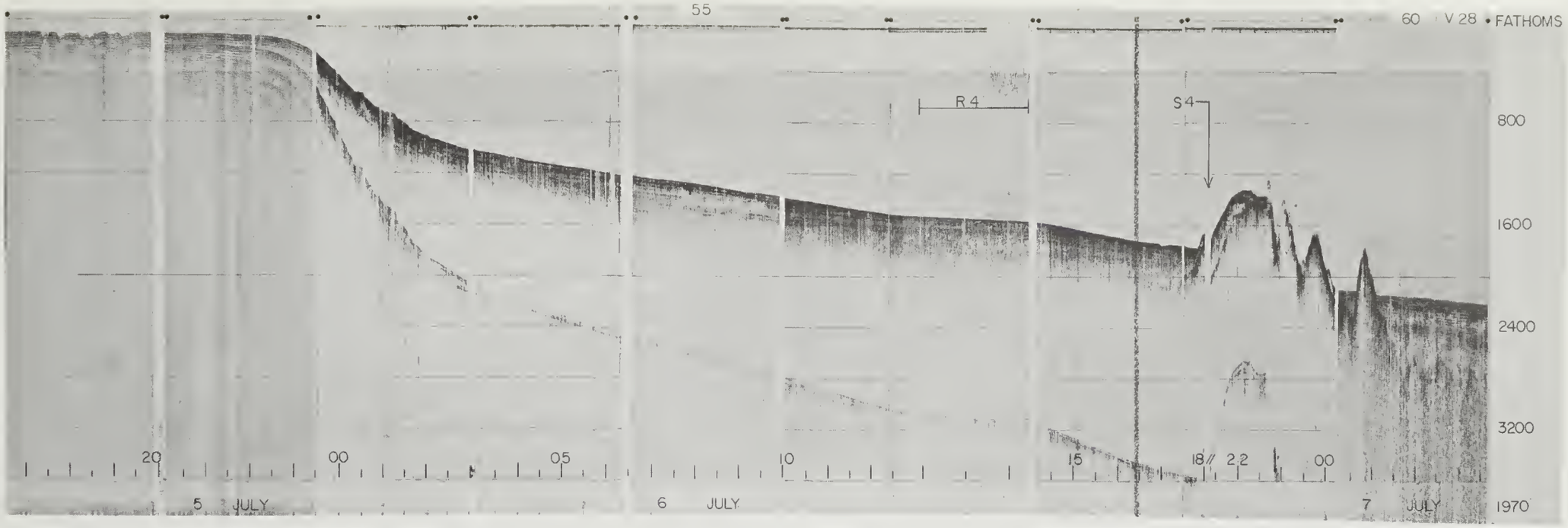

25
30
R1
S3
2.0
0.0
0.5
1.0
1.8
2.0
0.0
069°
29 JUNE
30 JUNE

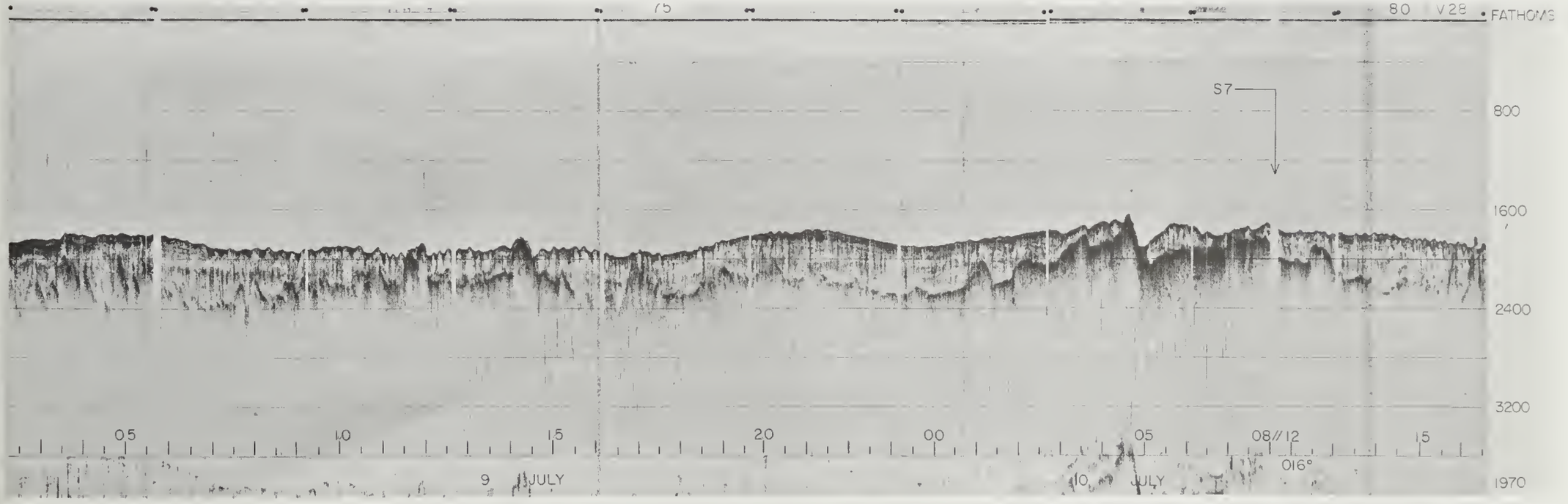

15
20
V28
FATHOMS
S2
800
1600
2400
3200
1970
05
10
15
20
00
05
10
15
090°
045°
110°
28 JUNE
29 JUNE

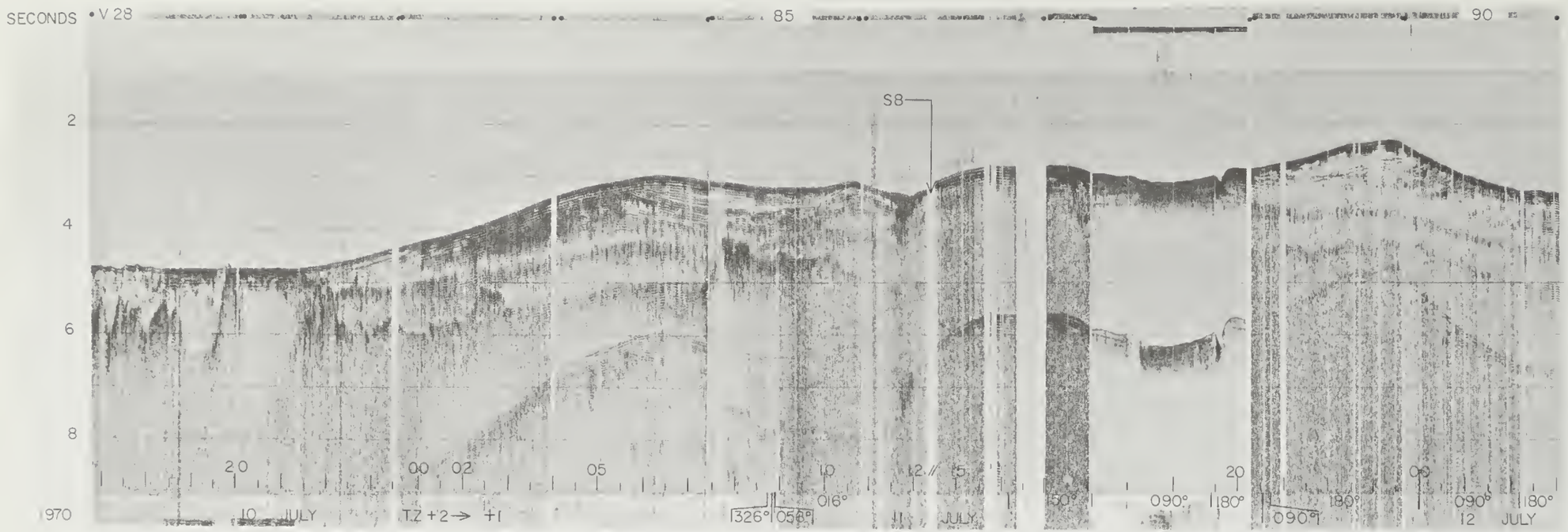

35
40
V28
R2
05
08
12
15
20
00
05
10
024°
000°
1 JULY
2 JULY

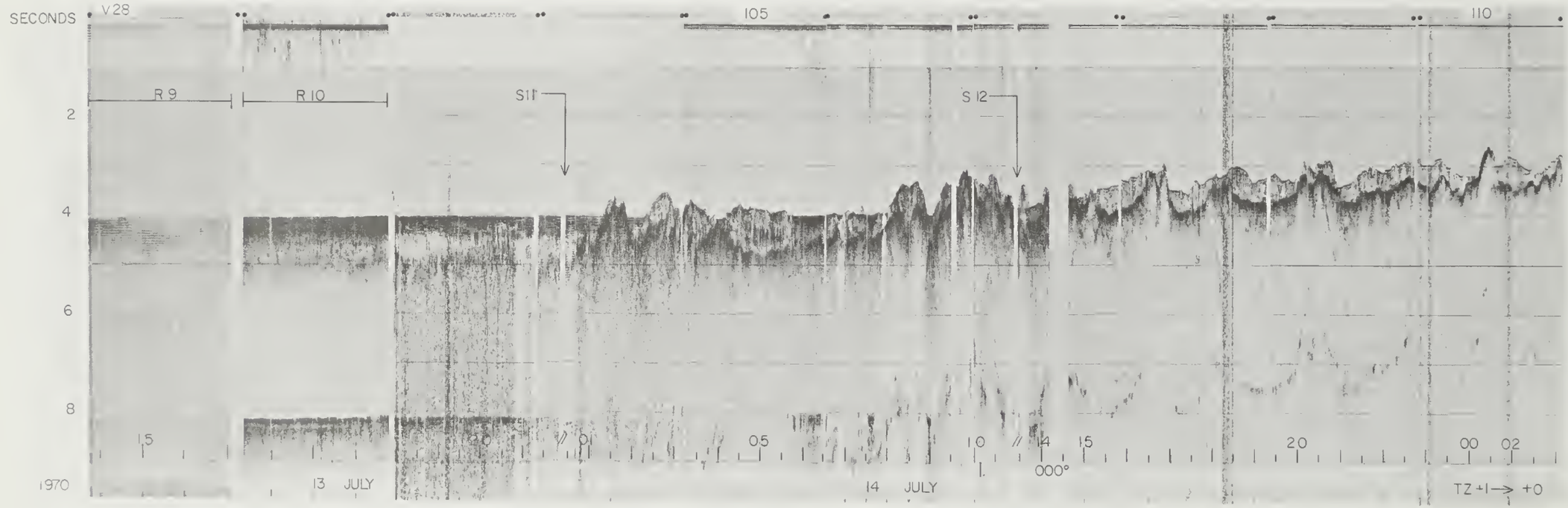

SECONDS
V 28
45
50
2
4
6
8
R3
ST. JOHNS
15
20
23
01
05
0
15
355°
352°
060°
1970
2 JULY
TZ +4 → +3
3 JULY
TZ +3 → +2
5 JULY

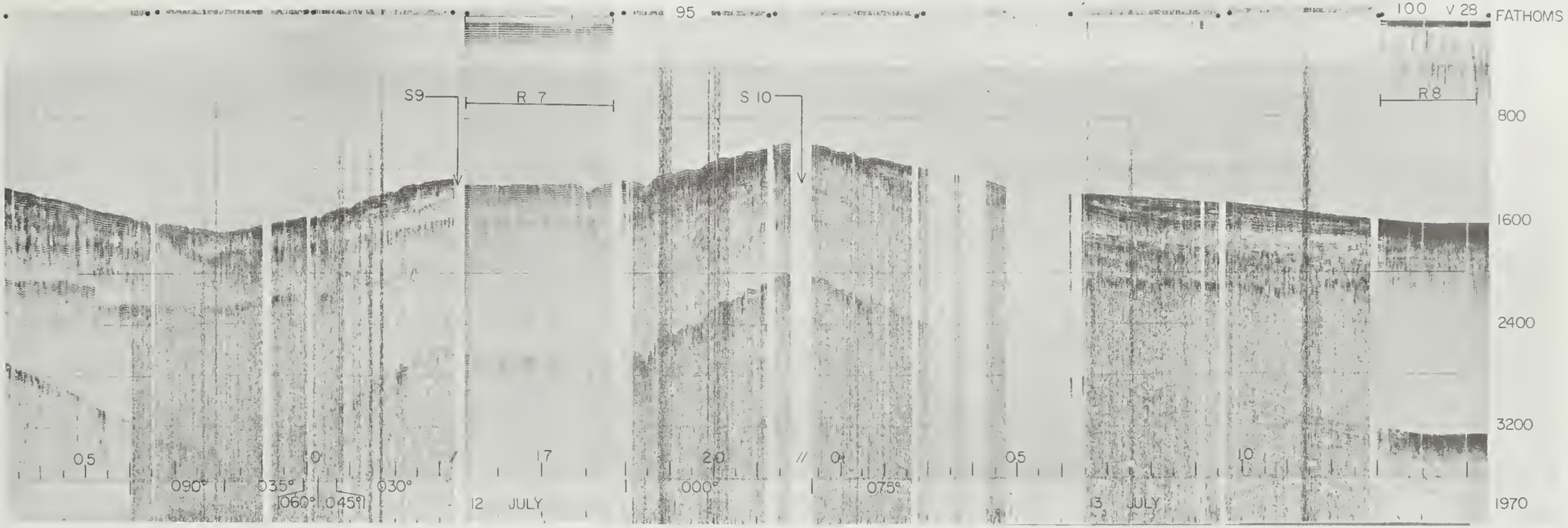

SECONDS
V 28
65
70
R5
S5,6
2
4
6
8
05
0
15
20
00
05
08
23
00
298°
300°
1970
7 JULY
8 JULY
9 JULY

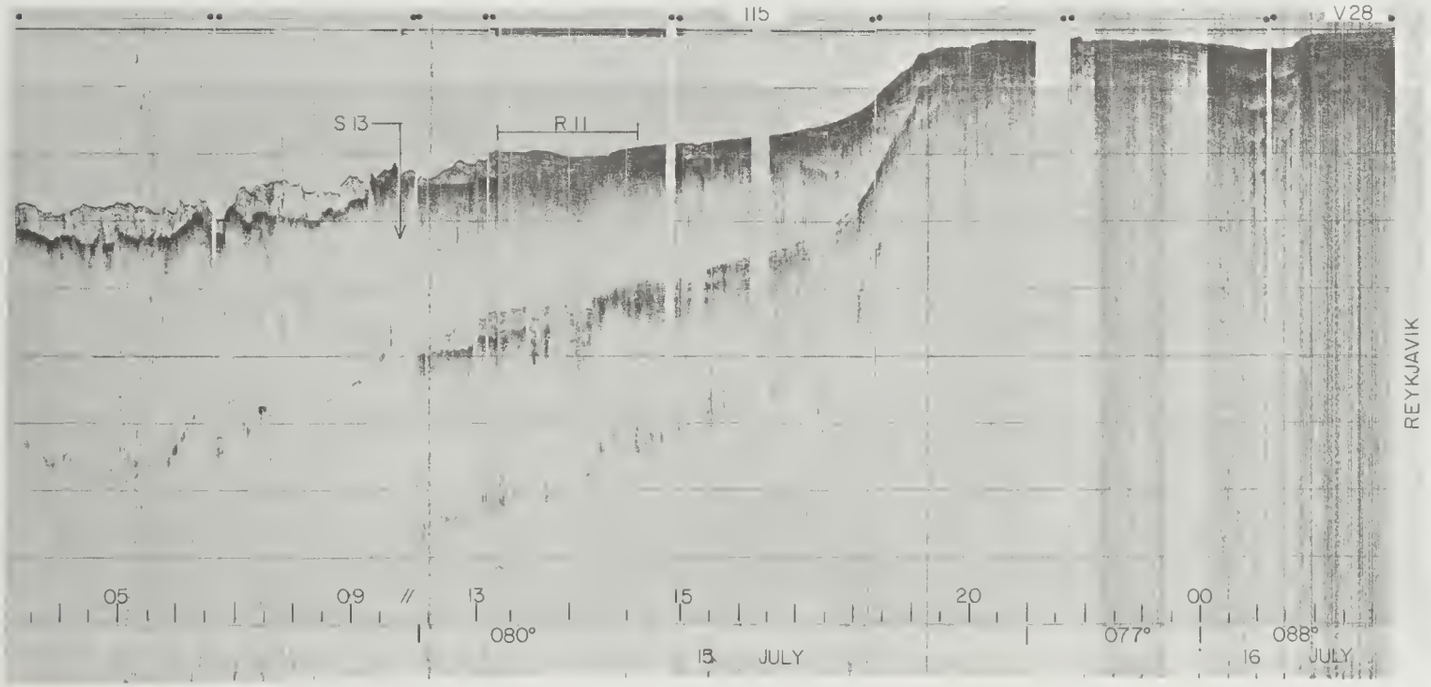

55
60
V 28
FATHOMS
R 4
S 4
800
1600
2400
3200
1970
20
00
05
10
15
18// 22
00
5 JULY
6 JULY
7 JULY

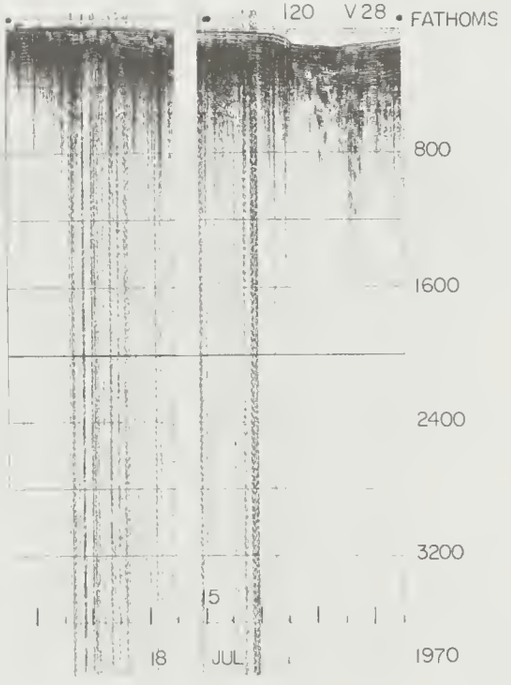

75
80
V28
FATHOMS
S7
800
1600
2400
3200
1970
05
10
15
20
00
05
08// 12
15
016°
9 JULY
10 JULY


SECONDS
V 28
85
90
2
4
6
8
S8
20
00
02
05
10
12
15
20
00
1970
10 JULY
TZ +2 → +1
326°
058°
016°
11 JULY
050°
090°
180°
090°
180°
090°
180°
12 JULY

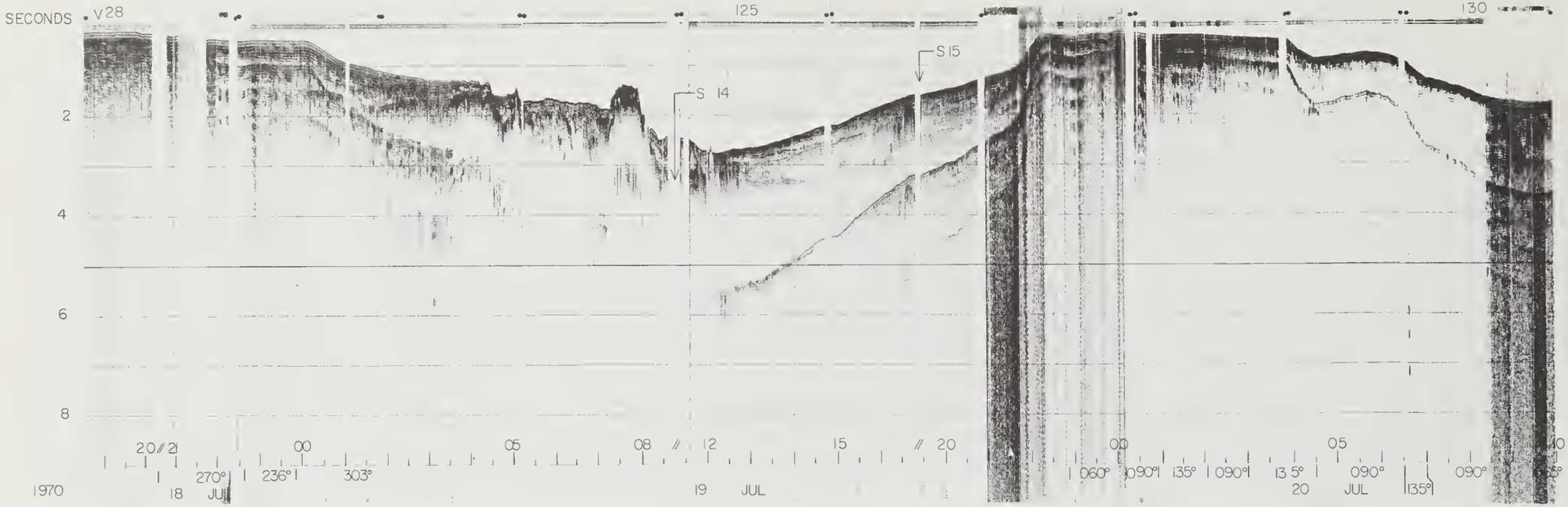

SECONDS
V28
105
110
R 9
R 10
S11
S 12
2
4
6
8
15
20
01
05
10
14
15
20
00
02
000°
1970
13 JULY
14 JULY
TZ +1 → +0

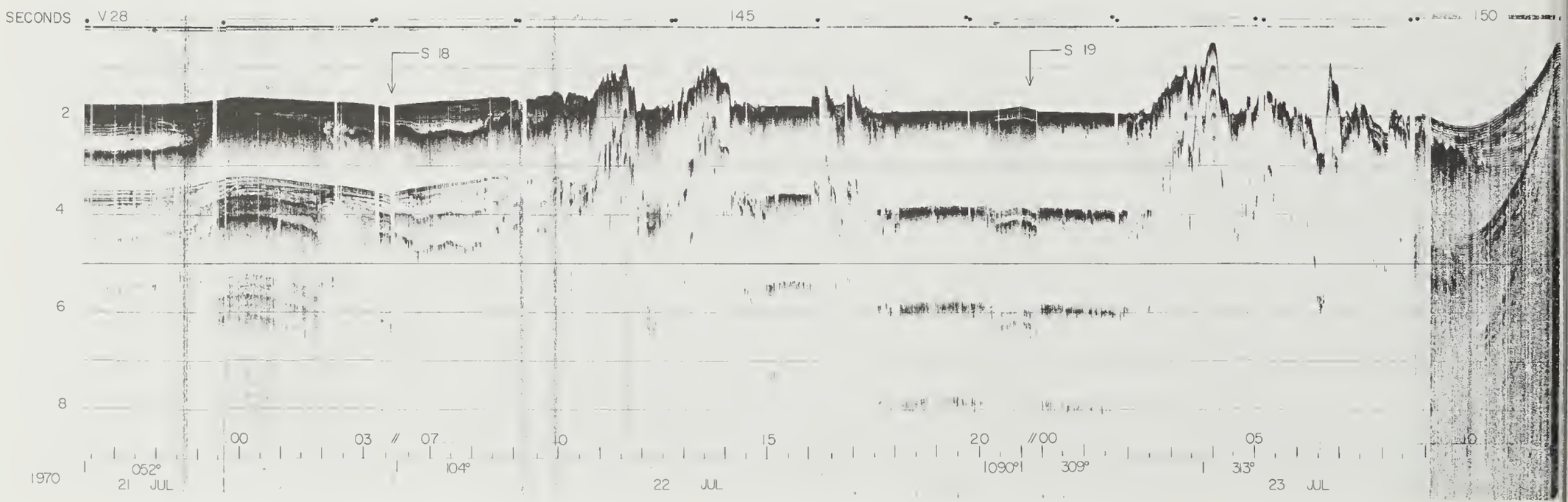

95
100
V 28
FATHOMS
S9
R 7
S 10
R 8
800
1600
2400
3200
1970
0.5
0
1.7
2.0
0.1
0.5
1.0
090°
035°
030°
060°
045°
12 JULY
000°
075°
13 JULY

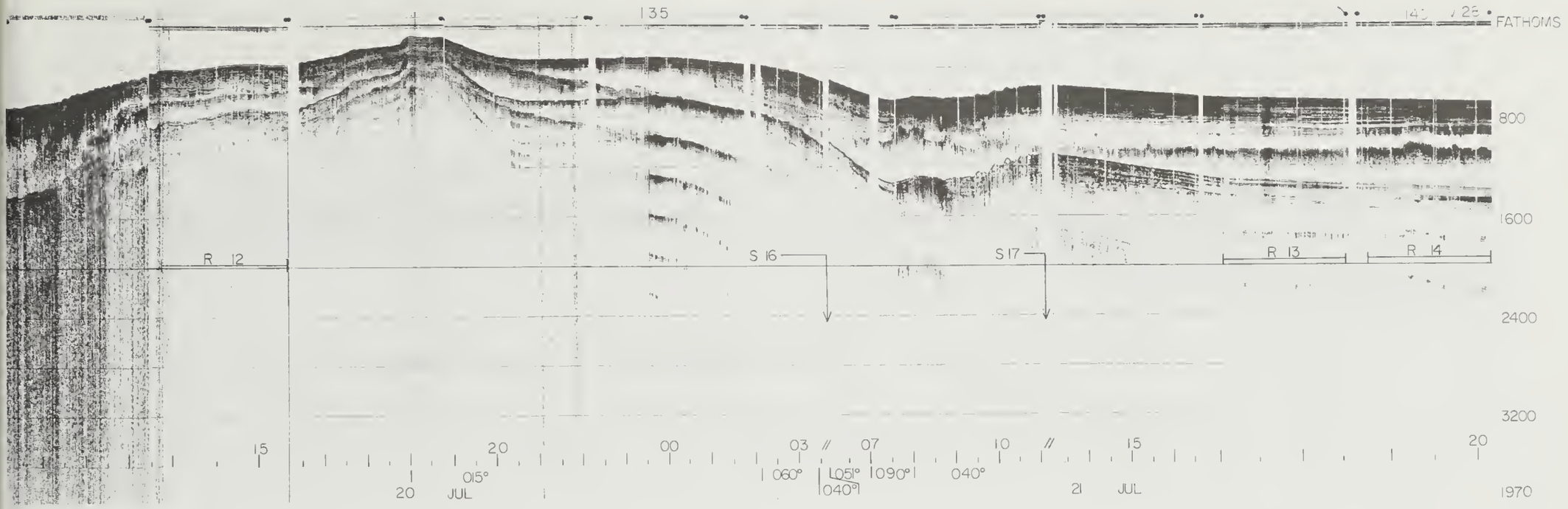

115
V28
S 13
R 11
05
09
13
15
20
00
080°
077°
088°
13 JULY
16 JULY

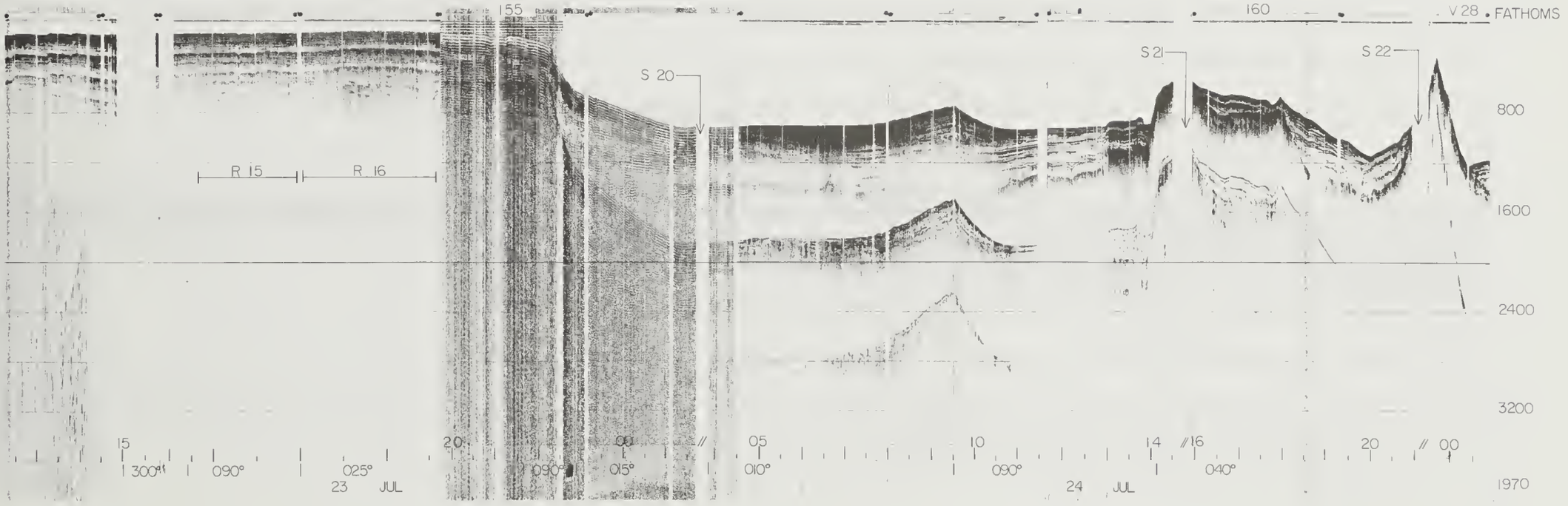

120
V 28
FATHOMS
800
1600
2400
3200
1970
15
18 JUL

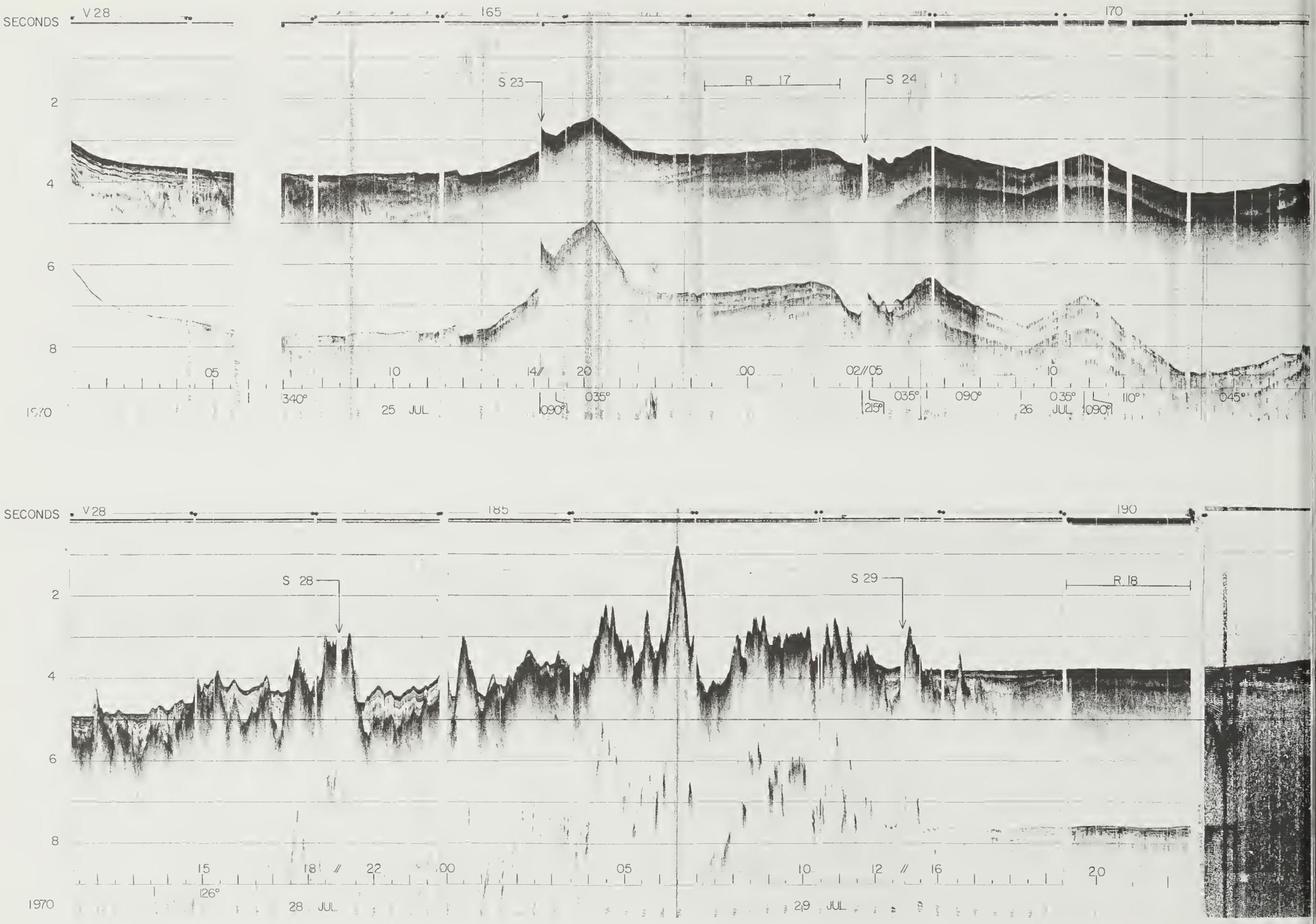
REYKJAVIK

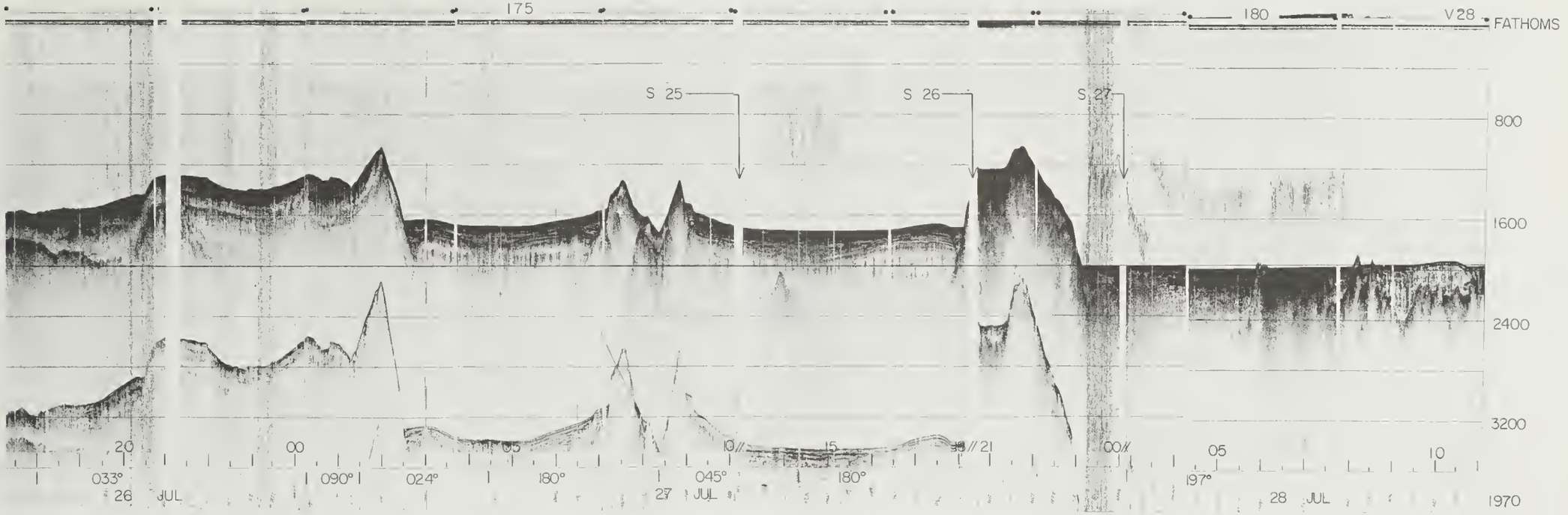

SECONDS
V28
125
130
S 14
S 15
2
4
6
8
20 // 21
00
05
08 // 12
15 // 20
00
05
270°
236°
303°
060°
090°
135°
090°
135°
090°
135°
1970
18 JUL
19 JUL
20 JUL

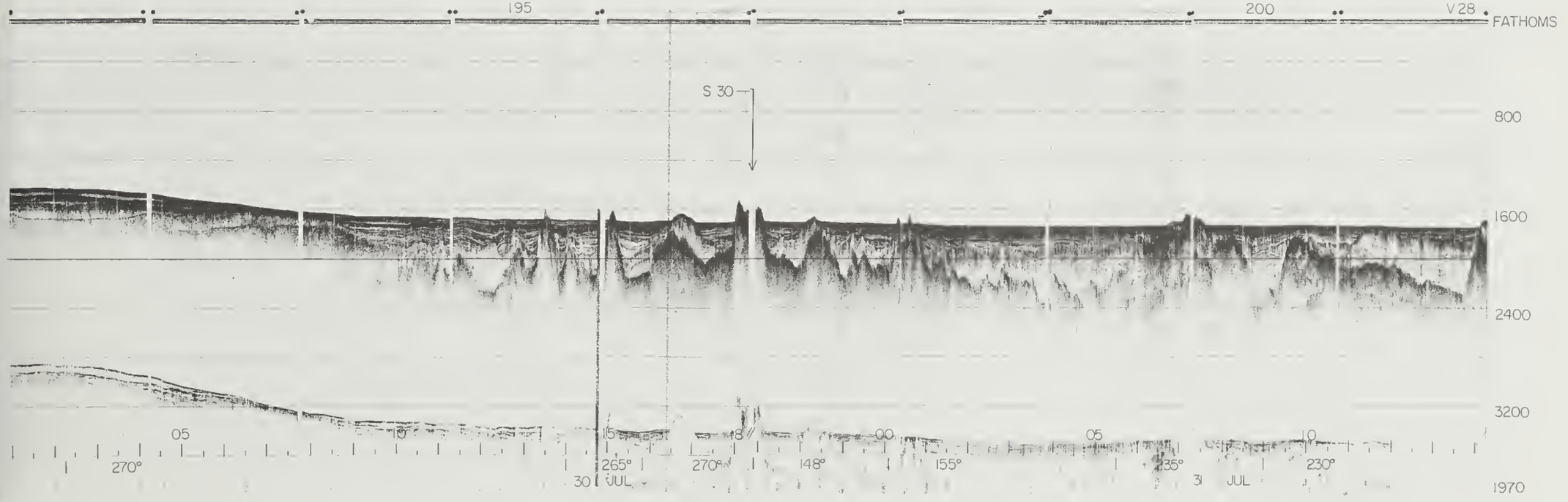

SECONDS
V28
145
150
S 18
S 19
2
4
6
8
00
03 // 07
10
15
20 // 00
05
10
052°
104°
090°
309°
313°
1970
21 JUL
22 JUL
23 JUL

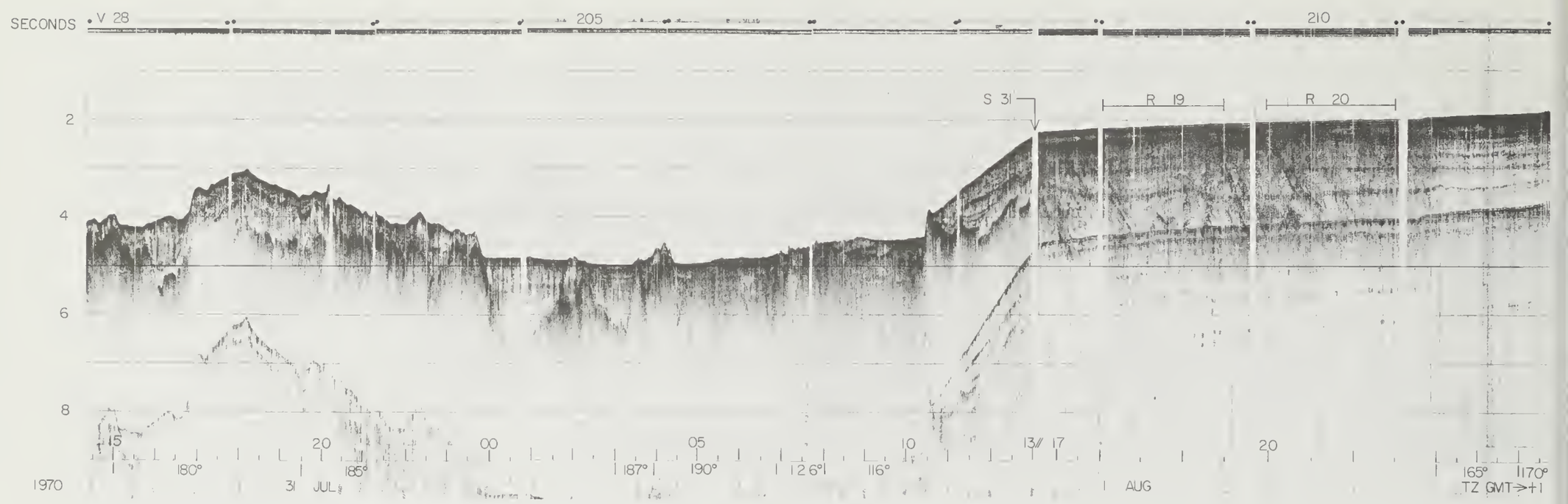

135
FATHOMS
800
1600
2400
3200
1970
R 12
S 16
S 17
R 13
R 14
15
20
00
03
07
10
15
20
015°
060°
051°
090°
040°
040°
20 JUL
21 JUL

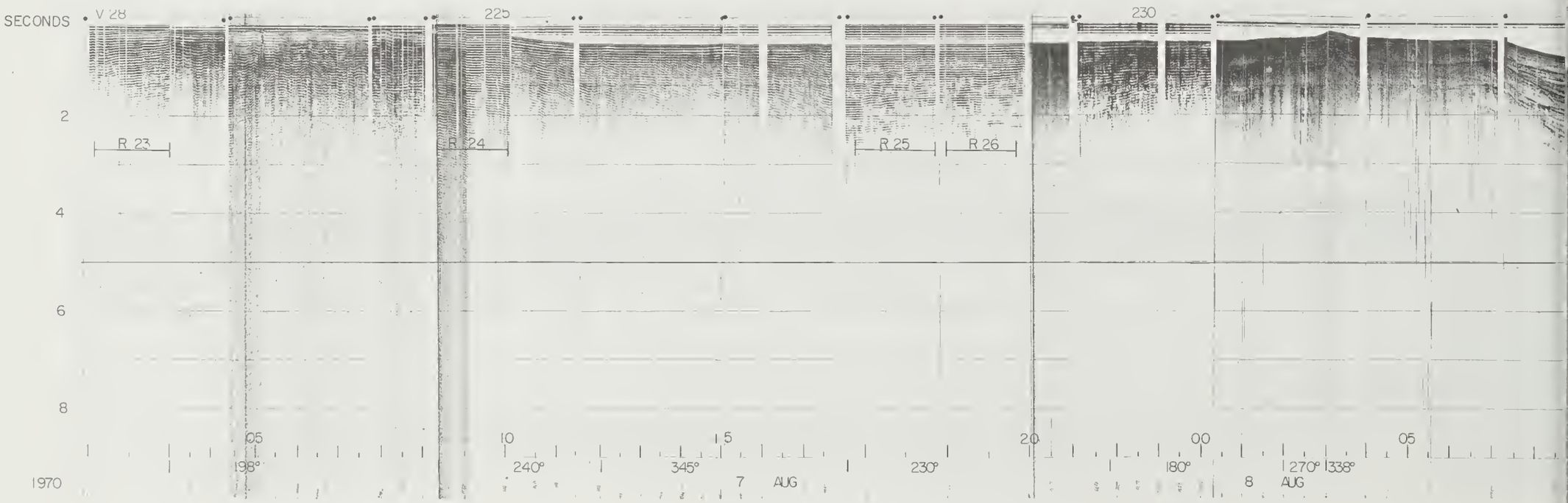

155
160
V 28
FATHOMS
800
1600
2400
3200
1970
S 20
S 21
S 22
R 15
R 16
15
20
01
05
10
14
16
20
00
300°
090°
025°
090°
015°
010°
090°
040°
23 JUL
24 JUL

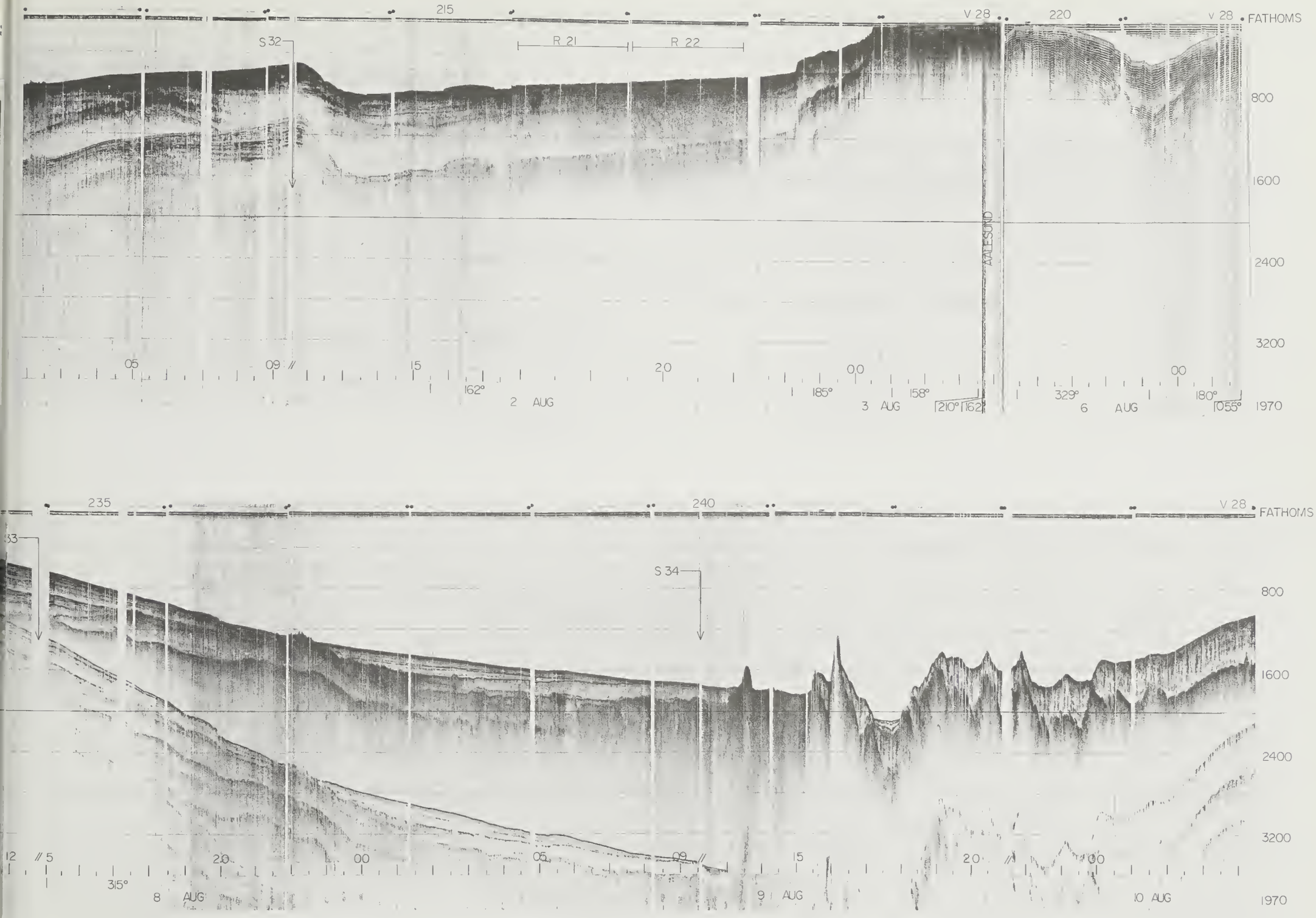

SECONDS
V 28
165
170
S 23
R 17
S 24
2
4
6
8
05
10
14
20
00
02
05
10
340°
25 JUL
090°
035°
215°
035°
090°
035°
090°
110°
045°
26 JUL
1970
SECONDS
V 28
185
190
S 28
S 29
R 18
2
4
6
8
15
18
22
00
05
10
12
16
20
126°
28 JUL
29 JUL
1970

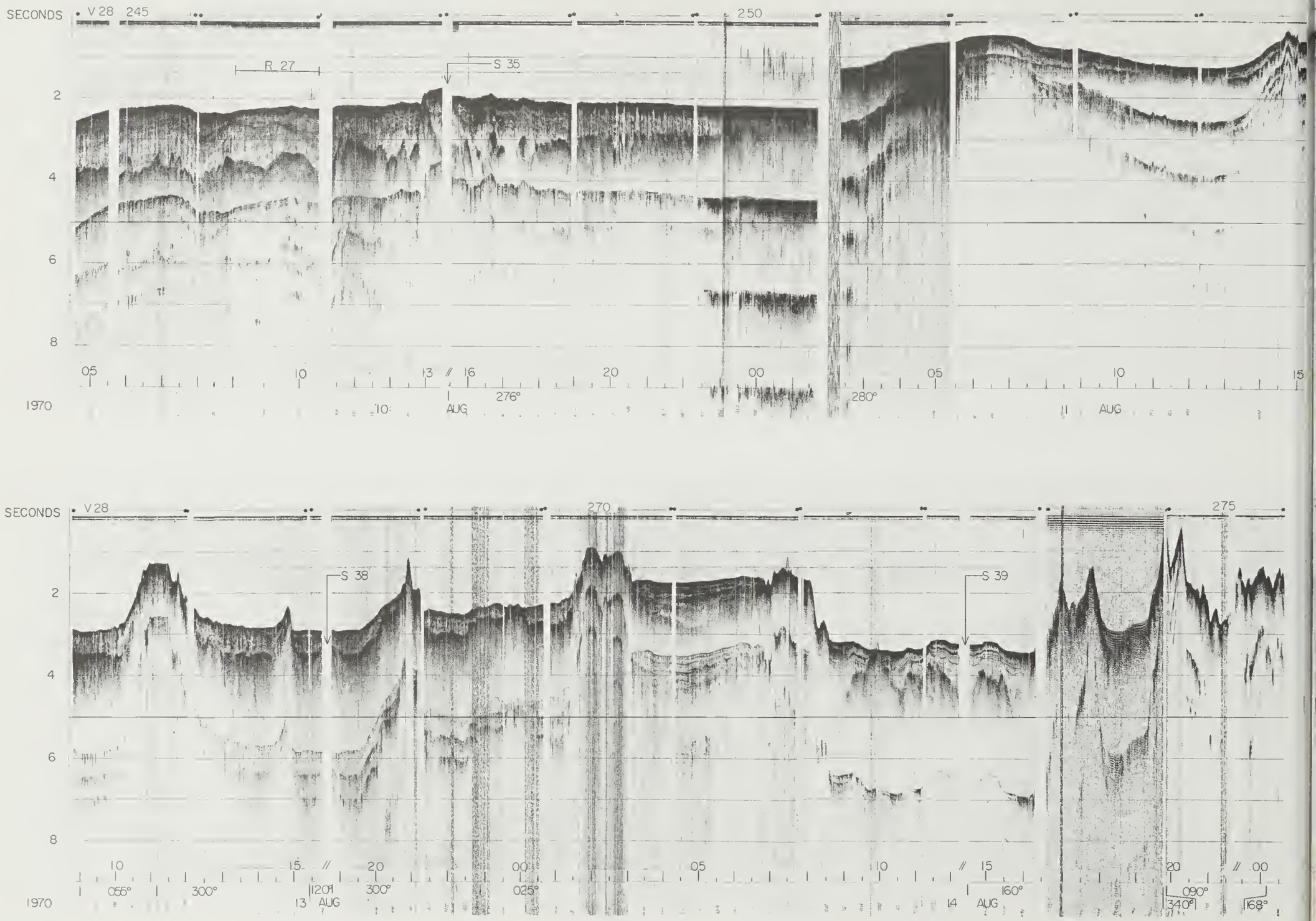

175
180
V28
FATHOMS
S 25
S 26
S 27
800
1600
2400
3200
1970
20
00
05
10
15
21
00
05
10
033°
090°
024°
180°
045°
180°
197°
26 JUL
27 JUL
28 JUL

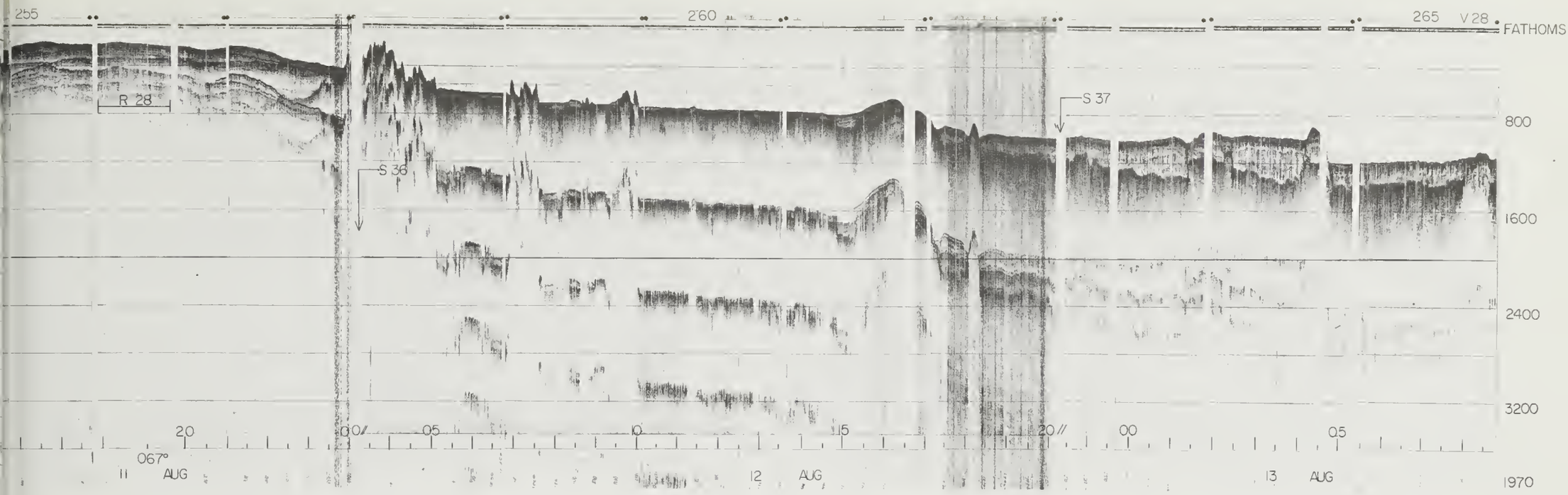

195
200
V28
FATHOMS
S 30
800
1600
2400
3200
1970
05
10
15
18
00
05
10
270°
265°
270°
148°
155°
235°
230°
30 JUL
31 JUL

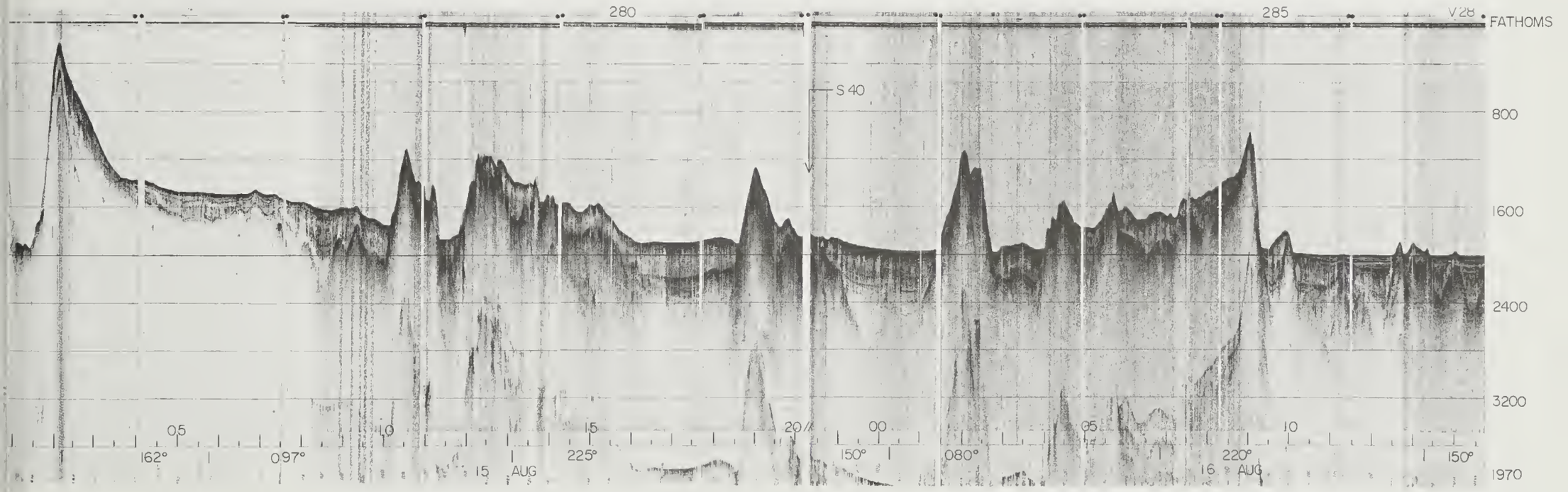

SECONDS
V 28
205
210
S 31
R 19
R 20
2
4
6
8
15
20
00
05
10
13// 17
20
180°
185°
187°
190°
126°
116°
165°
170°
1970
31 JUL
1 AUG
TZ GMT⇒+1

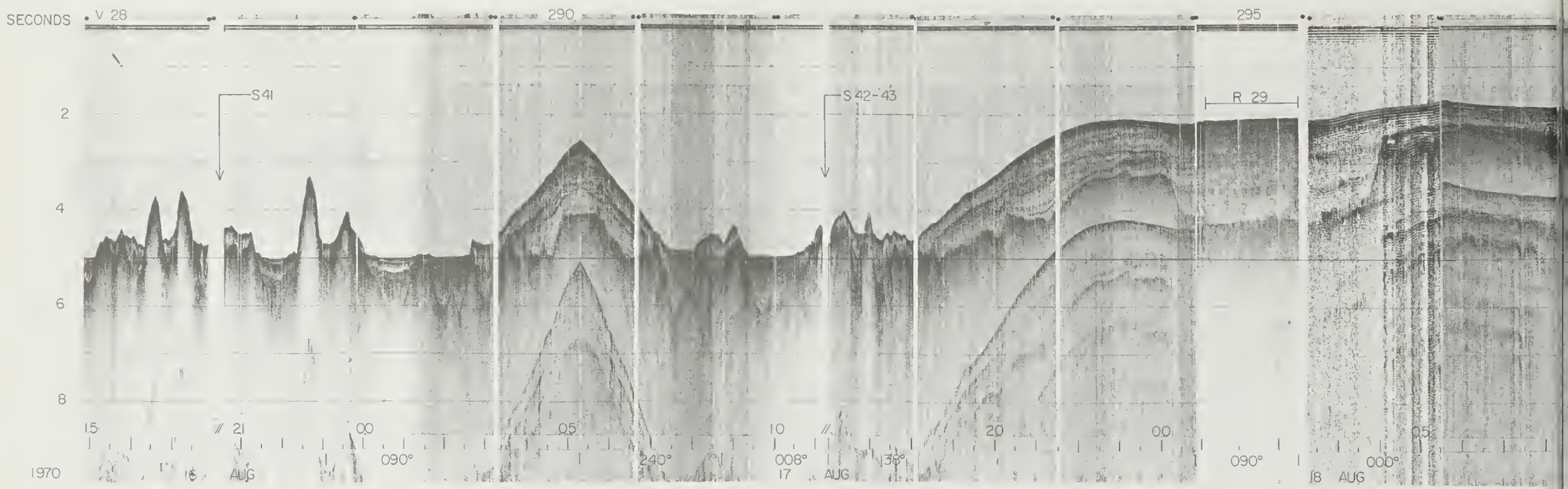

SECONDS
V 28
225
230
R 23
R 24
R 25
R 26
2
4
6
8
05
10
15
20
00
05
198°
240°
345°
230°
180°
270°
338°
1970
7 AUG
8 AUG

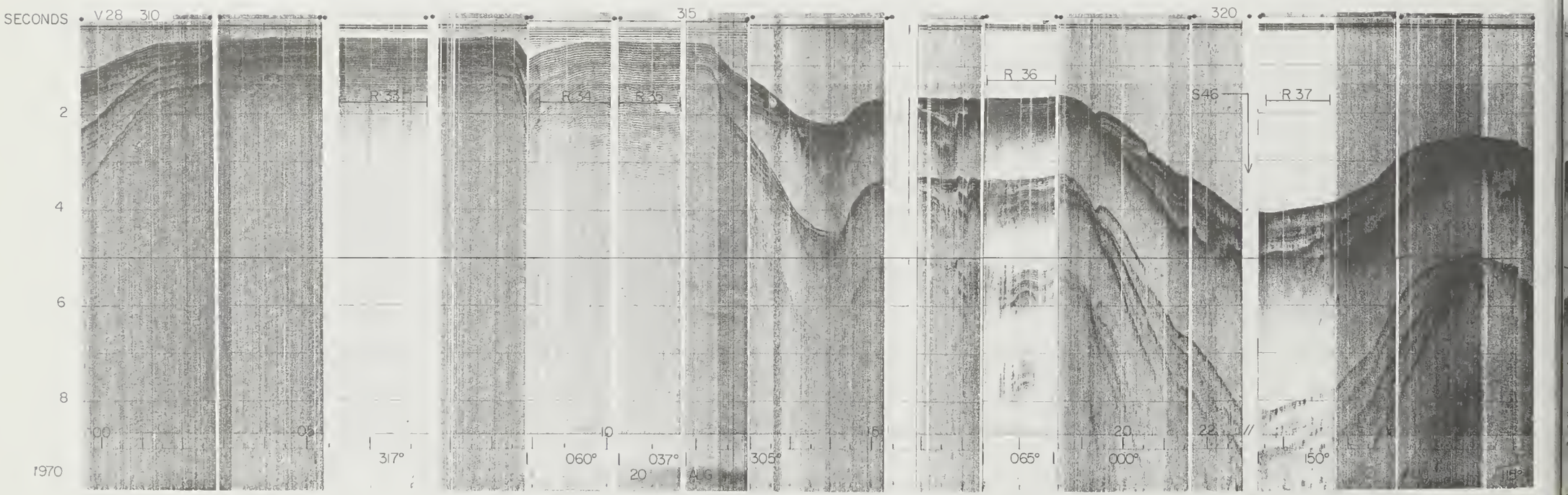

215
V 28
220
V 28
FATHOMS
S 32
R 21
R 22
AALESUND
800
1600
2400
3200
1970
05
09
15
20
00
00
162°
2 AUG
185°
158°
3 AUG
210°
162°
329°
180°
6 AUG
055°
235
240
V 28
FATHOMS
33
S 34
800
1600
2400
3200
1970
12
5
20
00
05
09
15
20
00
315°
8 AUG
9 AUG
10 AUG

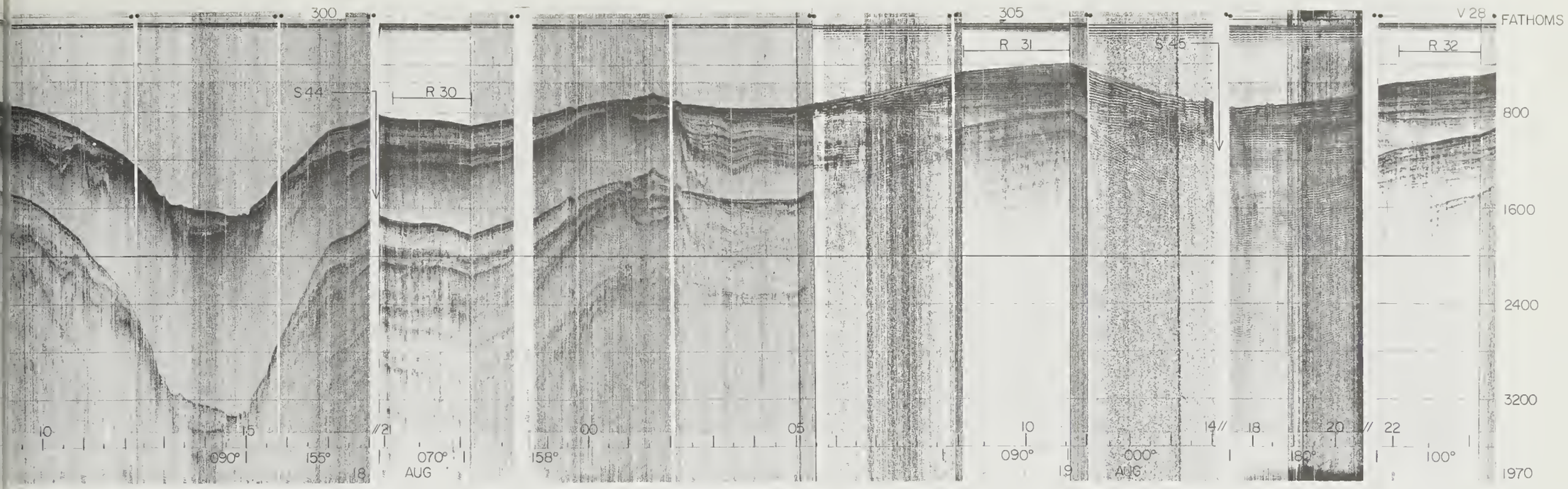

SECONDS
V 28
245
250
R 27
S 35
2
4
6
8
05
10
13
16
20
00
05
10
15
1970
10 AUG
276°
280°
11 AUG
SECONDS
V 28
270
275
S 38
S 39
2
4
6
8
10
15
20
00
05
10
15
20
00
055°
300°
120°
300°
025°
160°
090°
340°
168°
1970
13 AUG
14 AUG

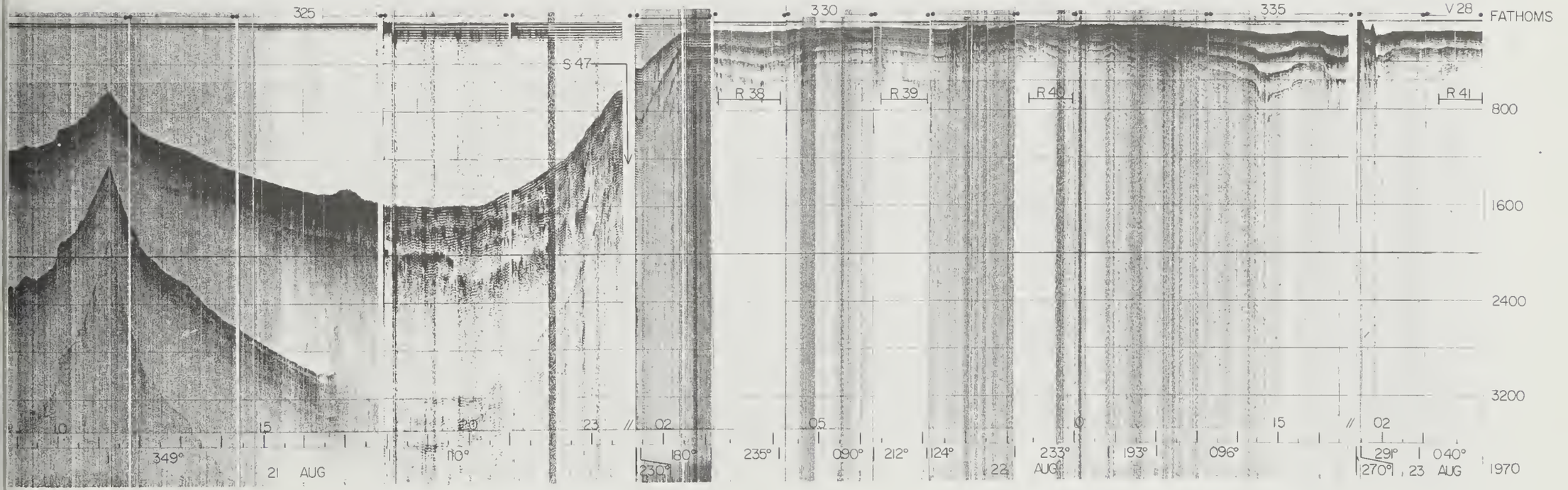

255
260
265
V 28
FATHOMS
R 28
S 36
S 37
800
1600
2400
3200
1970
20
00
05
10
15
20
00
05
067°
11 AUG
12 AUG
13 AUG

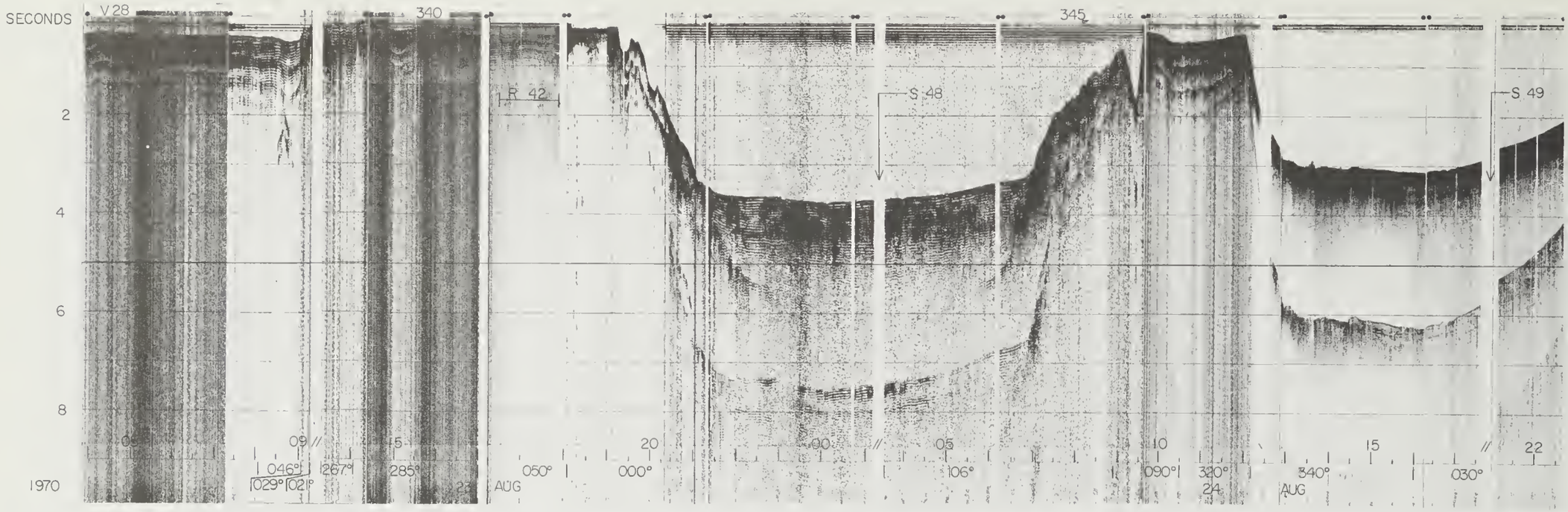

280
285
V 28
FATHOMS
S 40
800
1600
2400
3200
1970
05
10
15
20
00
05
10
162°
097°
225°
150°
080°
220°
150°
15 AUG
16 AUG

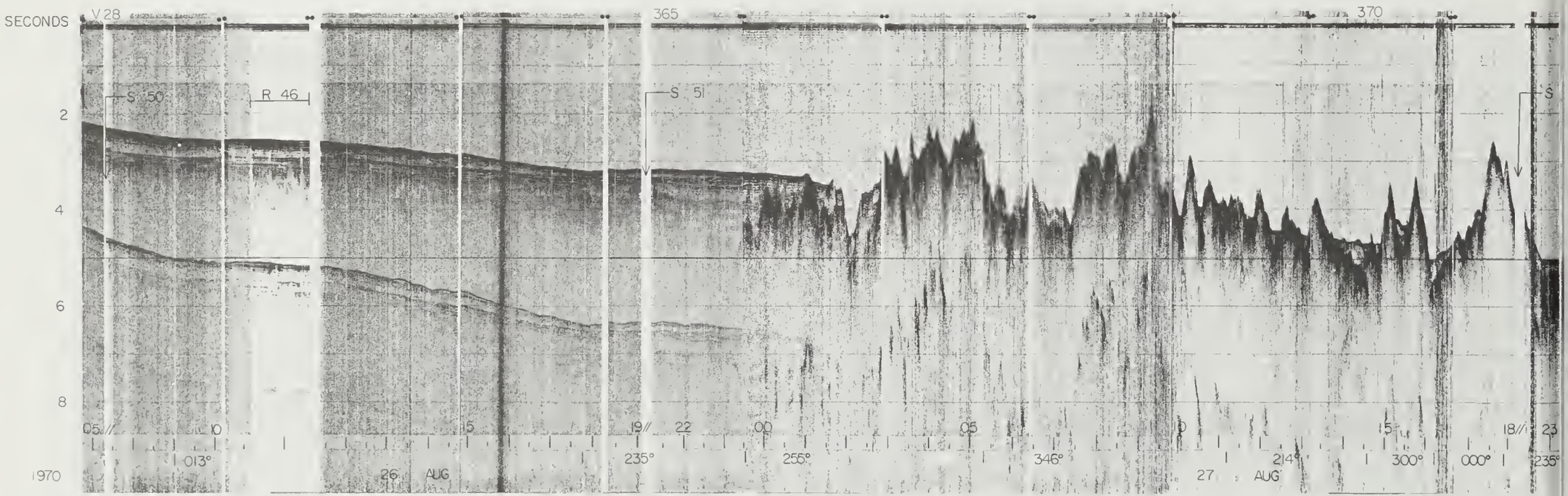

SECONDS
V 28
290
295
S41
S 42-43
R 29
2
4
6
8
15
21
00
05
10
20
00
05
090°
240°
008°
38°
090°
000°
1970
16 AUG
17 AUG
18 AUG

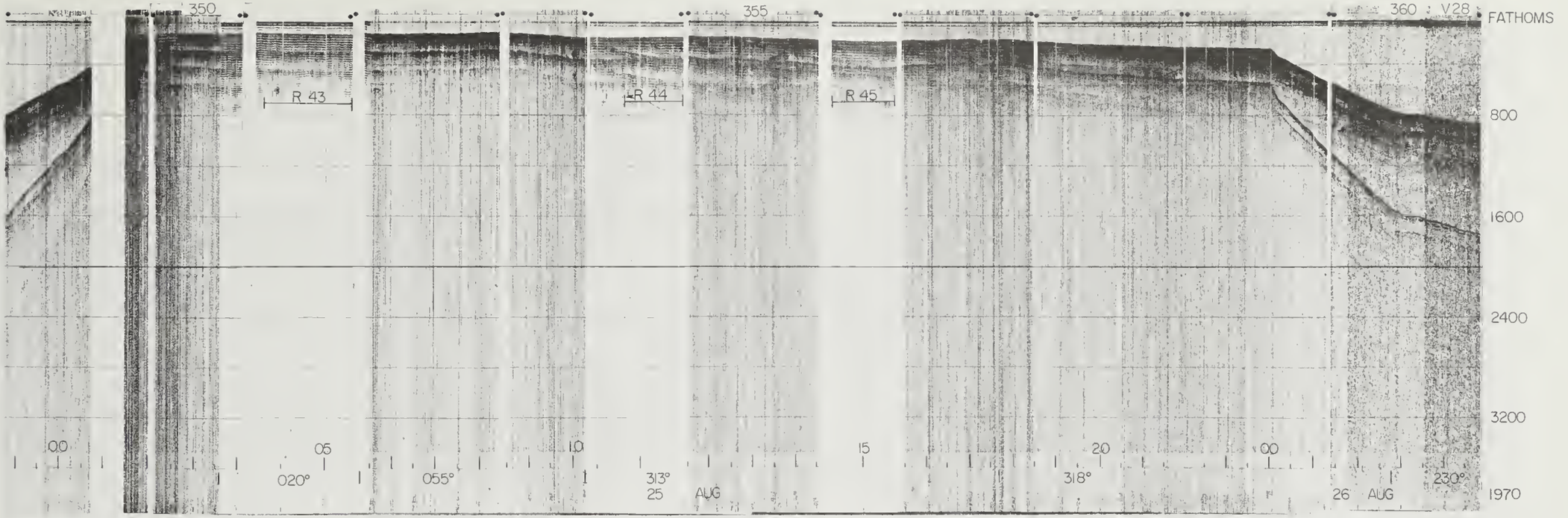

SECONDS
V28
310
315
320
R 33
R 34
R 35
R 36
S46
R 37
2
4
6
8
00
05
10
15
20
22
317°
060°
037°
305°
065°
000°
150°
118°
1970
20 AUG

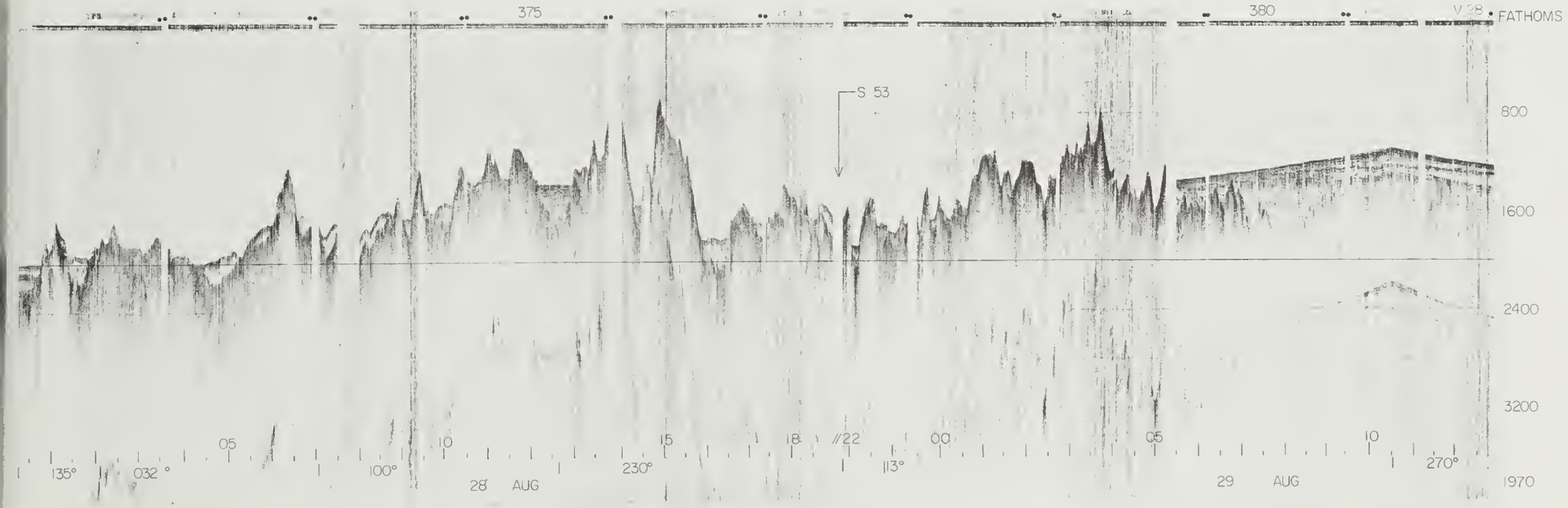

300
S 44
R 30
305
R 31
S 45
V 28
R 32
FATHOMS
800
1600
2400
3200
1970
10
15
21
090°
155°
070°
18
AUG
00
05
158°
10
090°
19
000°
AUG
14
18
20
22
180°
100°

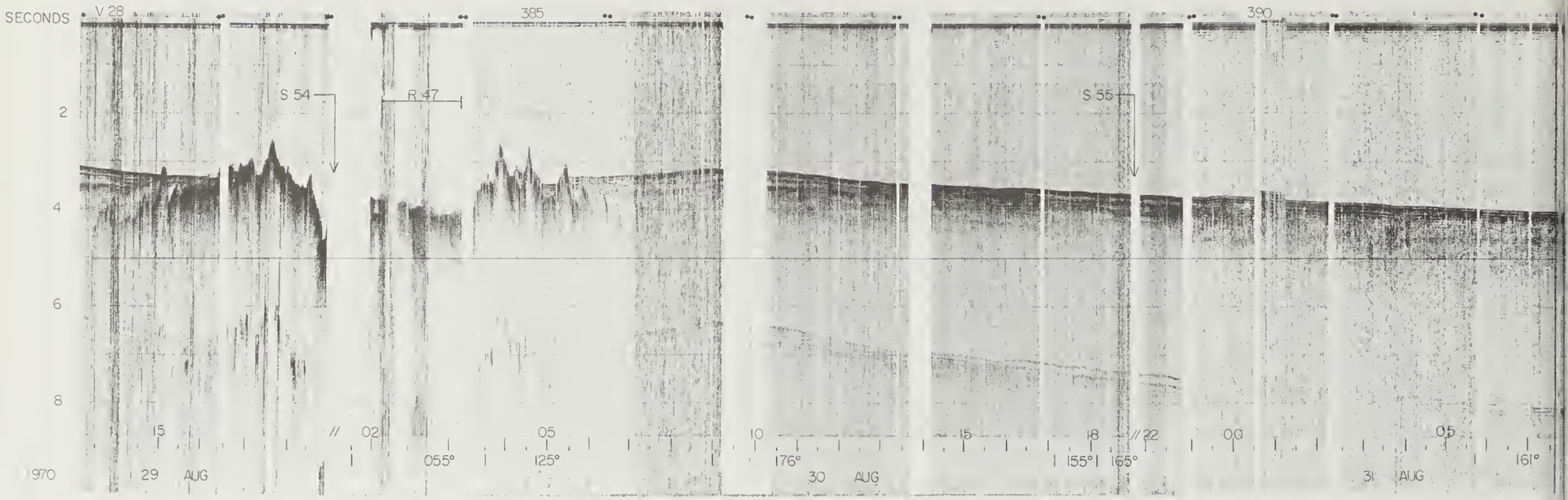

325
S 47
330
335
V 28
FATHOMS
R 38
R 39
R 40
R 41
800
1600
2400
3200
1970
10
15
20
23
02
05
0
15
02
349°
21 AUG
110°
180°
230°
235°
090°
212°
124°
22
233°
AUG
193°
096°
291°
040°
270°
23 AUG

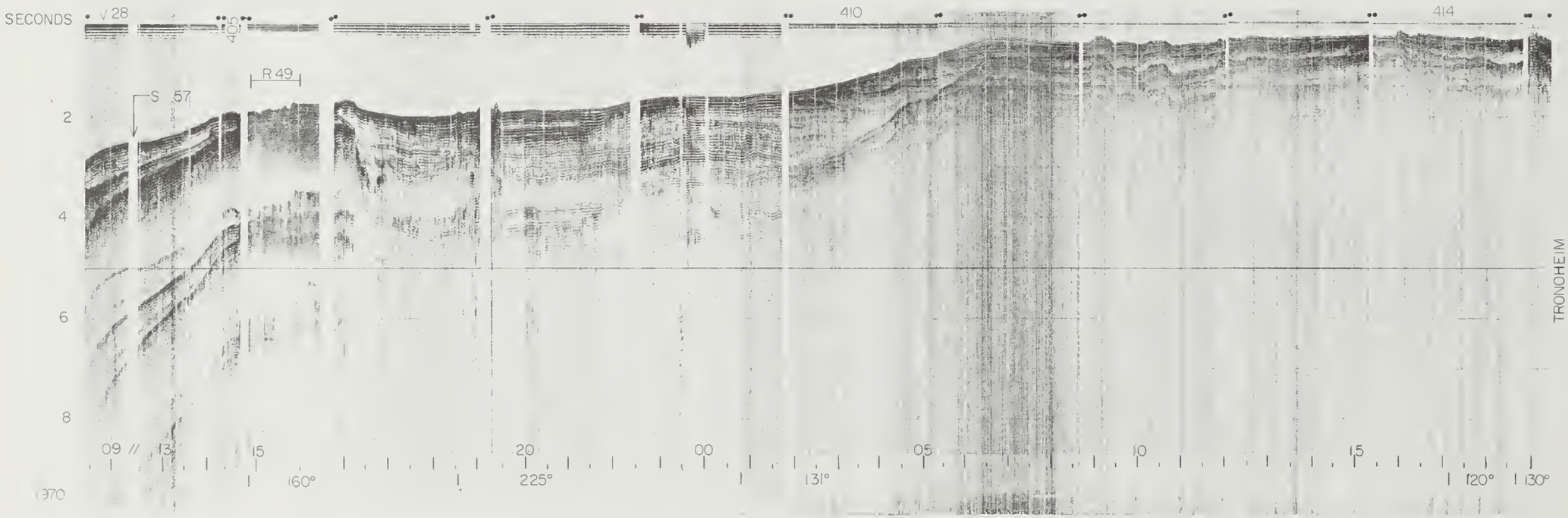

SECONDS
V 28
340
345
R 42
S 48
S 49
2
4
6
8
09 //
5
20
00 //
05
10
15
// 22
046°
029°
021°
267°
285°
050°
000°
106°
090°
320°
340°
030°
1970
AUG
24
AUG

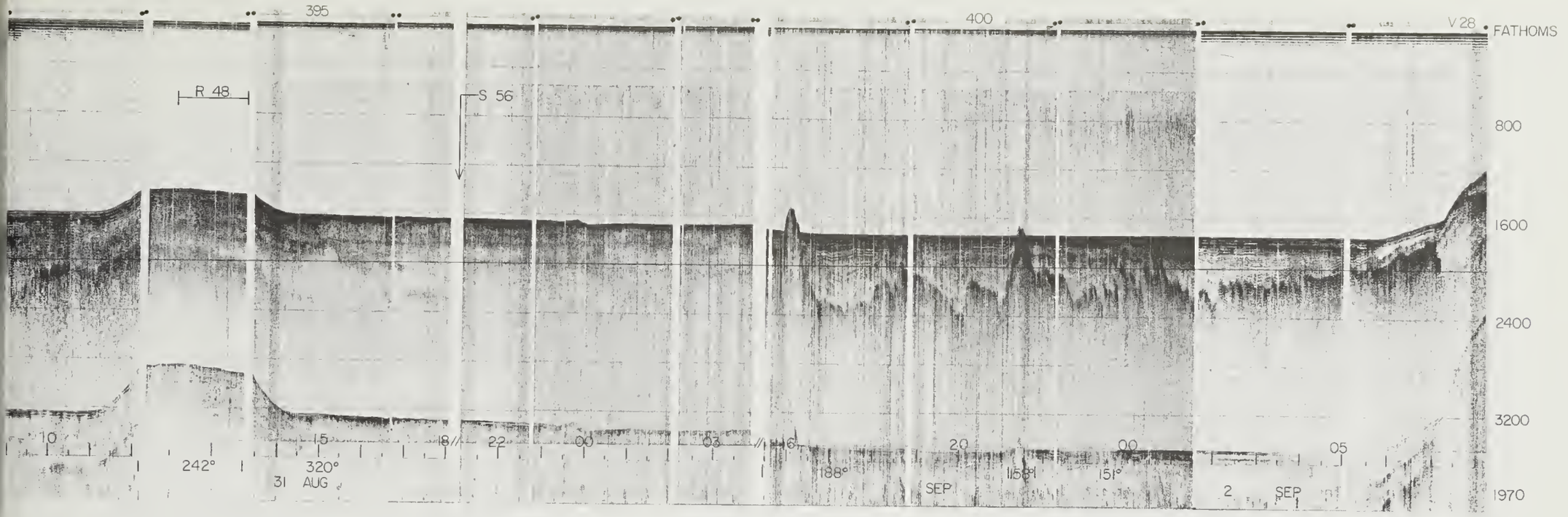

SECONDS
V 28
365
370
S 50
R 46
S 51
S
2
4
6
8
05 //
10
5
19 //
22
00
05
10
15
18 //
23
013°
235°
255°
346°
214°
300°
000°
235°
1970
26 AUG
27 AUG

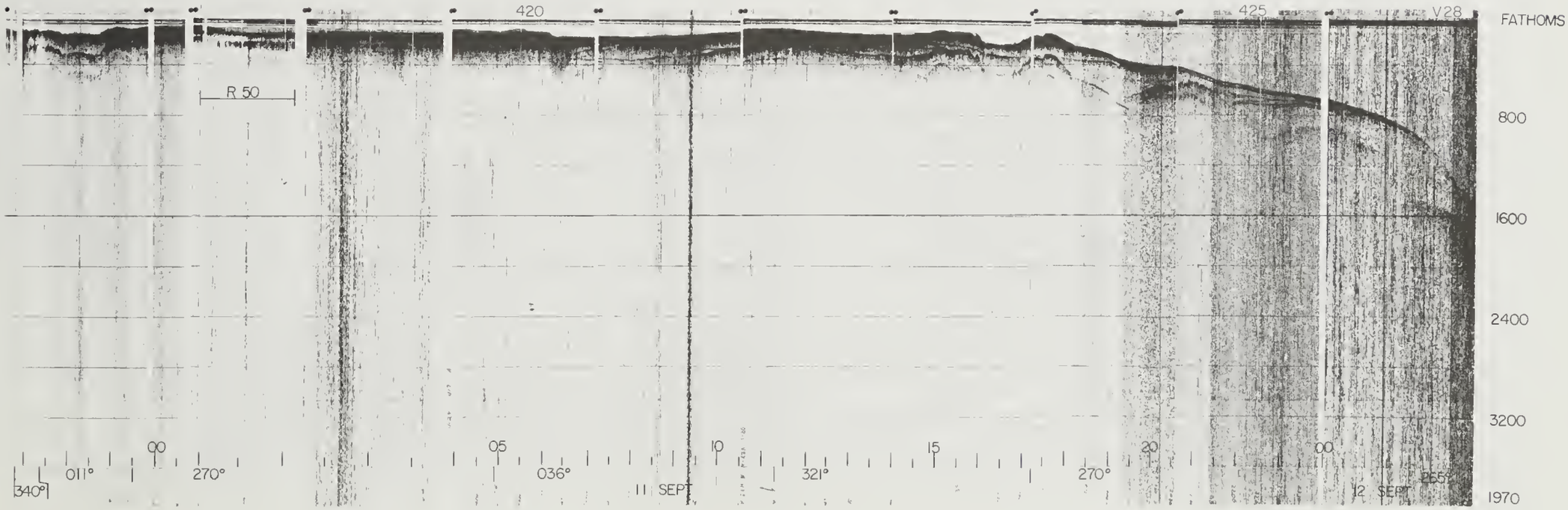

350
355
360
V28
FATHOMS
R 43
R 44
R 45
800
1600
2400
3200
1970
00
05
10
15
20
00
020°
055°
313°
25 AUG
318°
26 AUG
230°

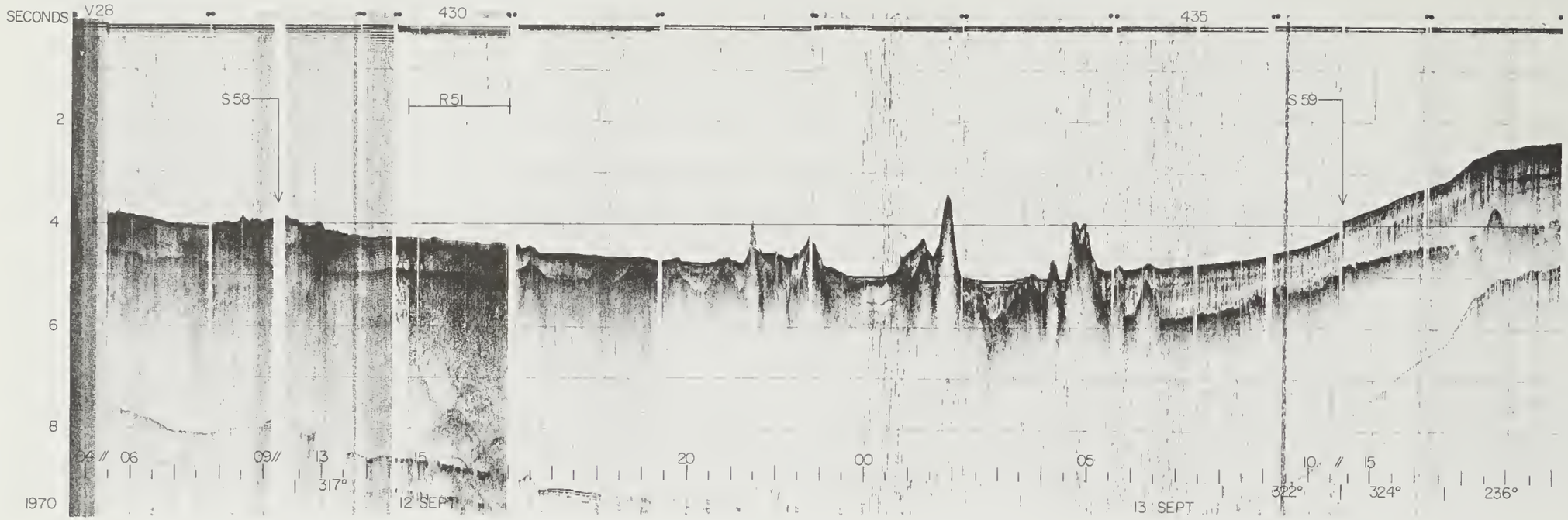

375
380
V28
FATHOMS
S 53
800
1600
2400
3200
1970
05
10
15
18
22
00
05
10
135°
032°
100°
28 AUG
230°
113°
29 AUG
270°

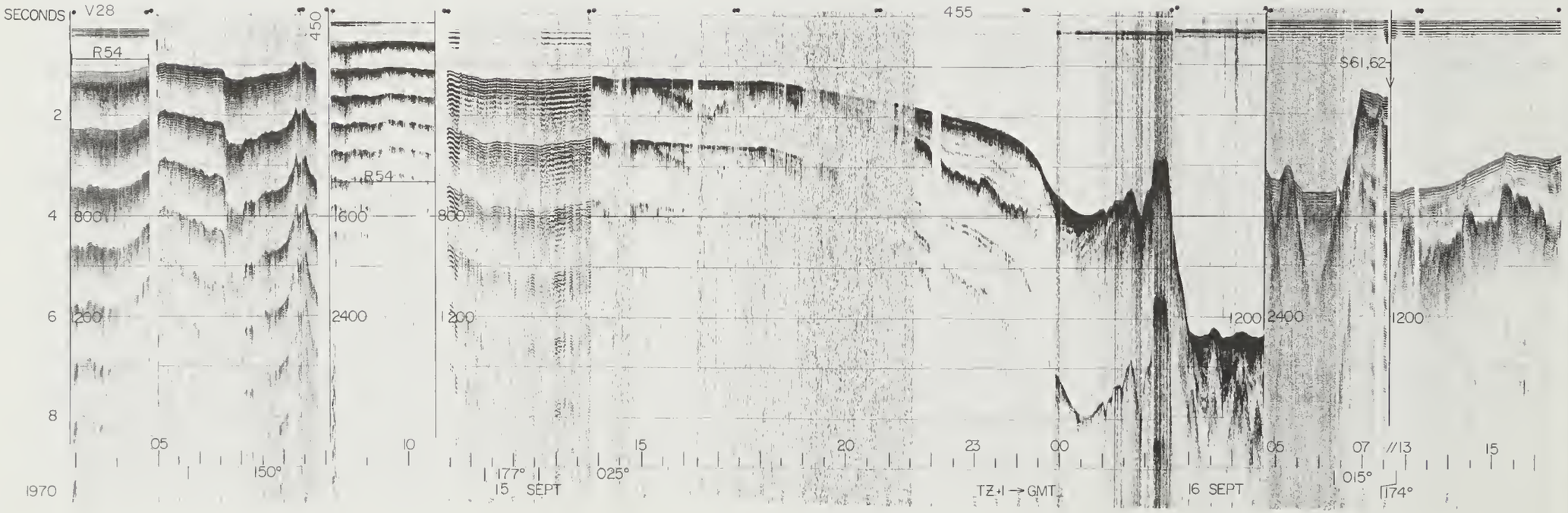

SECONDS
V 28
385
390
S 54
R 47
S 55
2
4
6
8
15
02
05
10
15
18
22
00
05
055°
125°
176°
155°
165°
161°
1970
29 AUG
30 AUG
31 AUG

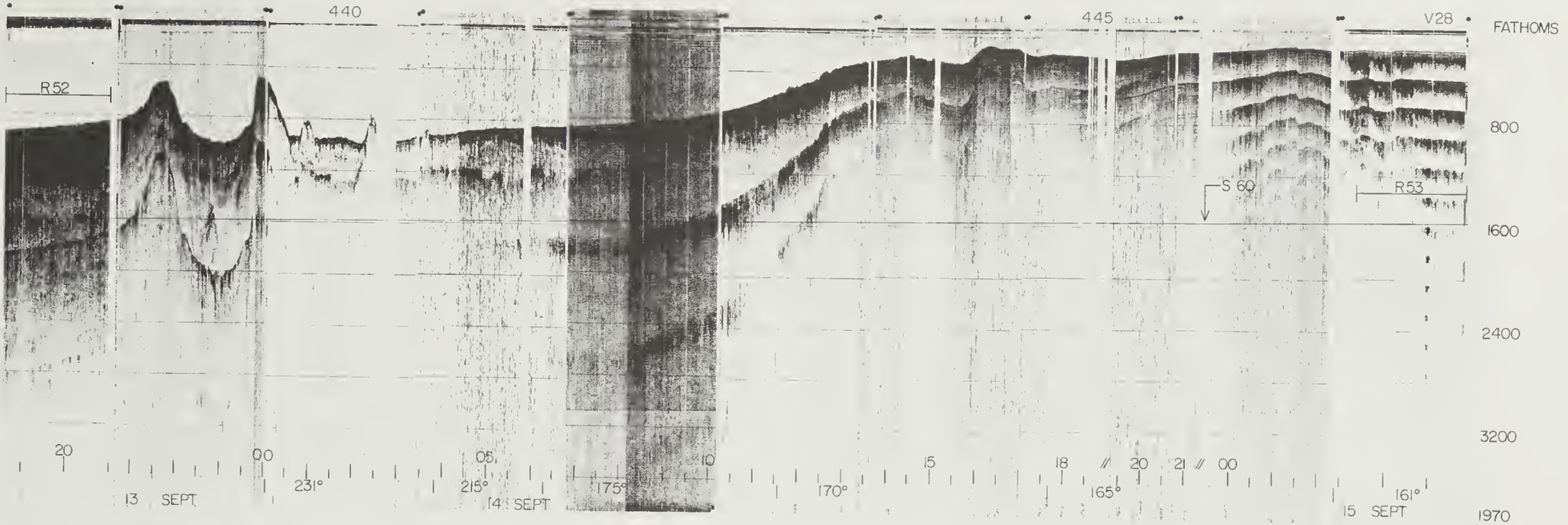

SECONDS
V 28
410
414
R 49
S 57
2
4
6
8
09
13
15
20
00
05
10
15
160°
225°
131°
120°
130°
1970
TRONOHEIM

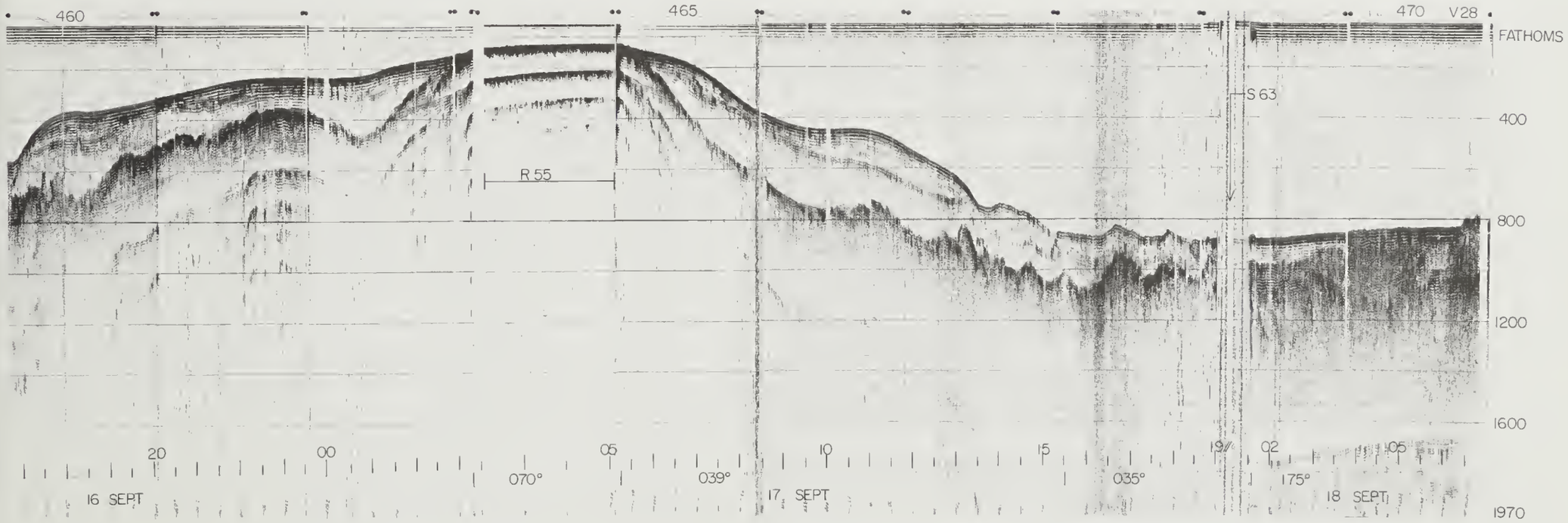

395
400
V 28
FATHOMS
R 48
S 56
800
1600
2400
3200
1970
10
15
18
22
00
03
06
20
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05
242°
320°
31 AUG
188°
SEP
158°
151°
2 SEP

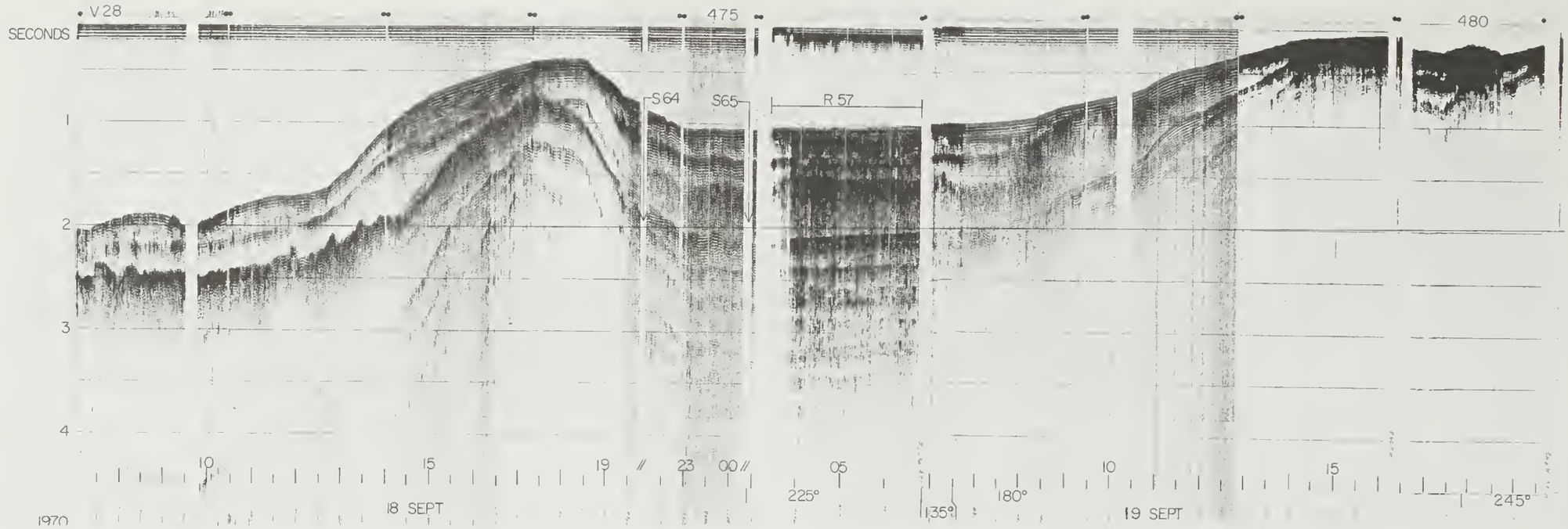

420
425
V 28
FATHOMS
R 50
800
1600
2400
3200
1970
00
05
10
15
20
00
340°
011°
270°
036°
11 SEPT
321°
270°
12 SEPT
265°

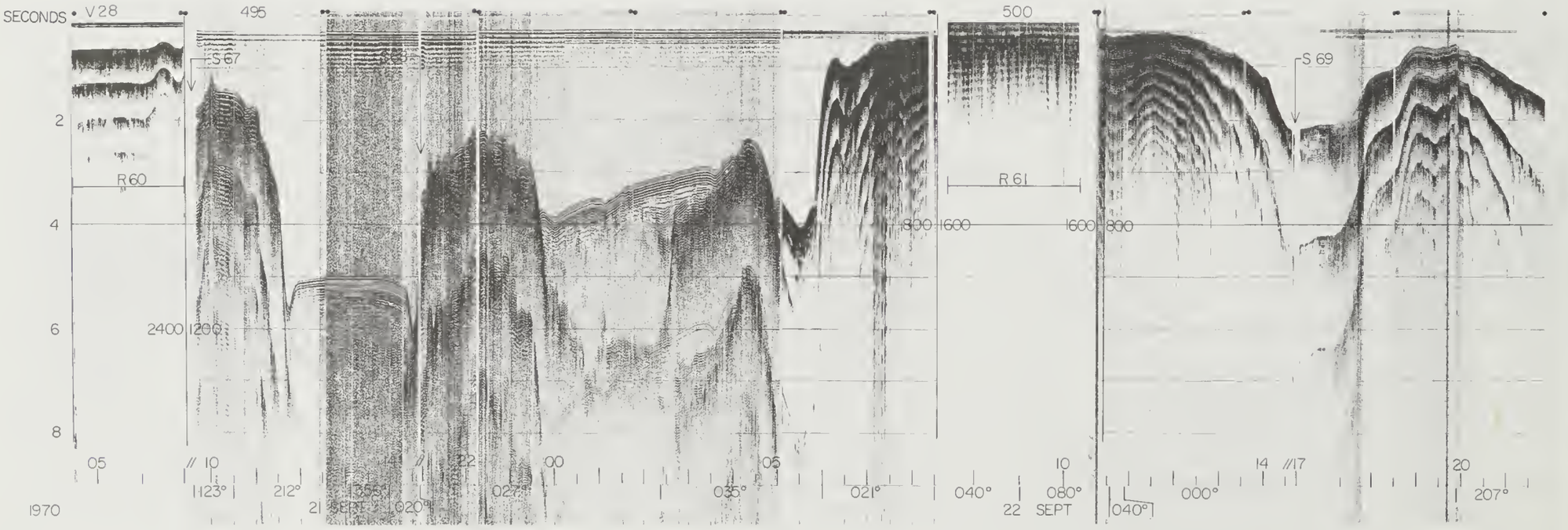

SECONDS
V28
430
435
S58
R51
S59
2
4
6
8
04 // 06
09 //
13
15
20
00
05
10 // 15
317°
322°
324°
236°
1970
12 SEPT
13 SEPT

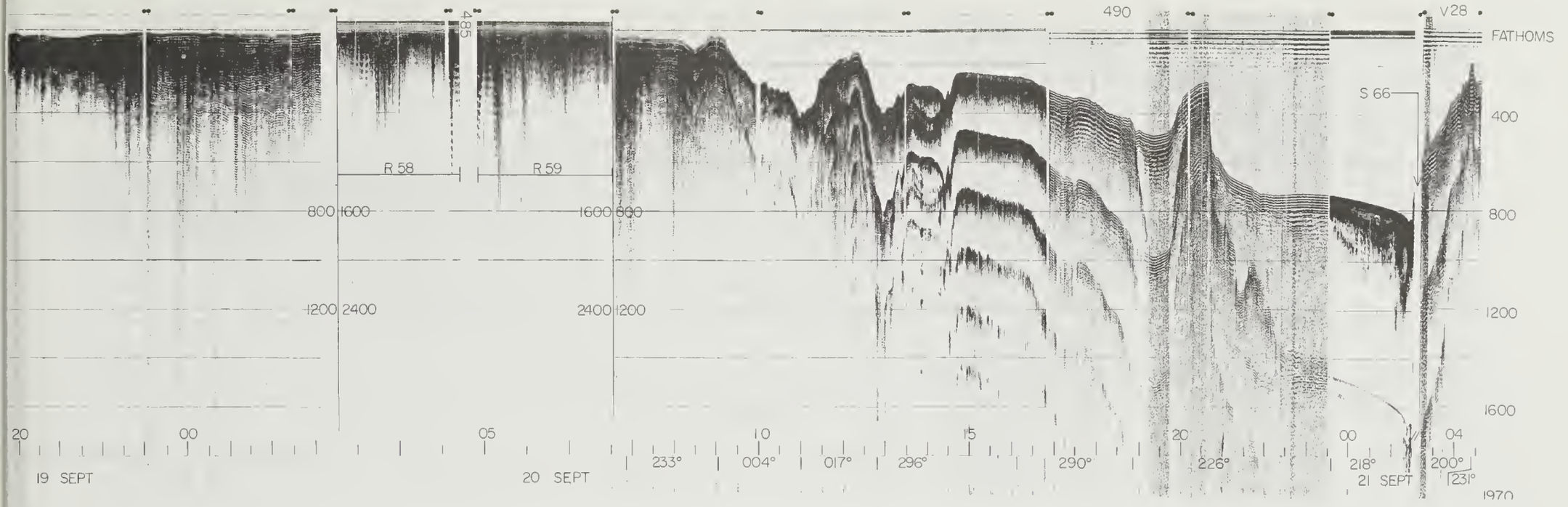

SECONDS
V28
450
455
R54
R54
S61,62
2
4
6
8
800
1600
800
1200
2400
1200
1200
2400
1200
05
10
15
20
23
00
05
07 //13
15
150°
177°
025°
015°
174°
1970
15 SEPT
TZ+1 → GMT
16 SEPT

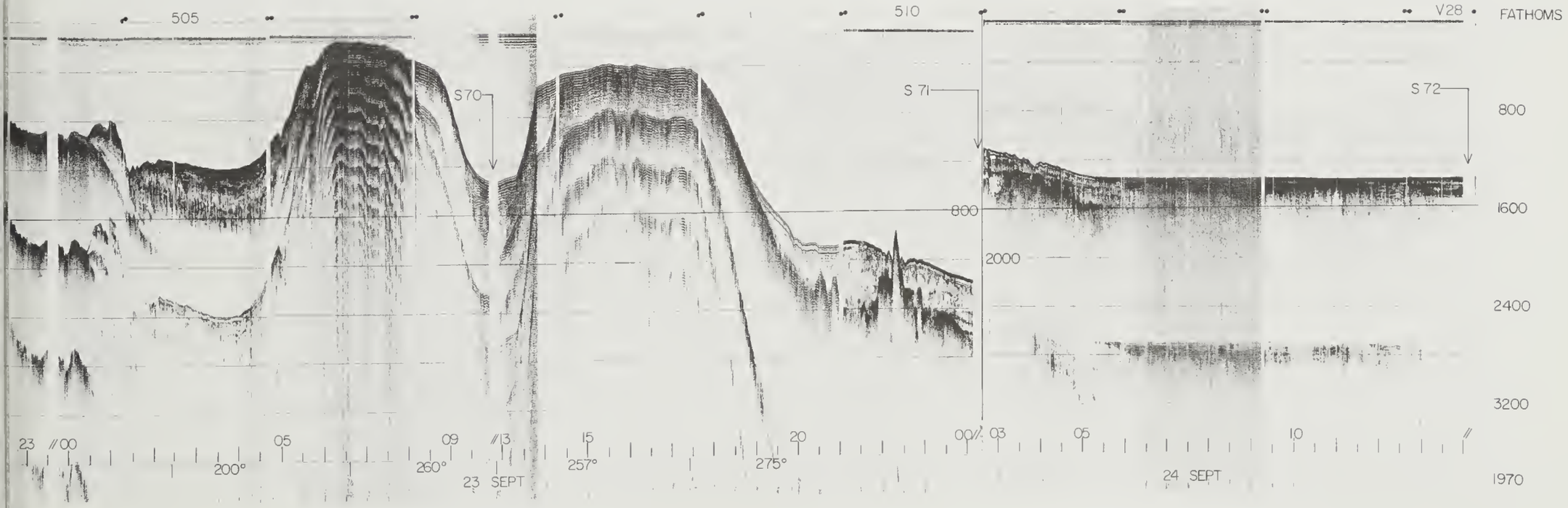

440
445
V28
FATHOMS
R52
S 60
R53
800
1600
2400
3200
1970
20
00
05
10
15
18
20
21
00
231°
215°
175°
170°
165°
161°
13 SEPT
14 SEPT
15 SEPT

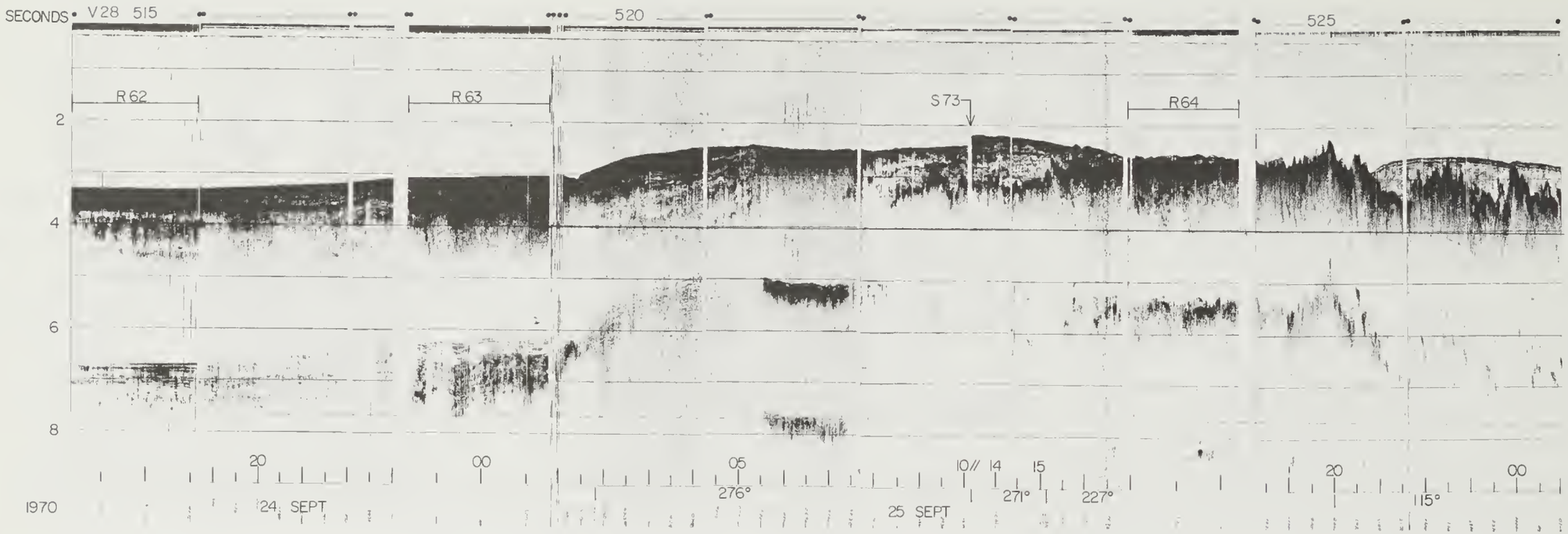

460
465
470
V28
FATHOMS
S 63
R 55
400
800
1200
1600
1970
20
00
05
10
15
19
02
05
070°
039°
035°
175°
16 SEPT
17 SEPT
18 SEPT

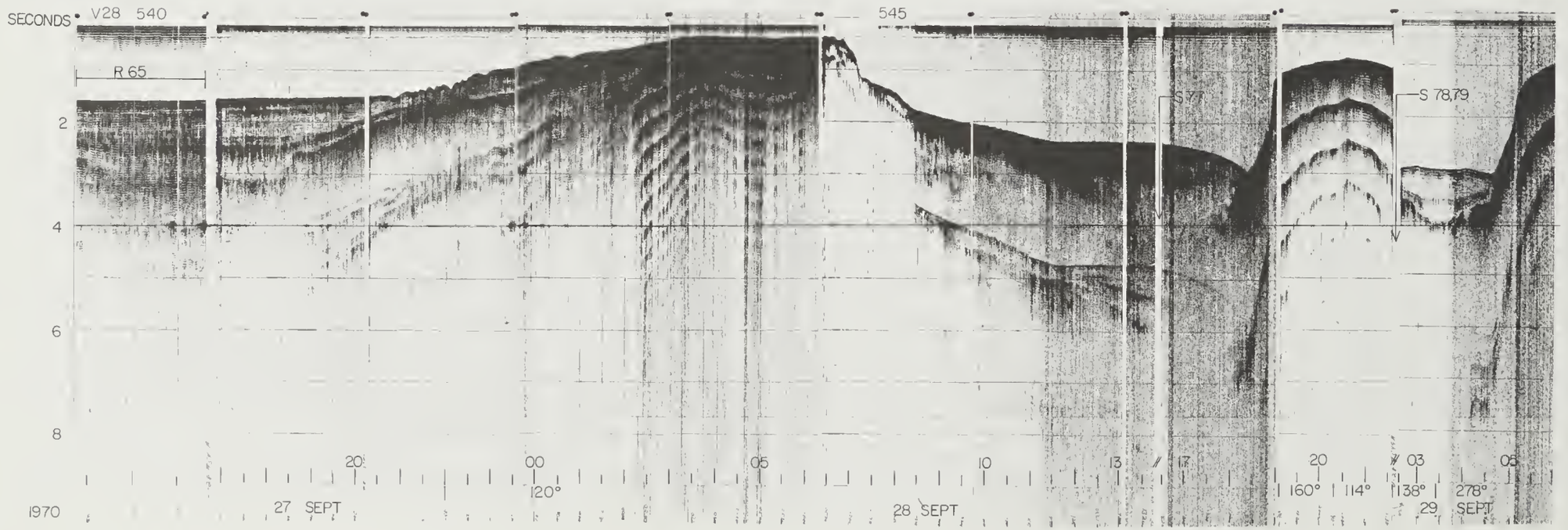

V28
SECONDS
475
480
S64
S65
R57
1
2
3
4
10
15
19
23
00
05
10
15
18 SEPT
19 SEPT
225°
135°
180°
245°
1970

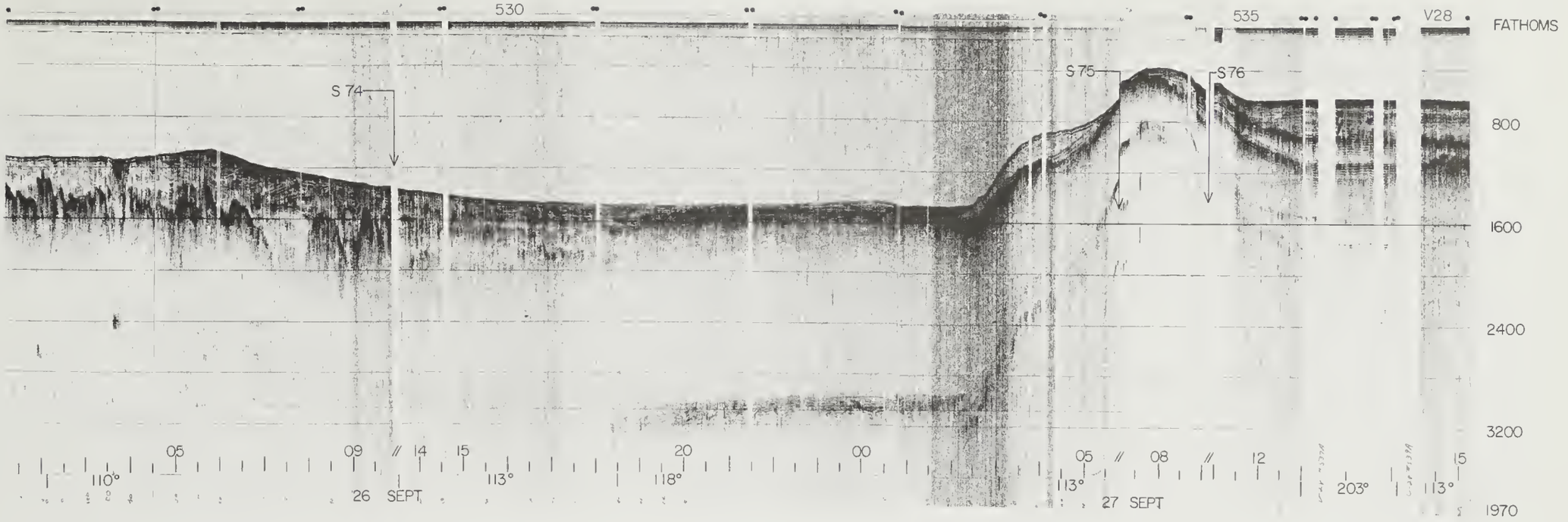

SECONDS
V28
495
500
S67
S69
R60
R61
2
4
6
8
2400
1200
1600
800
05
10
22
00
14
17
20
123°
212°
356°
020°
027°
035°
021°
040°
080°
000°
040°
207°
21 SEPT
22 SEPT
1970

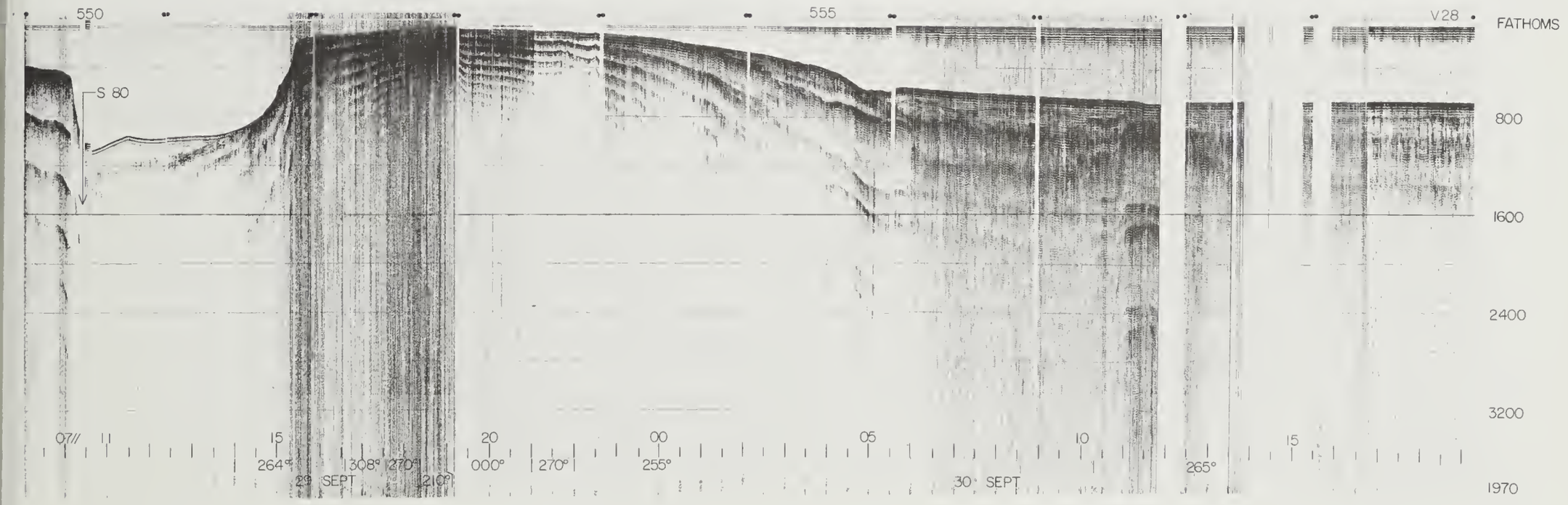

485
490
V28
FATHOMS
R 58
R 59
S 66
800 1600
1600 800
1200 2400
2400 1200
400
800
1200
1600
20
00
05
10
15
20
00
04
233°
004°
017°
296°
290°
226°
218°
200°
231°
19 SEPT
20 SEPT
21 SEPT
1970

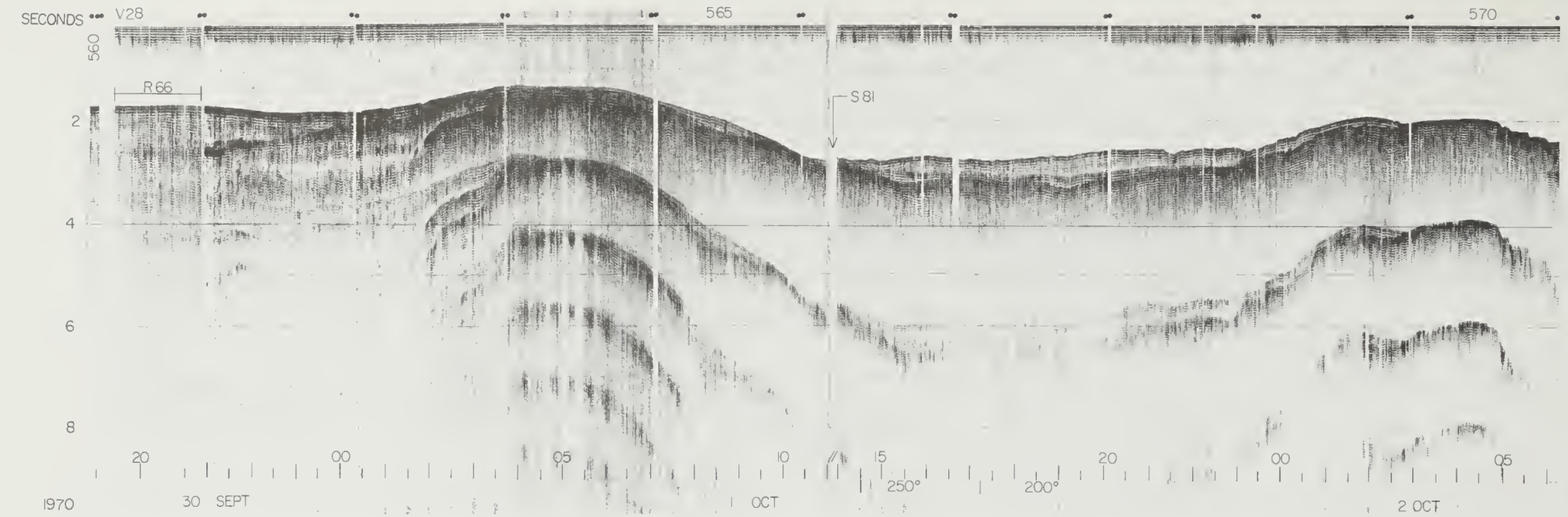

505
510
V28
FATHOMS
S 70
S 71
S 72
800
1600
2000
2400
3200
23
00
05
09
13
15
20
00
03
05
10
200°
260°
257°
275°
23 SEPT
24 SEPT
1970

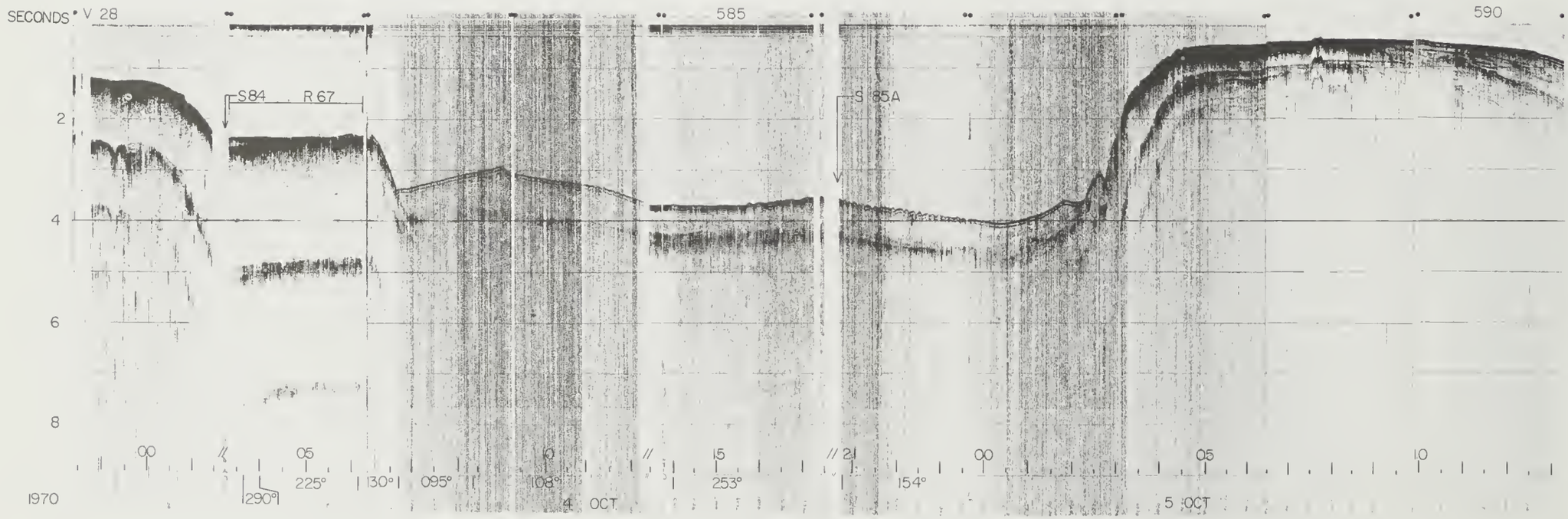

SECONDS
V28 515
520
525
R62
R63
S73
R64
2
4
6
8
20
00
05
10//
14
15
20
00
276°
271°
227°
115°
1970
24 SEPT
25 SEPT

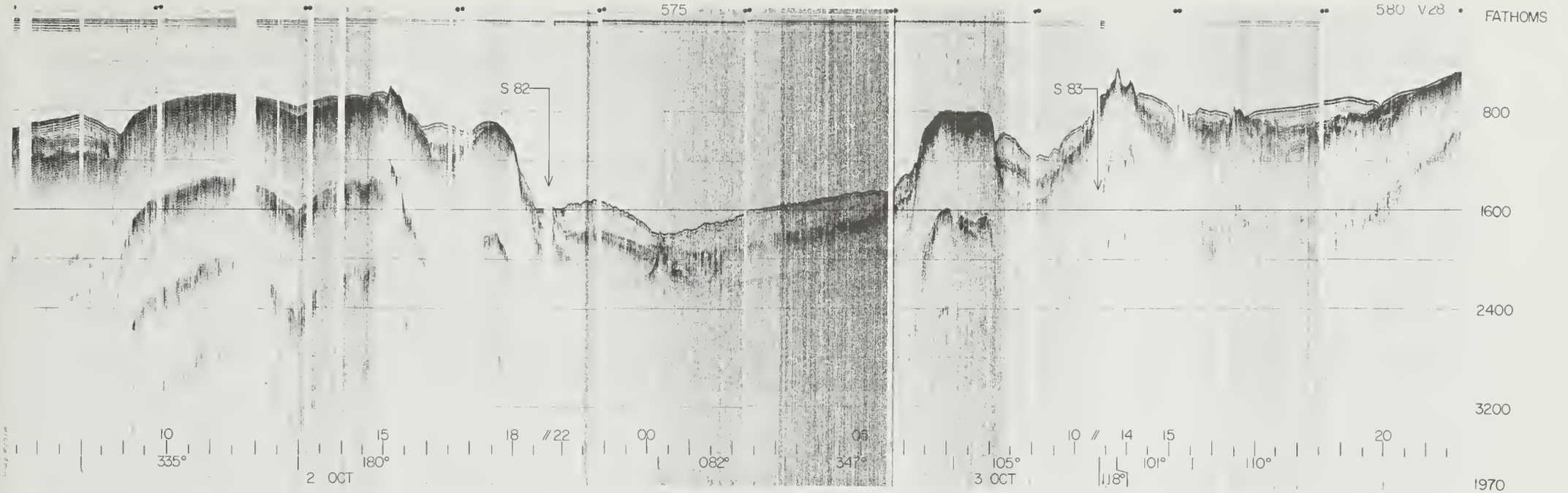

SECONDS
V28 540
545
R 65
S 77
S 78,79
2
4
6
8
20
00
05
10
13
17
20
03
05
120°
160°
114°
138°
278°
1970
27 SEPT
28 SEPT
29 SEPT

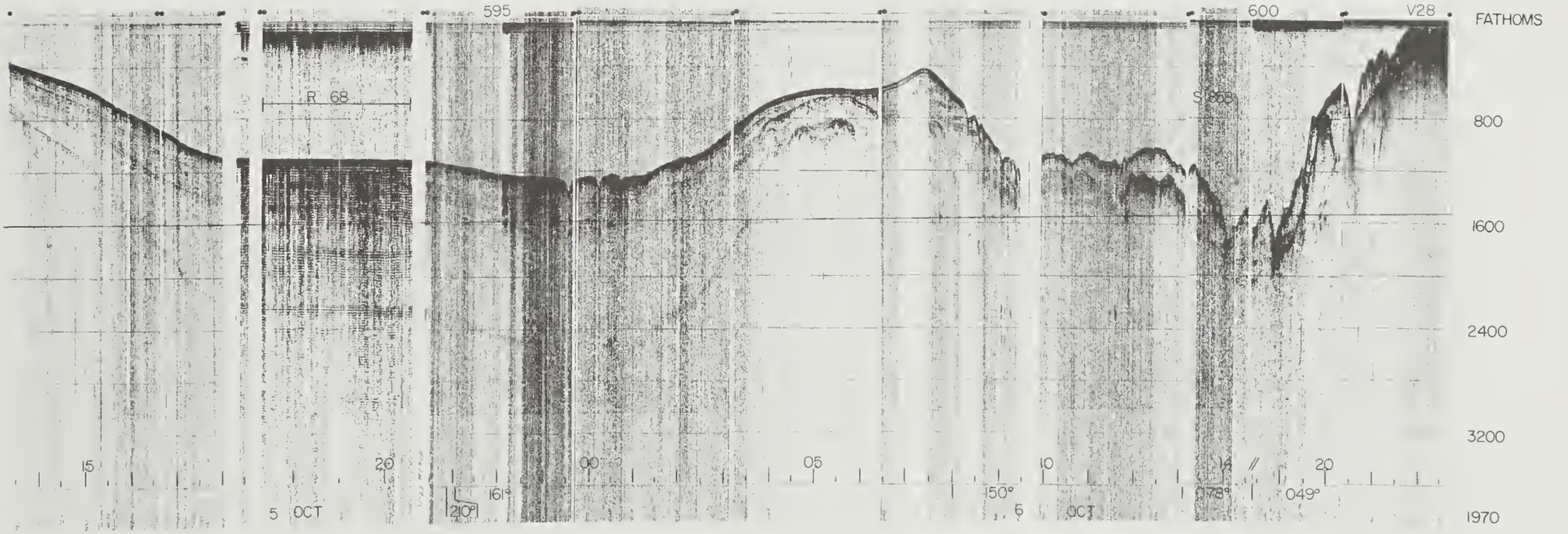

530
535
V28
FATHOMS
S 74
S 75
S 76
800
1600
2400
3200
1970
05
09
14
15
20
00
05
08
12
15
110°
113°
118°
113°
203°
113°
26 SEPT
27 SEPT

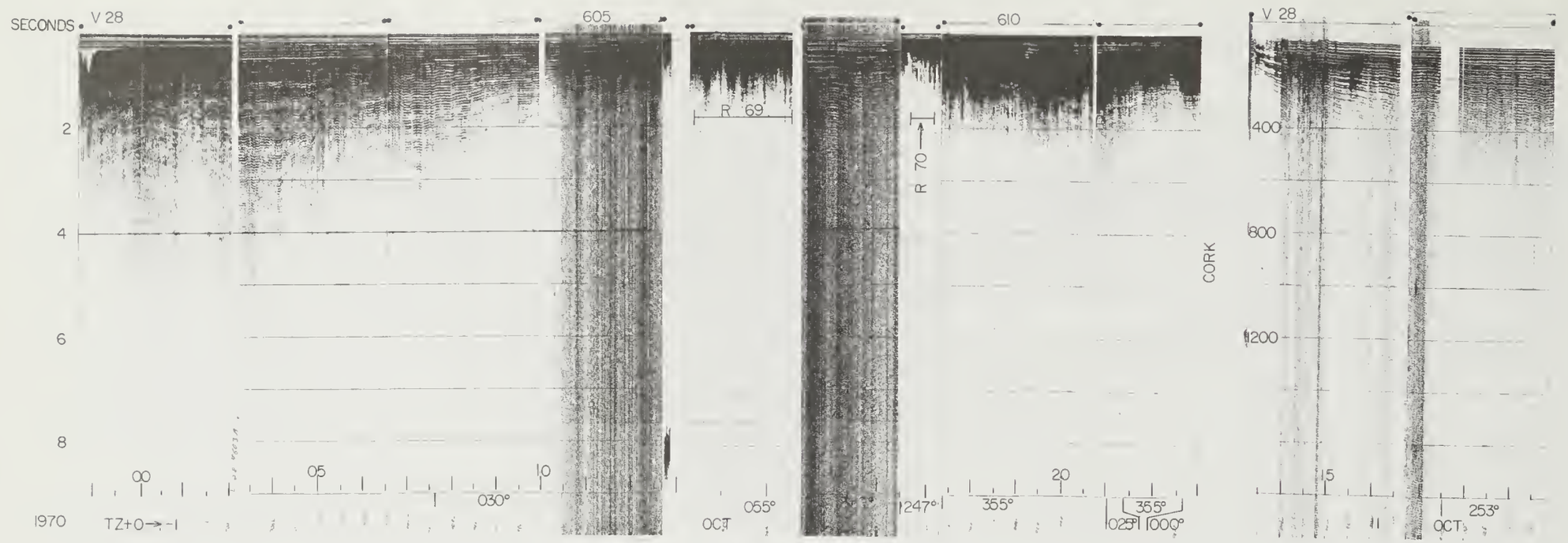

550
555
V28
FATHOMS
S 80
800
1600
2400
3200
1970
07
11
15
20
00
05
10
15
264°
308°
270°
000°
270°
255°
265°
29 SEPT
30 SEPT

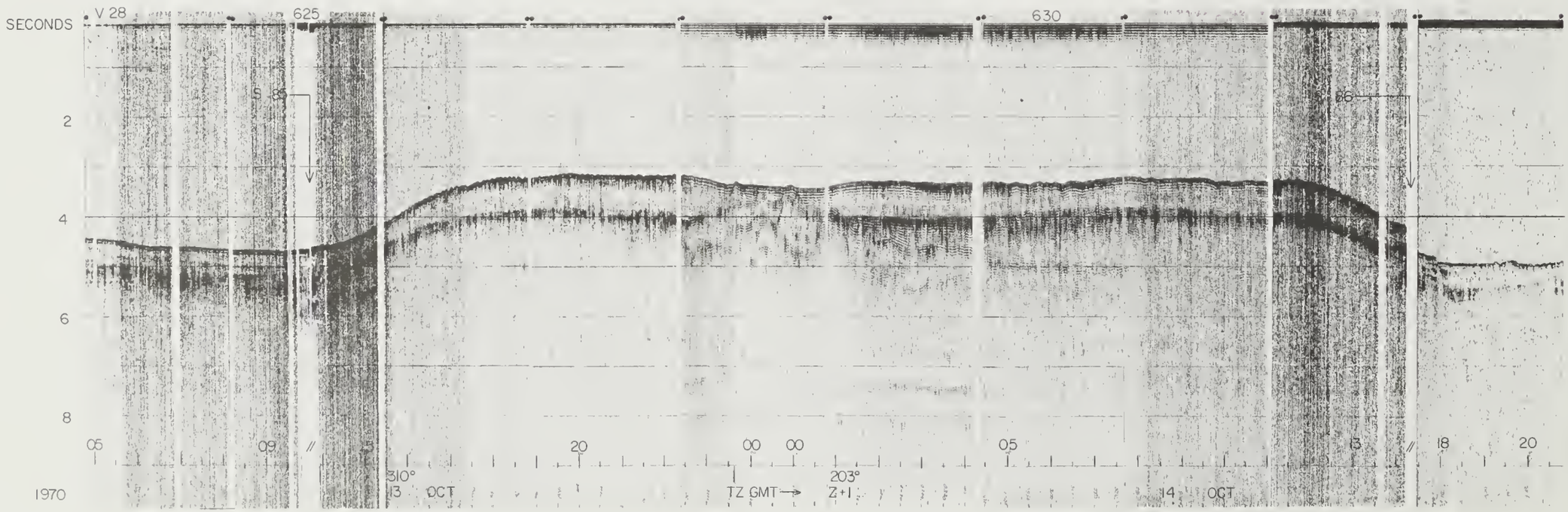

SECONDS
V28
560
565
570
R66
S81
2
4
6
8
20
00
05
10
15
20
00
05
1970
30 SEPT
OCT
250°
200°
2 OCT

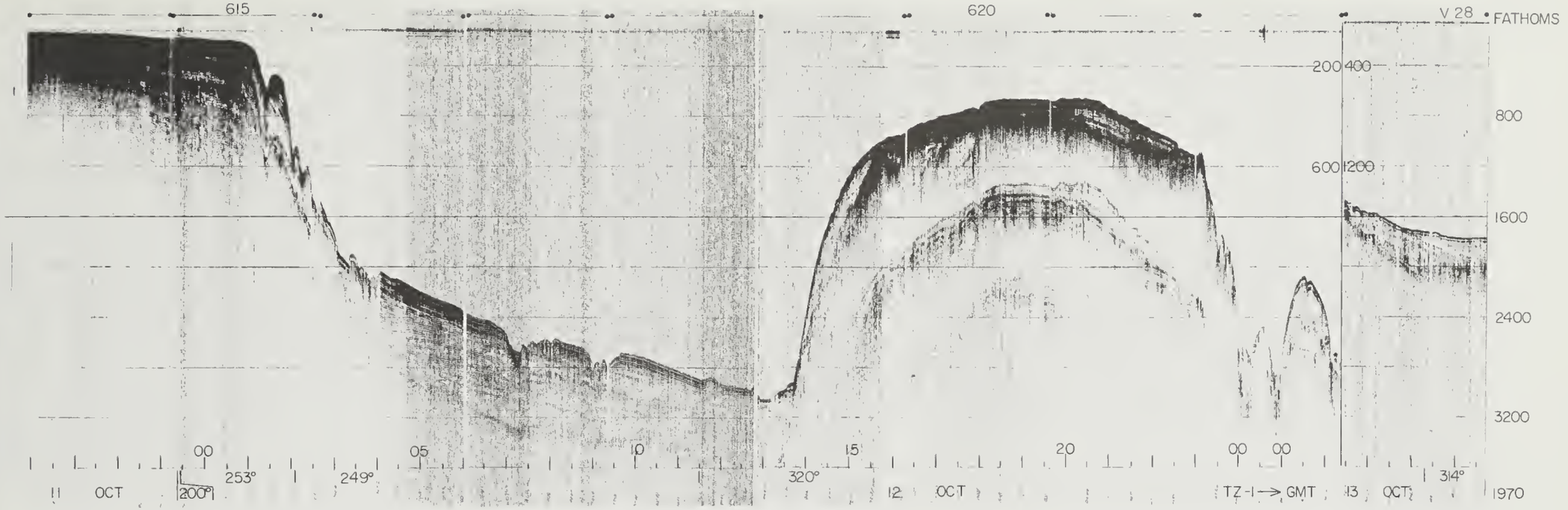

SECONDS
V 28
585
590
S84
R67
S 85A
2
4
6
8
00
05
10
15
21
00
05
10
1970
290°
225°
130°
095°
108°
4 OCT
253°
154°
5 OCT

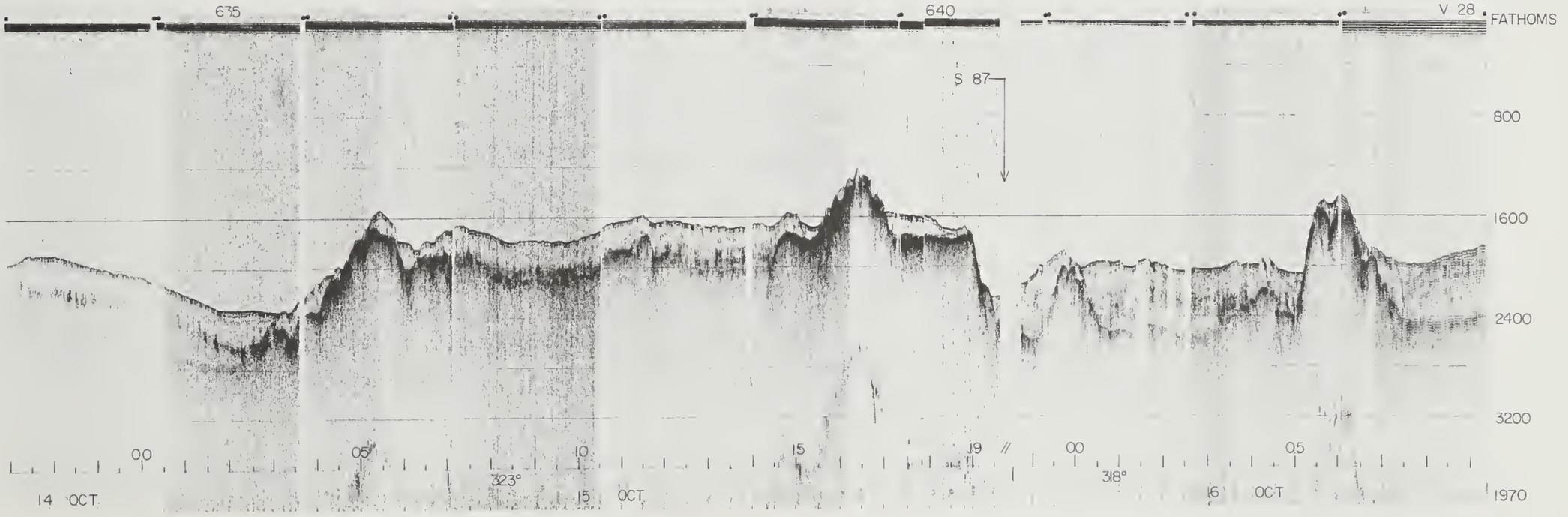

575
580 V28
FATHOMS
S 82
S 83
800
1600
2400
3200
1970
10
15
18
22
00
05
10
14
15
20
335°
180°
082°
347°
105°
101°
110°
118°
2 OCT
3 OCT

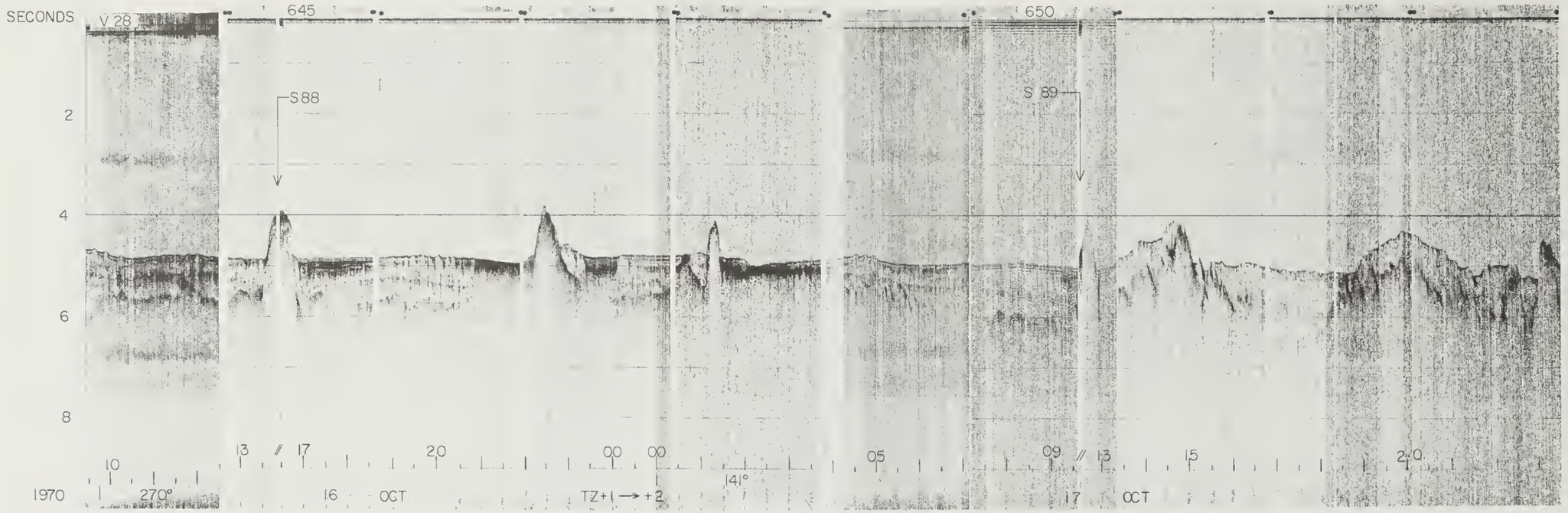

595
600
V28
FATHOMS
R 68
S 68
800
1600
2400
3200
1970
15
20
00
05
10
16
20
161°
210°
150°
078°
049°
5 OCT
5 OCT

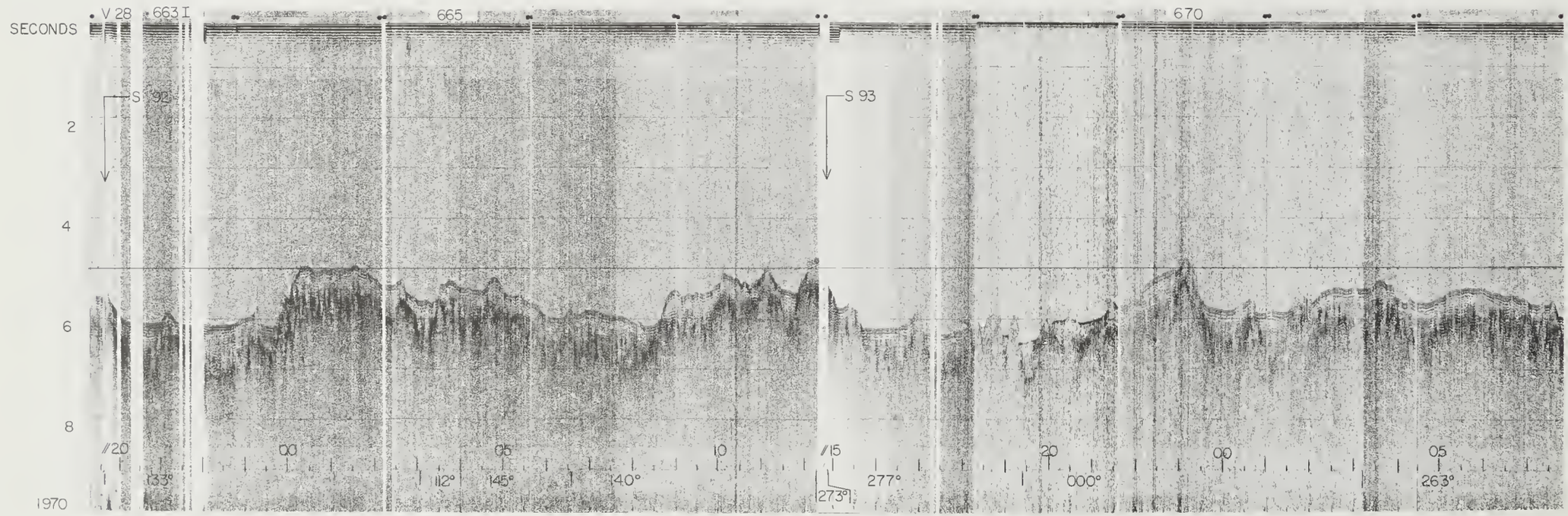

SECONDS
V 28
605
610
V 28
R 69
R 70
CORK
2
4
6
8
400
800
1200
00
05
10
15
20
030°
055°
247°
355°
355°
025°
000°
253°
1970
TZ+0→-1
OCT
OCT

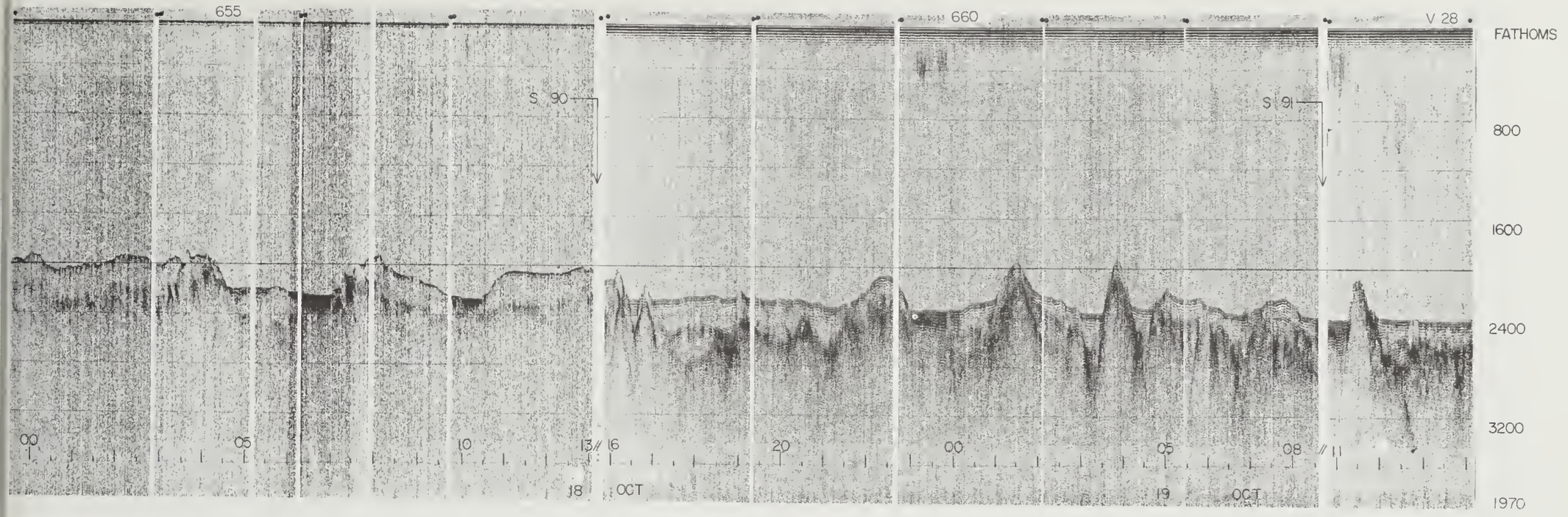

SECONDS
V 28
625
630
S 85
86
2
4
6
8
05
09
13
20
00
00
05
13
18
20
310°
203°
1970
13 OCT
TZ GMT→ Z+1
14 OCT

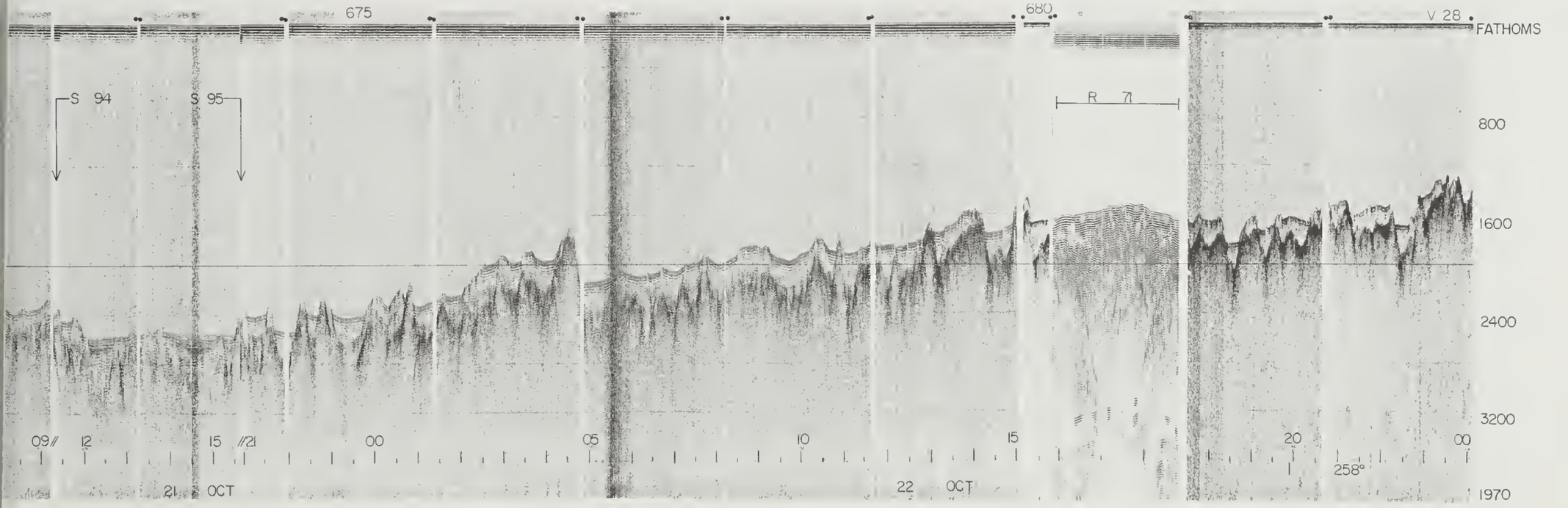

615
620
V 28
FATHOMS
200 400
800
600 1200
1600
2400
3200
1970
00
05
10
15
20
00 00
253°
249°
320°
314°
11 OCT
200°
12 OCT
TZ-1 → GMT
13 OCT

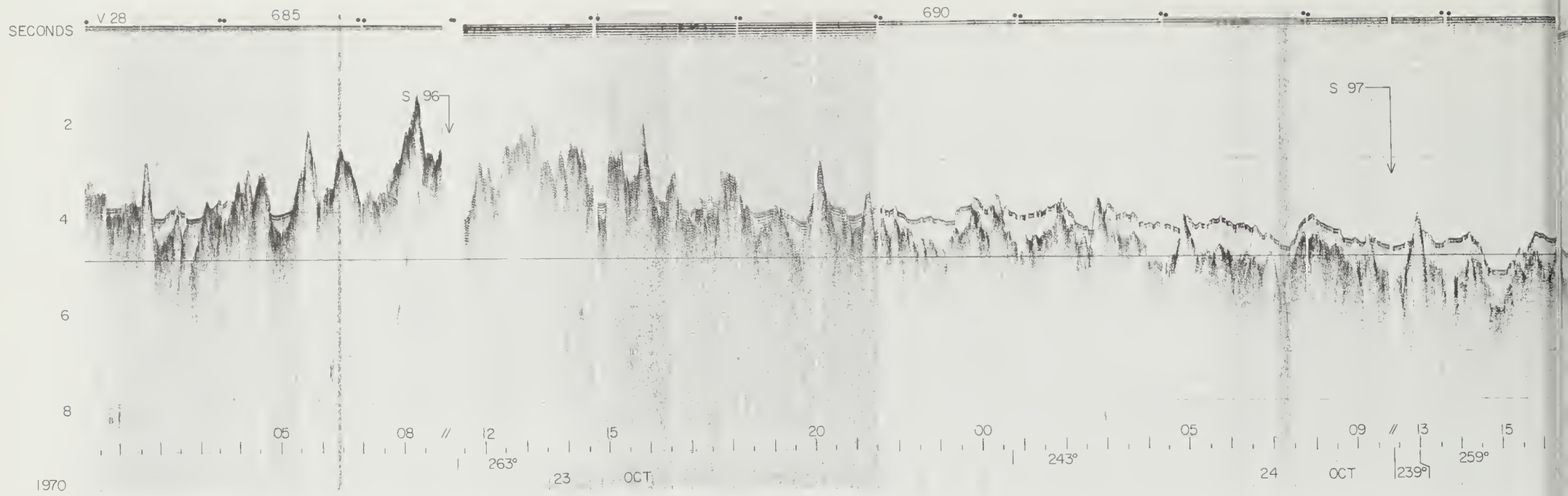

635
640
V 28
FATHOMS
S 87
800
1600
2400
3200
1970
00
05
10
15
19
00
05
323°
318°
14 OCT
15 OCT
16 OCT

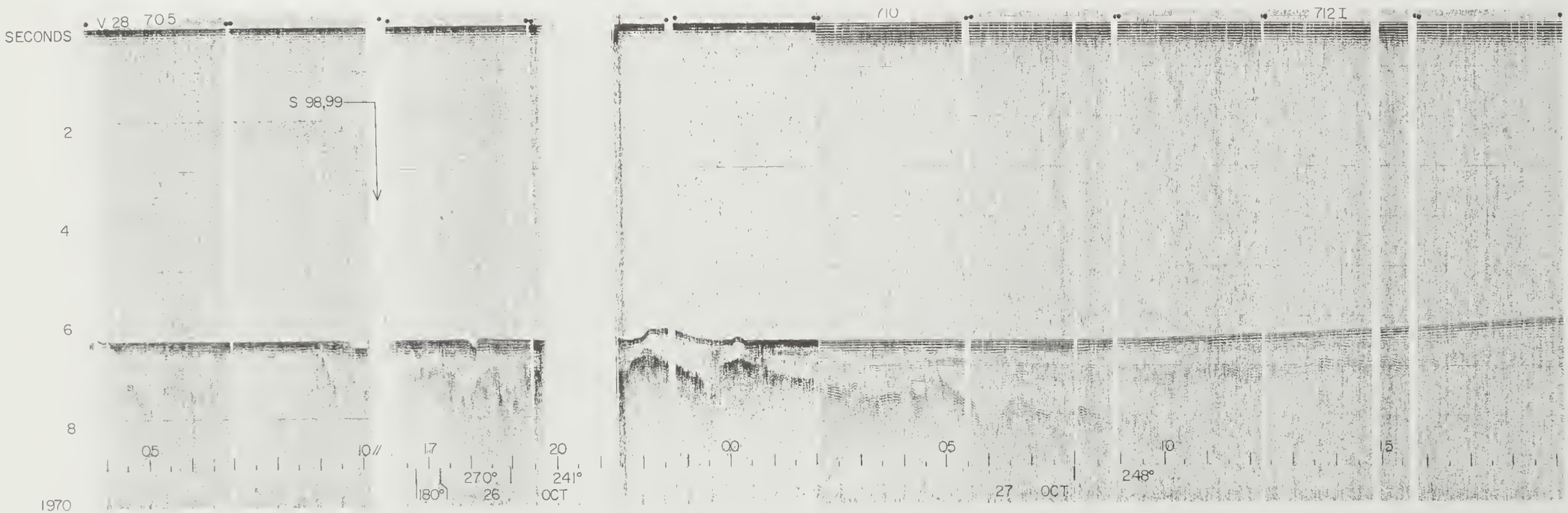

SECONDS
V 28
645
650
S 88
S 89
2
4
6
8
13 // 17
20
00 00
05
09 // 13
15
20
10
1970
270°
16 OCT
TZ+1 → +2
141°
17 OCT

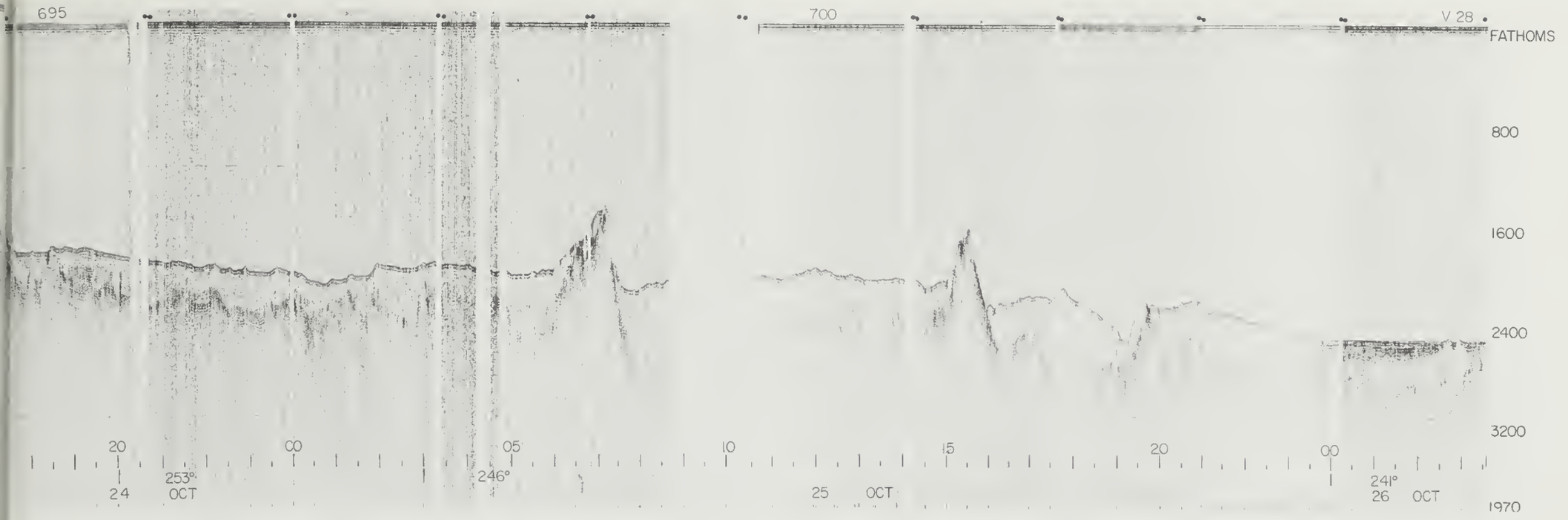

SECONDS
V 28
663 I
665
670
S 92
S 93
2
4
6
8
// 20
00
05
10
// 15
20
00
05
1970
133°
112°
145°
140°
273°
277°
000°
263°

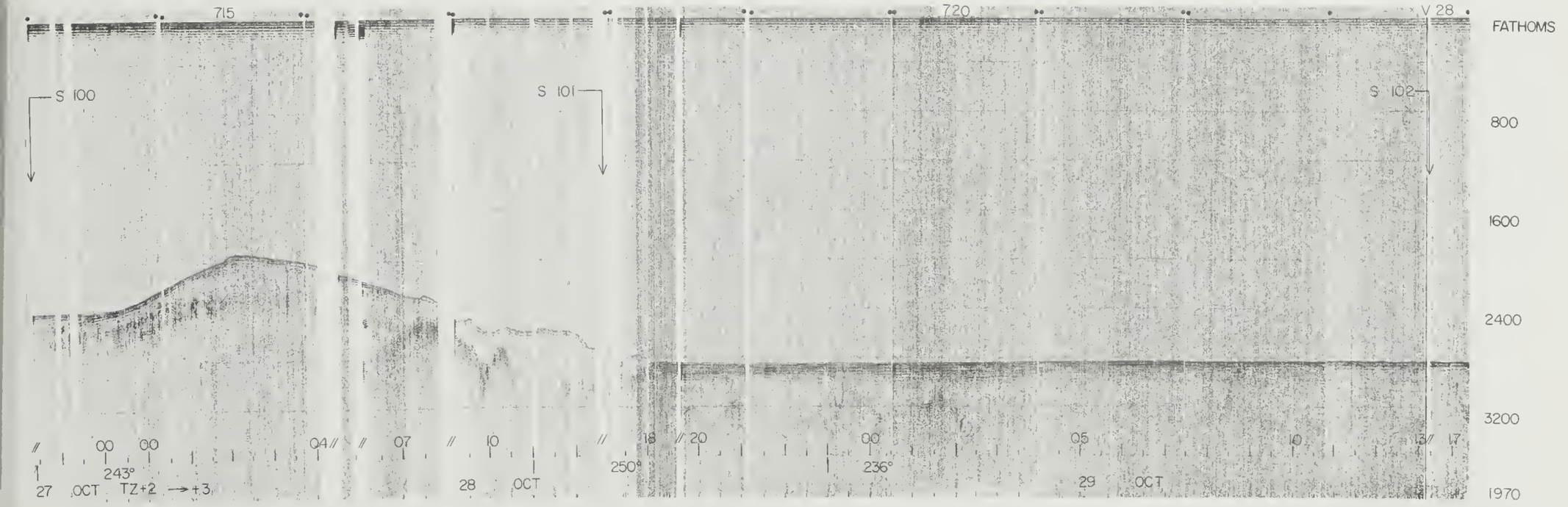

655
S 90
660
V 28
S 91
FATHOMS
800
1600
2400
3200
1970
00
05
10
13// 16
20
18 OCT
00
05
08 // 11
19 OCT


675
680
V 28
FATHOMS
S 94
S 95
R 71
800
1600
2400
3200
1970
09// 12
15 //21
00
05
10
15
20
00
21 OCT
22 OCT
258°

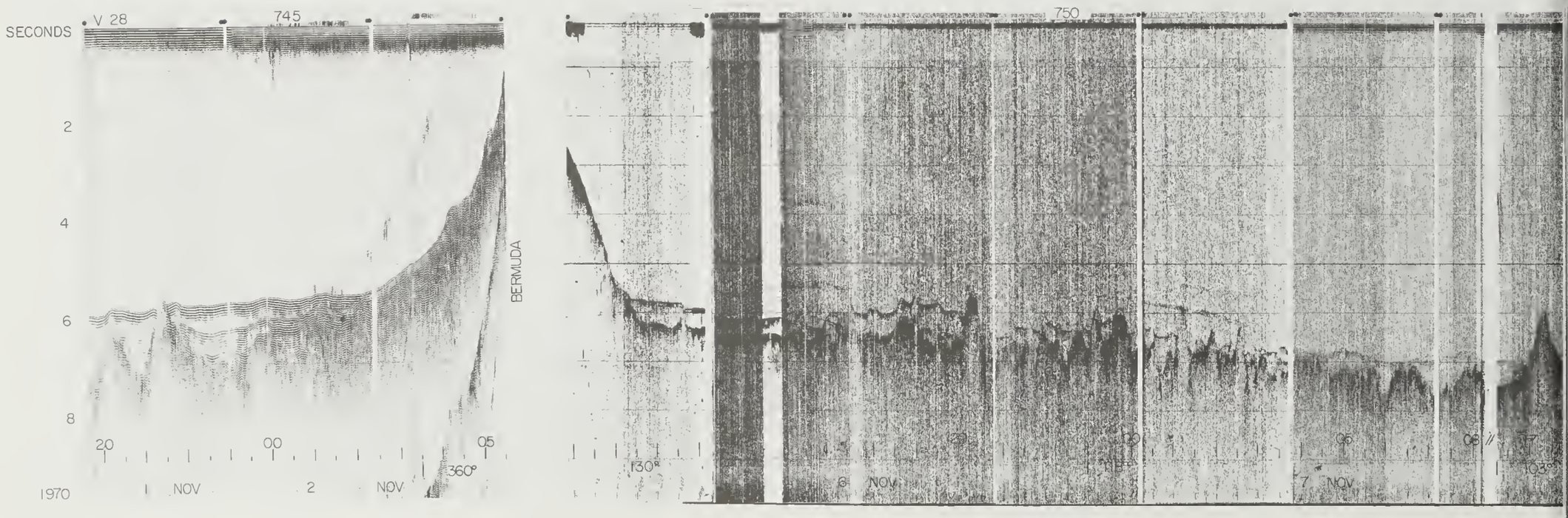

SECONDS
V 28
685
690
S 96
S 97
2
4
6
8
05
08
12
15
20
00
05
09
13
15
263°
243°
259°
239°
23 OCT
24 OCT
1970

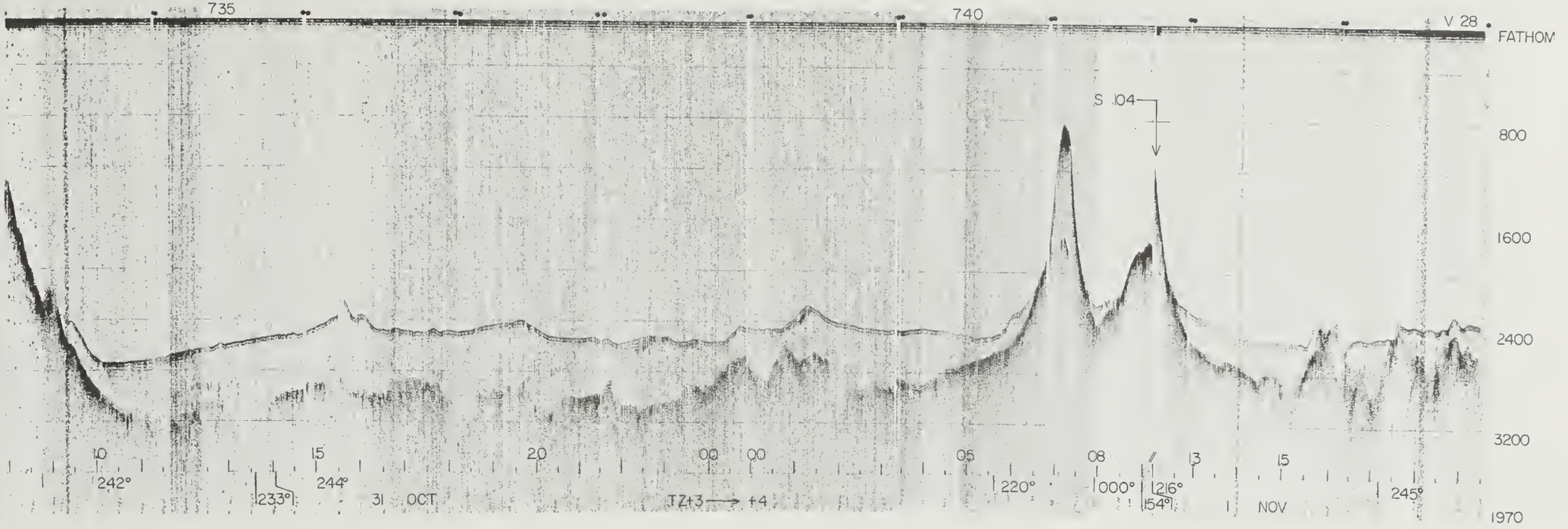

SECONDS
V 28
705
710
712 I
S 98,99
2
4
6
8
05
10
17
20
00
05
10
15
270°
241°
180°
248°
26 OCT
27 OCT
1970

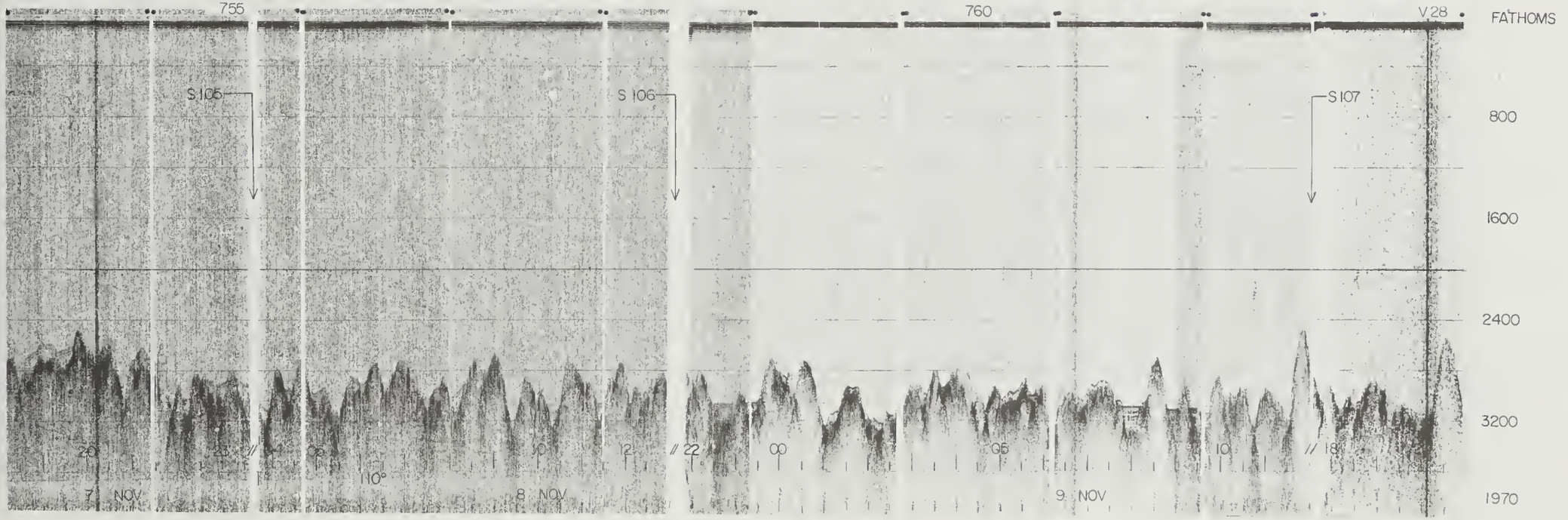

695
700
V 28
FATHOMS
800
1600
2400
3200
1970
20
00
05
10
15
20
00
253°
24 OCT
246°
25 OCT
241°
26 OCT

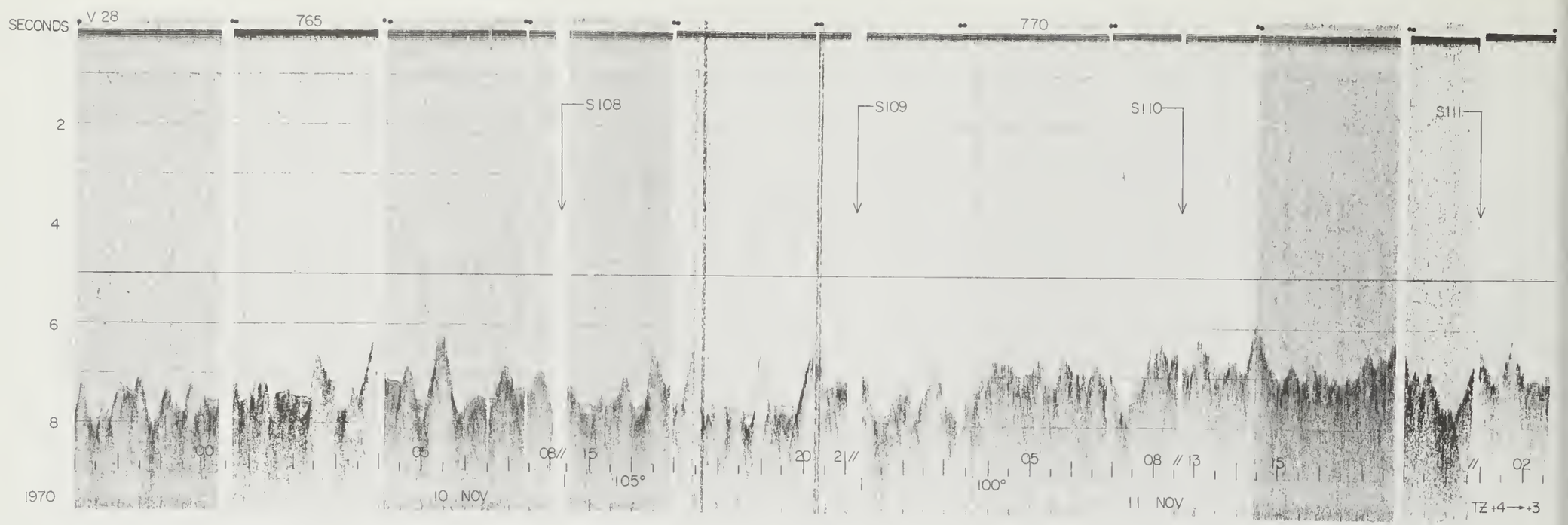

715
720
V 28
FATHOMS
S 100
S 101
S 102
800
1600
2400
3200
1970
00
00
04
07
10
18
20
00
05
10
17
243°
27 OCT TZ+2 → +3
250°
28 OCT
236°
29 OCT

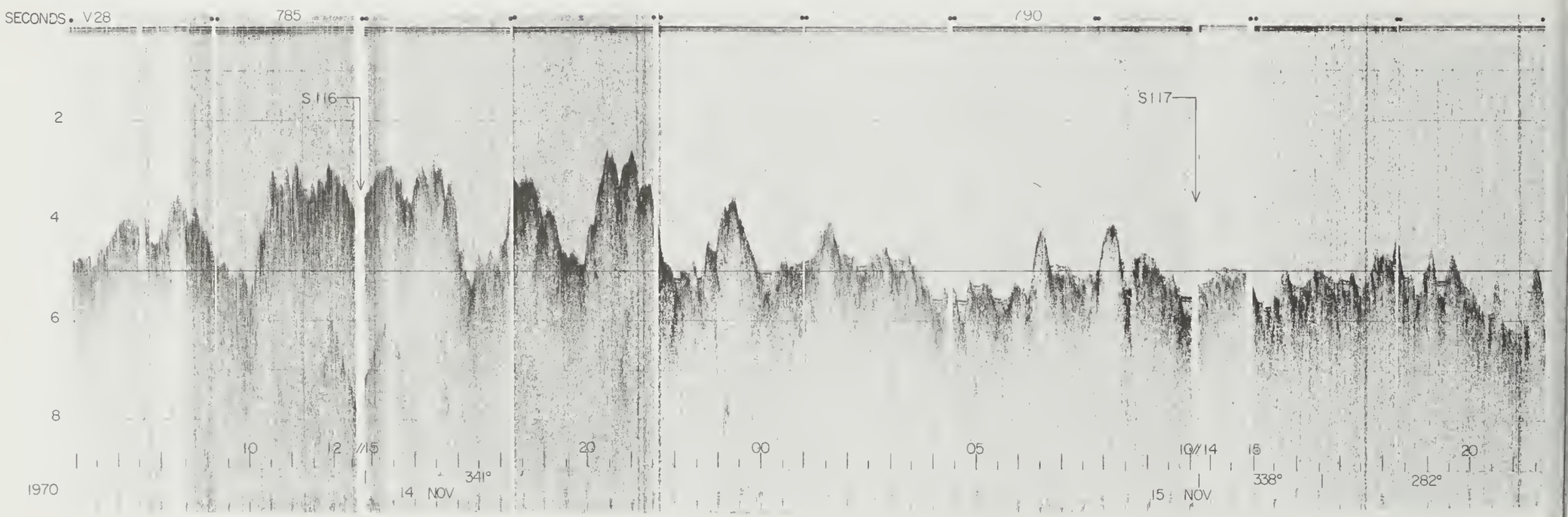

SECONDS
V 28
725
730
2
4
6
8
S 103
20
00
05
10
20
07
000°
1970
29 OCT
30 OCT
233°
31 OCT

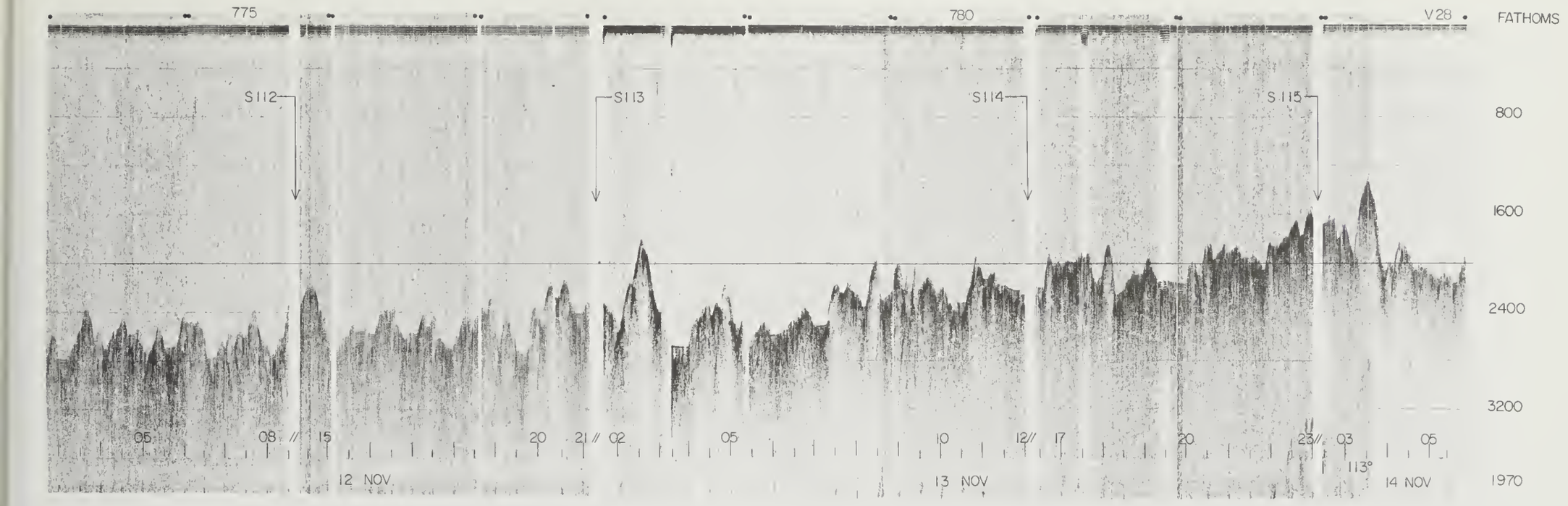

SECONDS
V 28
745
750
2
4
6
8
BERMUDA
20
00
05
360°
1970
NOV
2
NOV
130°
6 NOV
7 NOV
103°

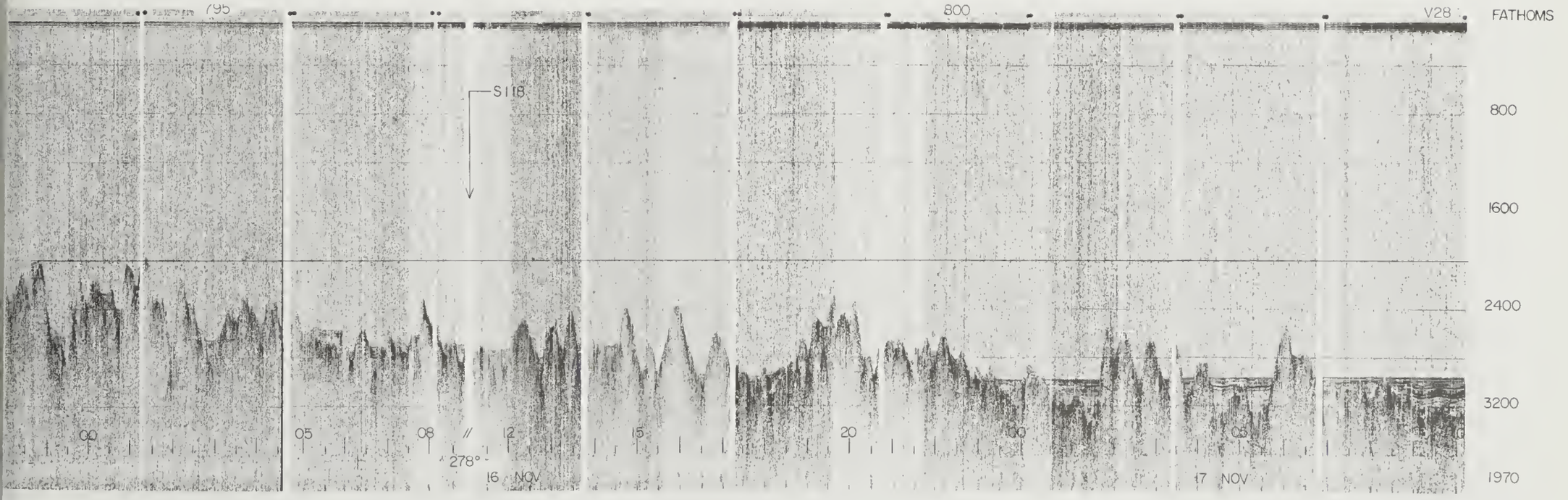

735
740
V 28
FATHOM
S 104
800
1600
2400
3200
1970
10
15
20
00
00
05
08
13
15
242°
233°
244°
31 OCT
TZ+3 → +4
220°
000°
216°
154°
1 NOV
245°

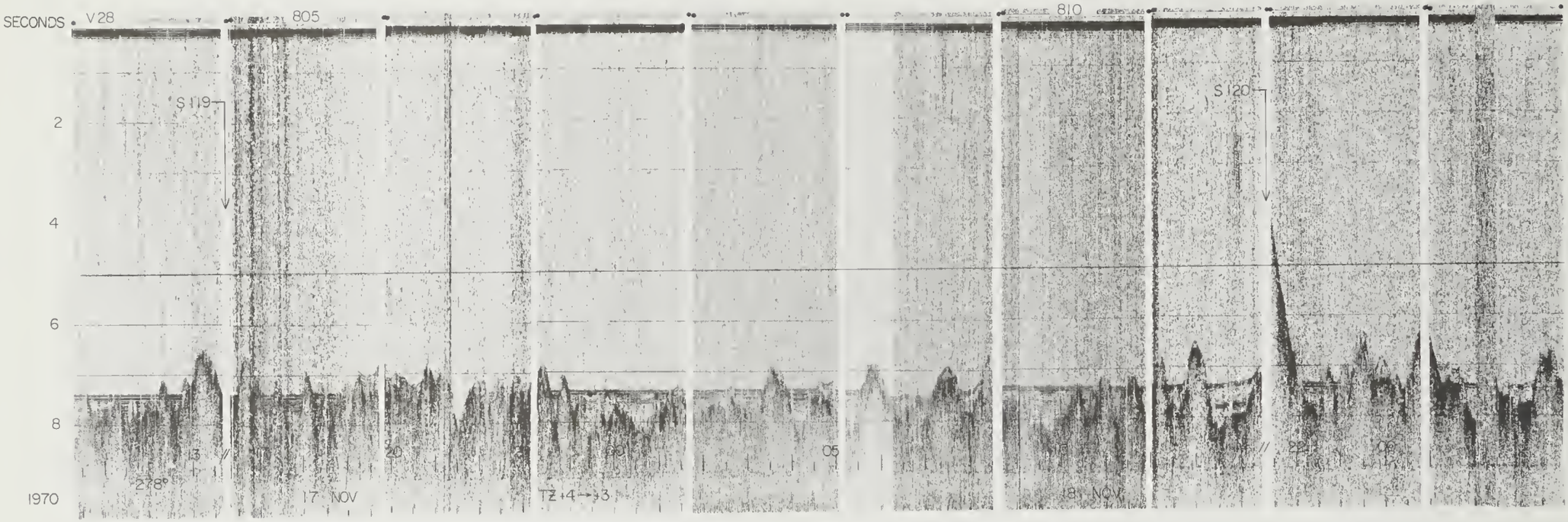

755
760
V28
FATHOMS
S 105
S 106
S 107
800
1600
2400
3200
1970
20
23
00
00
12
22
00
05
10
18
110°
7 NOV
8 NOV
9 NOV

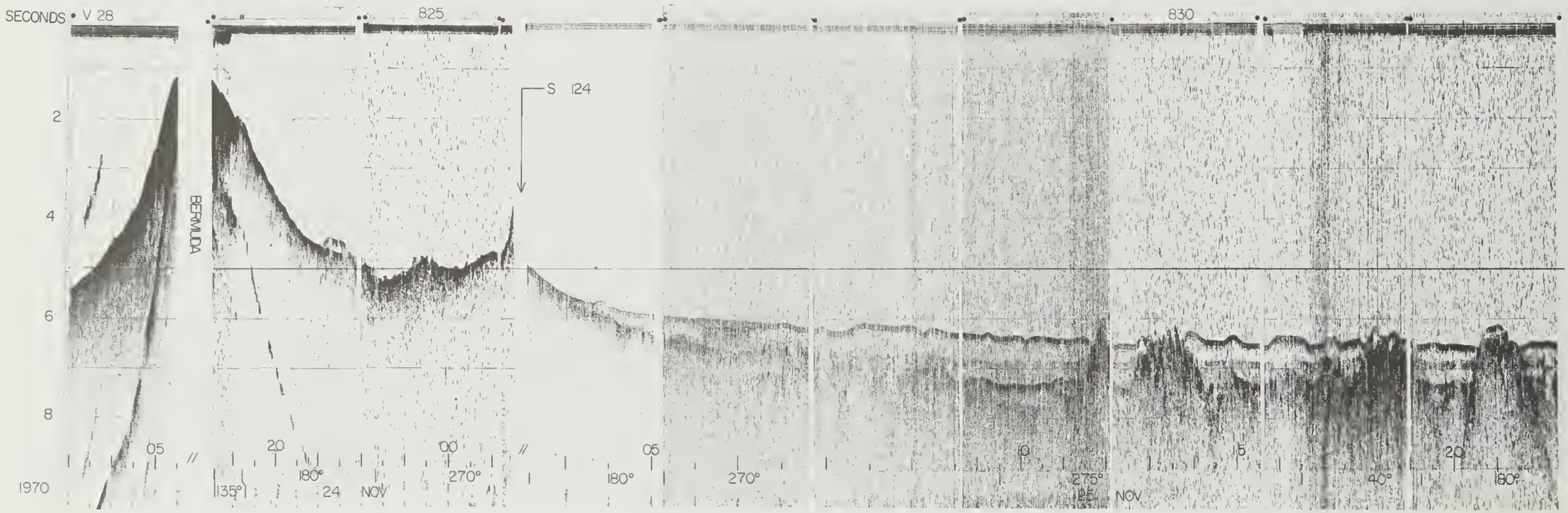

SECONDS
V 28
765
770
S108
S109
S110
S111
2
4
6
8
00
05
08// 15
105°
10 NOV
20
2//
05
100°
08 // 13
15
11 NOV
//
02
TZ +4→+3
1970

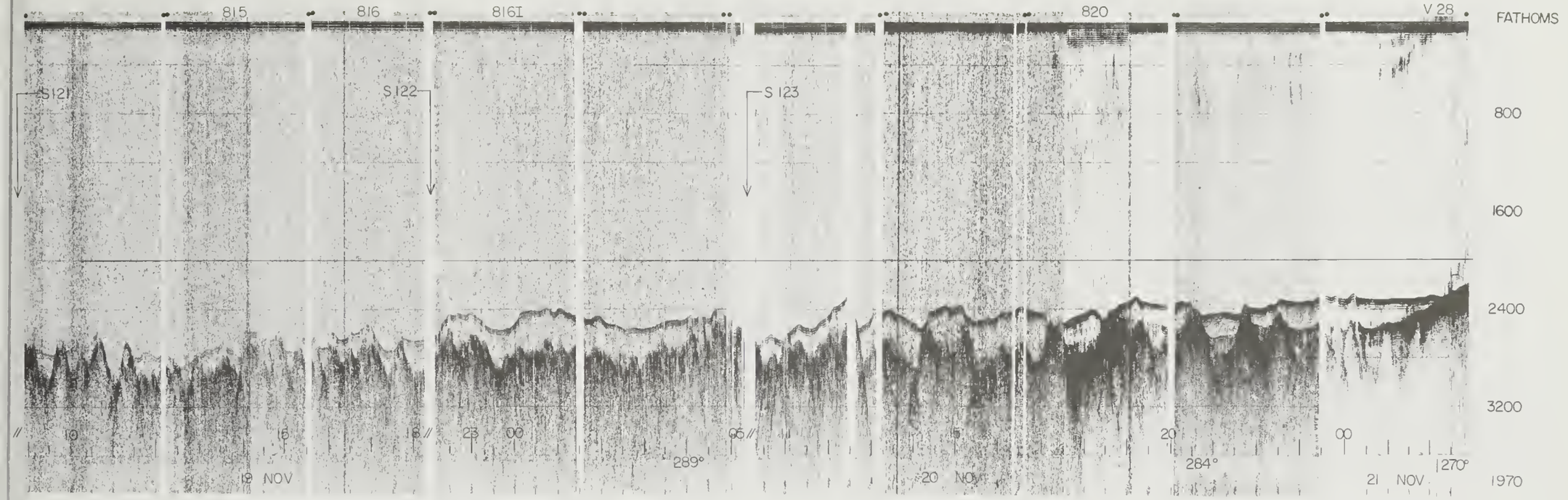

SECONDS
V28
785
790
S116
S117
2
4
6
8
10
12 //15
341°
14 NOV
20
00
05
10//14
15
338°
15 NOV
20
282°
1970

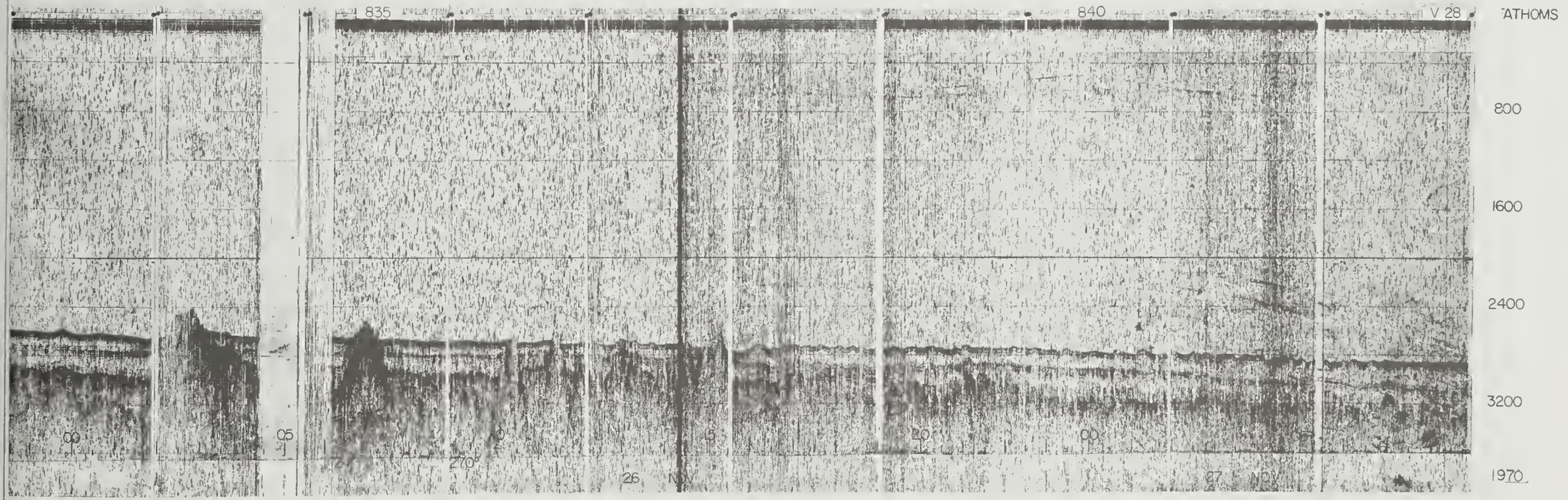

775
780
V28
FATHOMS
S112
S113
S114
S115
800
1600
2400
3200
1970
05
08
//
15
20
21
//
02
05
10
12
//
17
20
23
//
03
05
12 NOV
13 NOV
113°
14 NOV

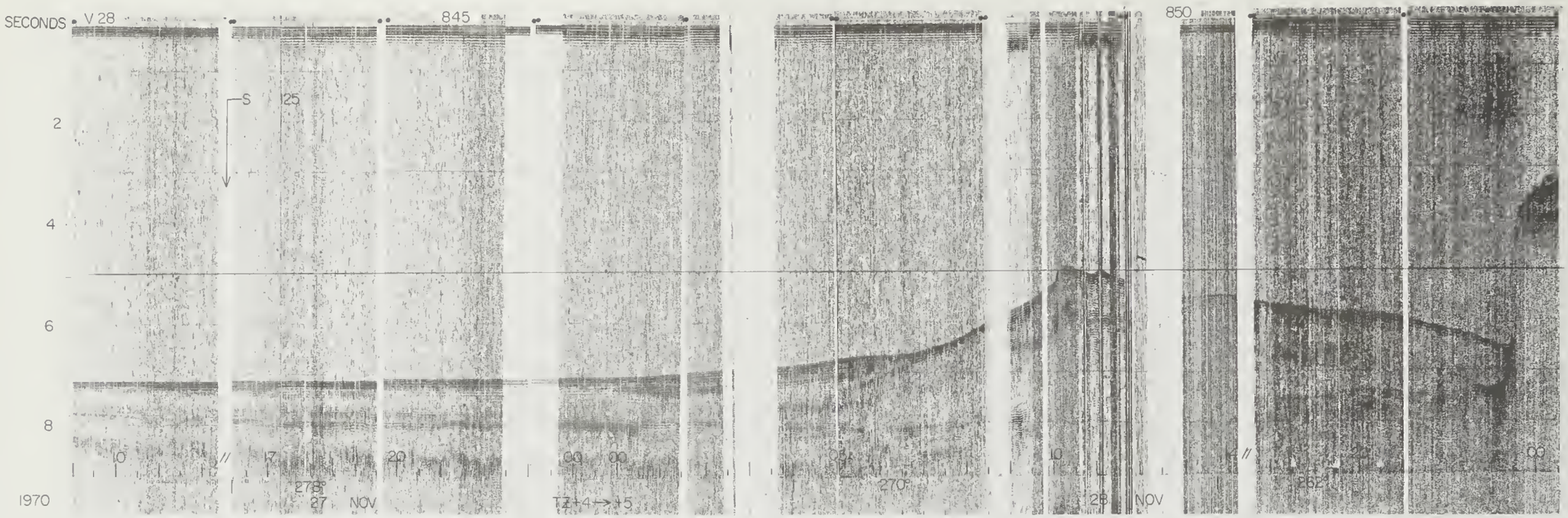

795
800
V28
FATHOMS
S118
800
1600
2400
3200
1970
00
05
08
//
12
15
20
00
05
278°
16 NOV
17 NOV

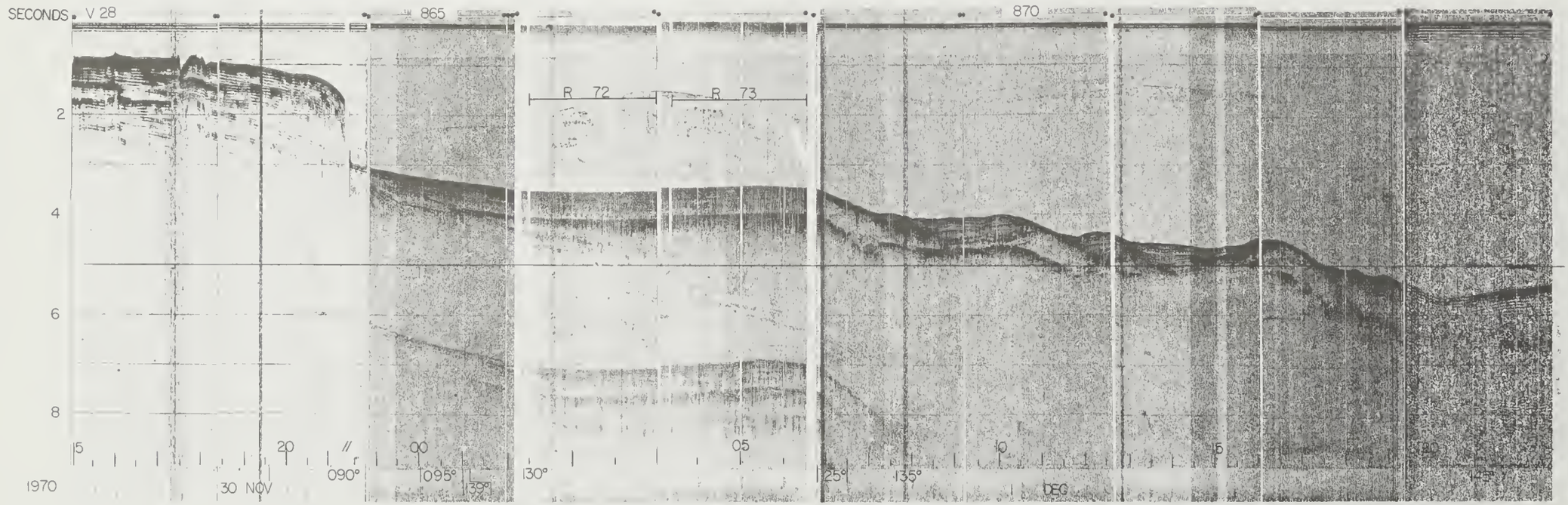

SECONDS
V 28
805
810
S 119
S 120
2
4
6
8
1970
278°
17 NOV
TZ+4→+3
18 NOV

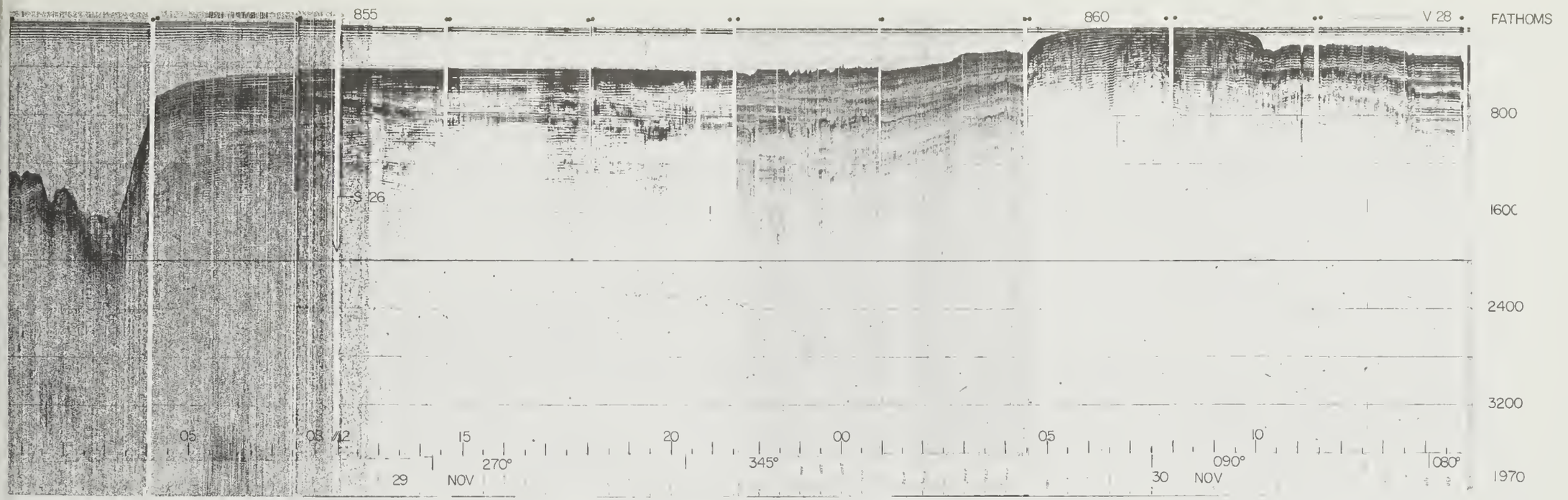

SECONDS
V 28
825
830
S 124
BERMUDA
2
4
6
8
1970
135°
24 NOV
180°
270°
180°
270°
275°
25 NOV
40°
180°

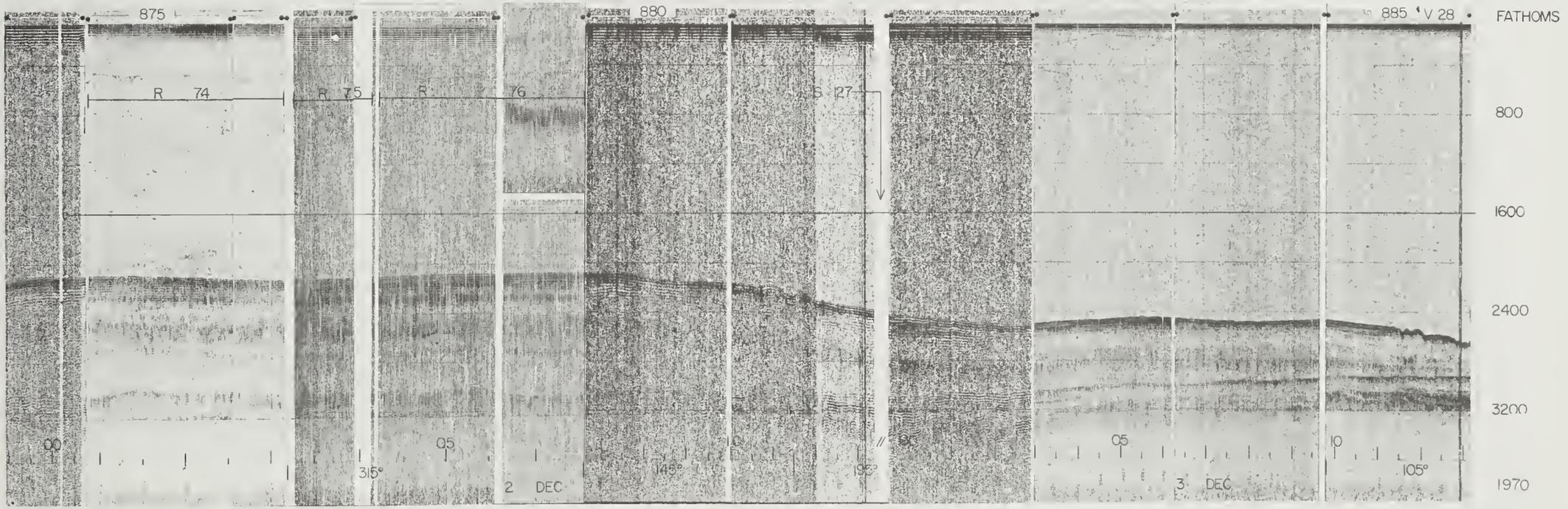

815
816
816I
820
V 28
FATHOMS
S121
S122
S 123
800
1600
2400
3200
1970
10
16
18
23
00
18 NOV
289°
05
5
20
00
20 NOV
284°
270°
21 NOV

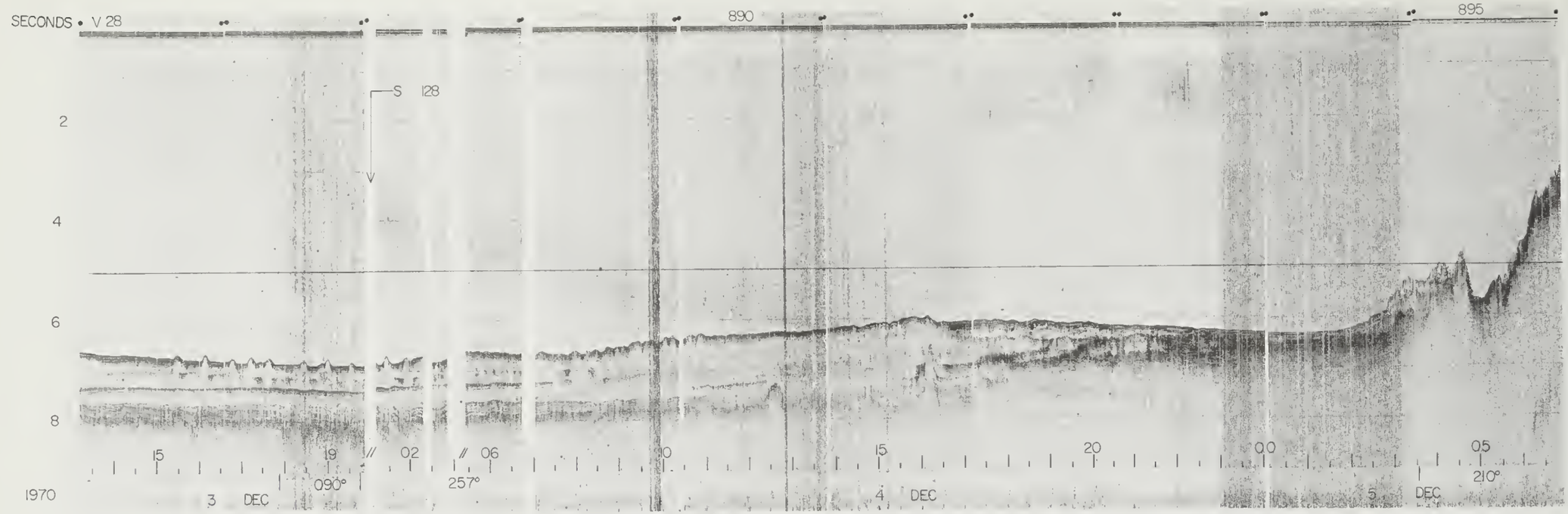

835
840
V 28
FATHOMS
800
1600
2400
3200
1970
00
05
20
00
26 NOV
27 NOV

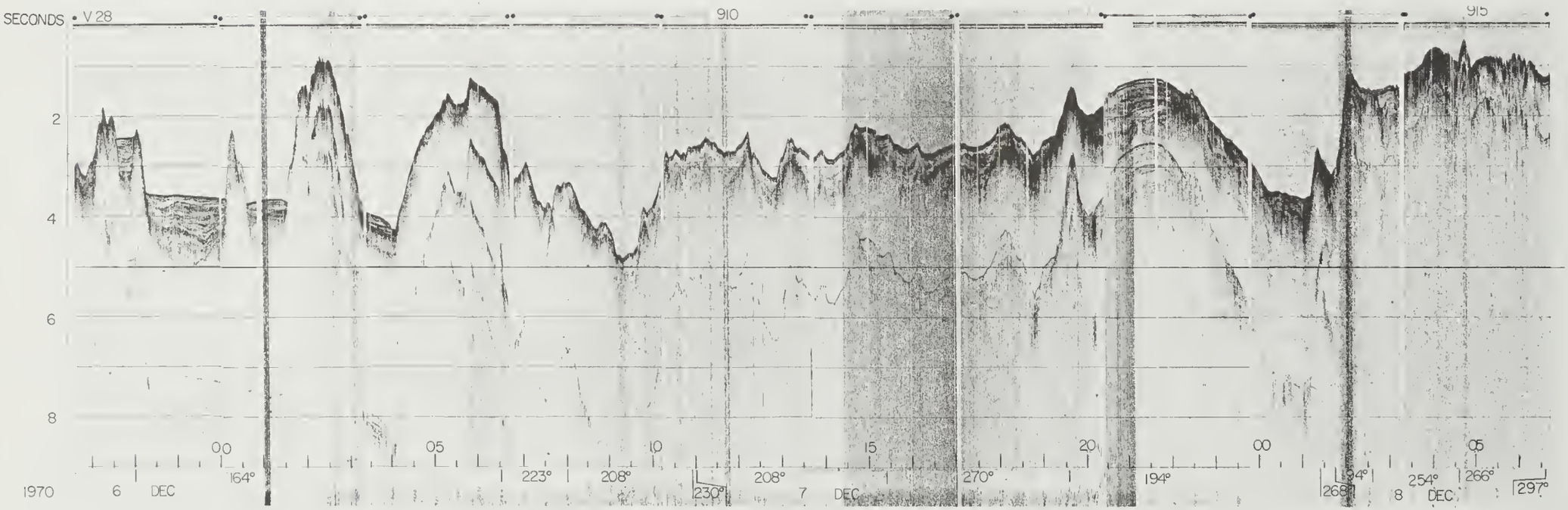

SECONDS
V 28
845
850
S
125
2
4
6
8
10
17
20
00
00
08
10
00
278°
27 NOV
TZ+4 → +5
270°
28 NOV
262°
1970

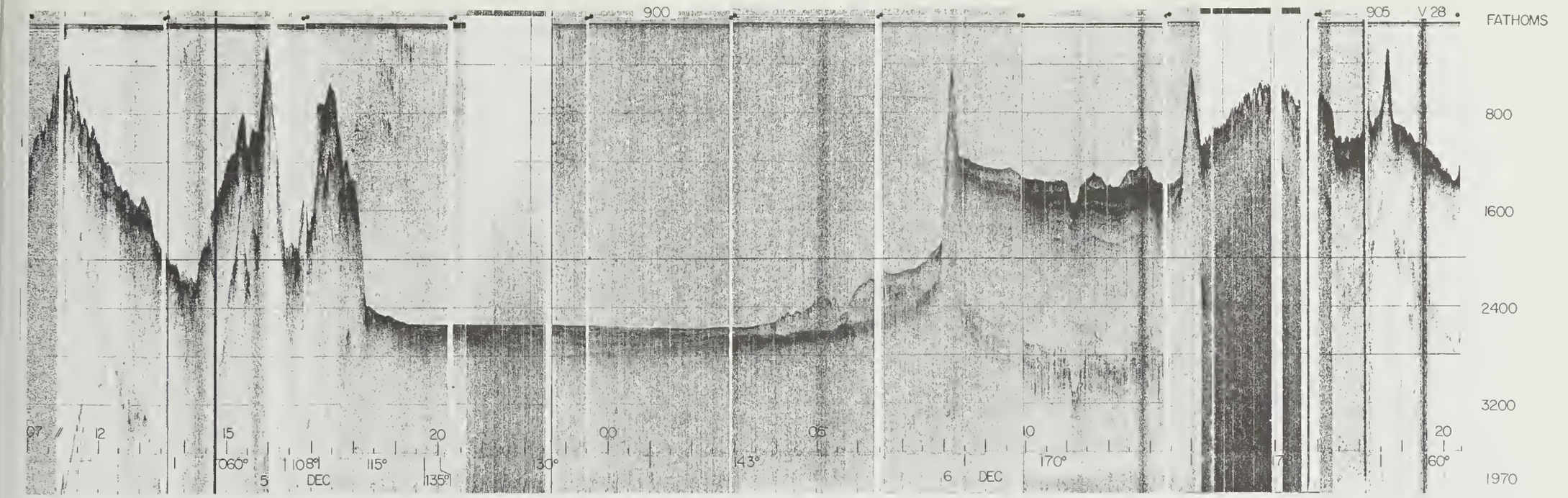

SECONDS
V 28
865
870
R 72
R 73
2
4
6
8
15
20
00
05
10
15
090°
095°
130°
135°
DEG
30 NOV
1970

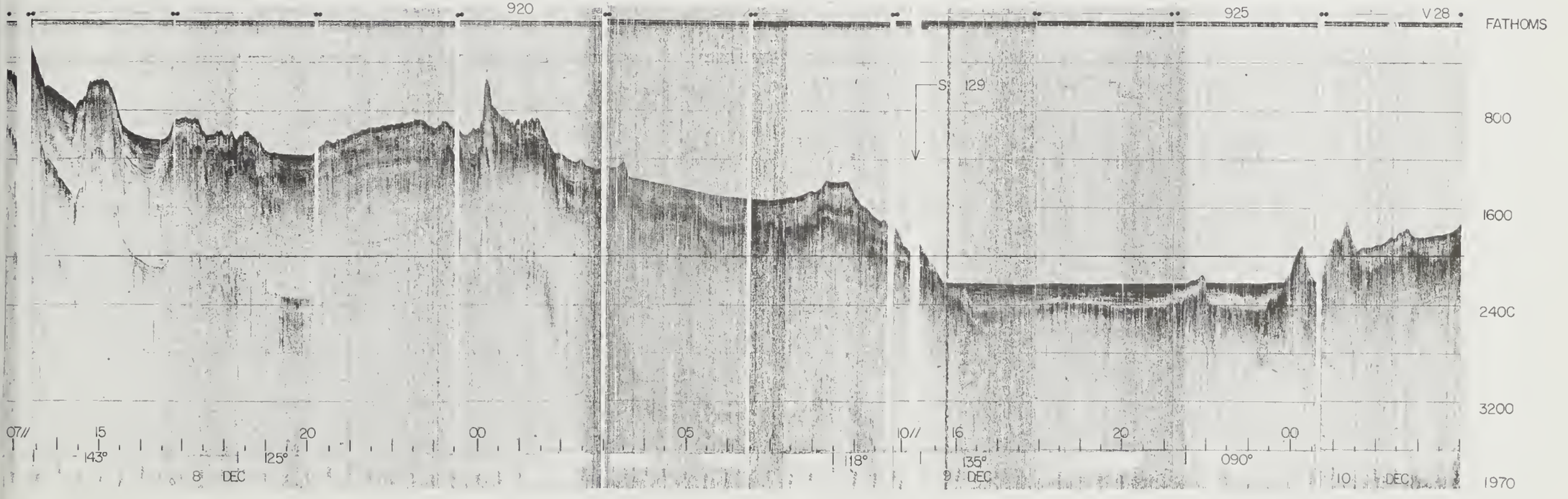

855
860
V 28
FATHOMS
800
1600
2400
3200
1970
S 26
05
08
12
15
20
00
05
10
270°
345°
090°
080°
29 NOV
30 NOV

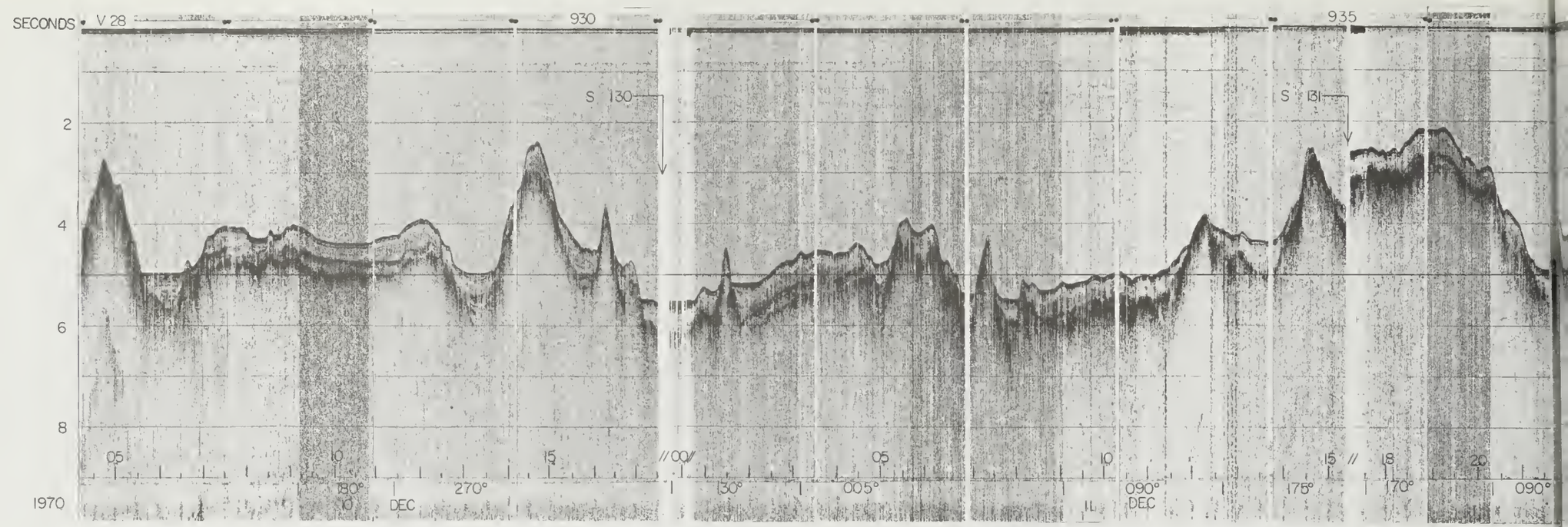

875
880
885
V 28
FATHOMS
800
1600
2400
3200
1970
R 74
R 75
R 76
S 27
00
05
05
10
315°
145°
195°
105°
2 DEC
3 DEC

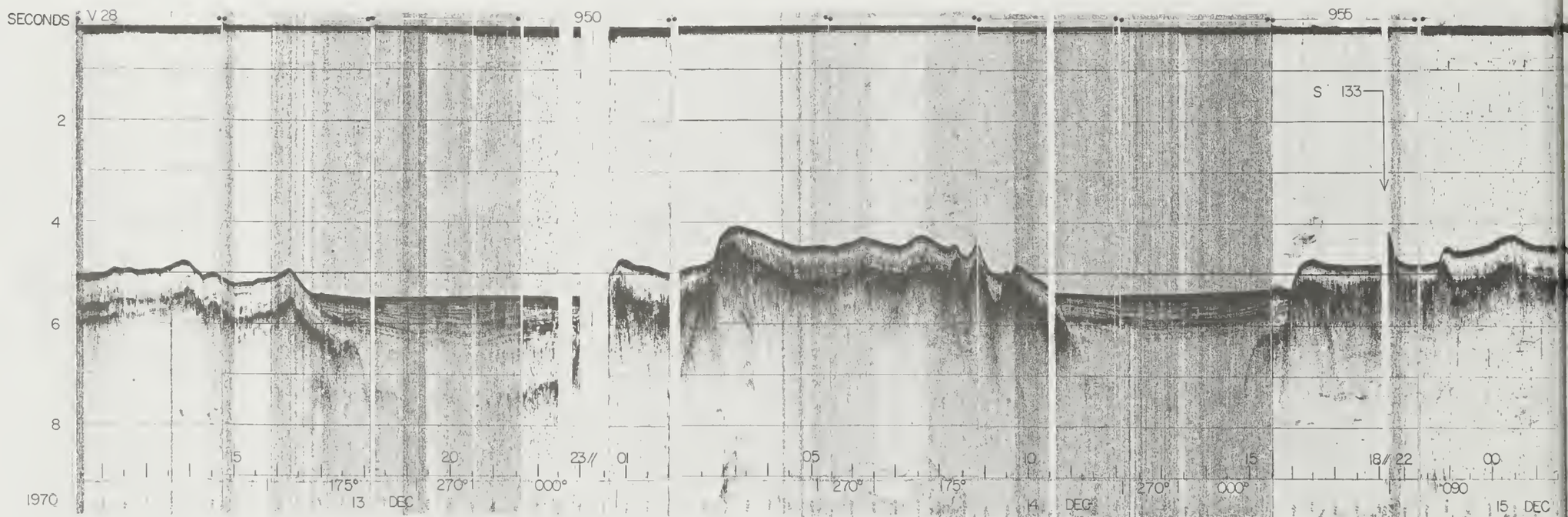

SECONDS • V 28
890
895
S 128
2
4
6
8
15
19
02
06
10
15
20
00
05
1970
3 DEC
090°
257°
4 DEC
5 DEC
210°

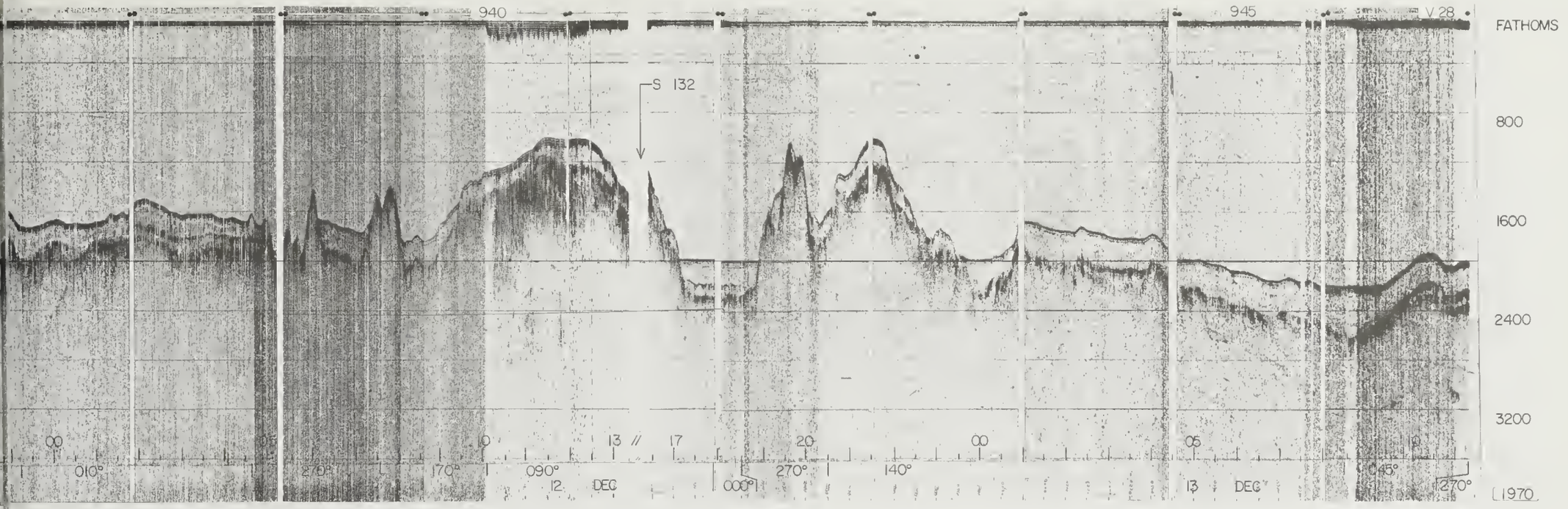

SECONDS • V 28
910
915
2
4
6
8
00
05
10
15
20
00
05
1970
6 DEC
164°
223°
208°
230°
208°
7 DEC
270°
194°
268°
254°
266°
297°
8 DEC

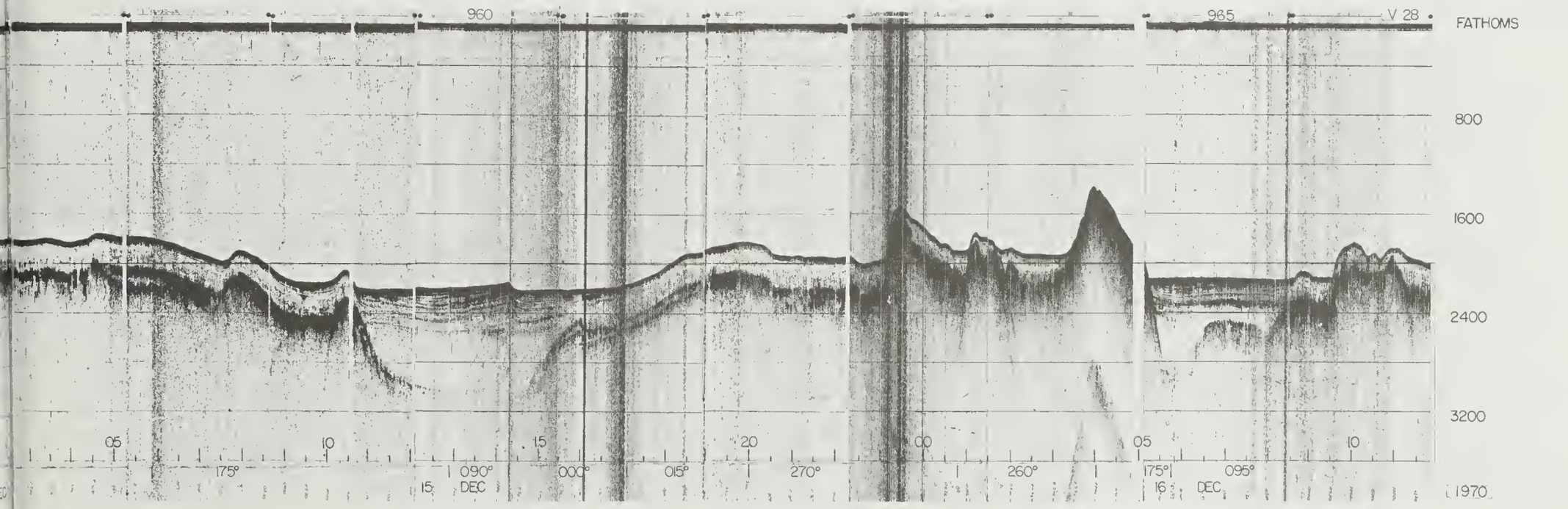

900
905
V 28
FATHOMS
800
1600
2400
3200
1970
07
12
15
20
00
05
10
20
060°
108°
115°
135°
30°
143°
170°
160°
5 DEC
6 DEC
7

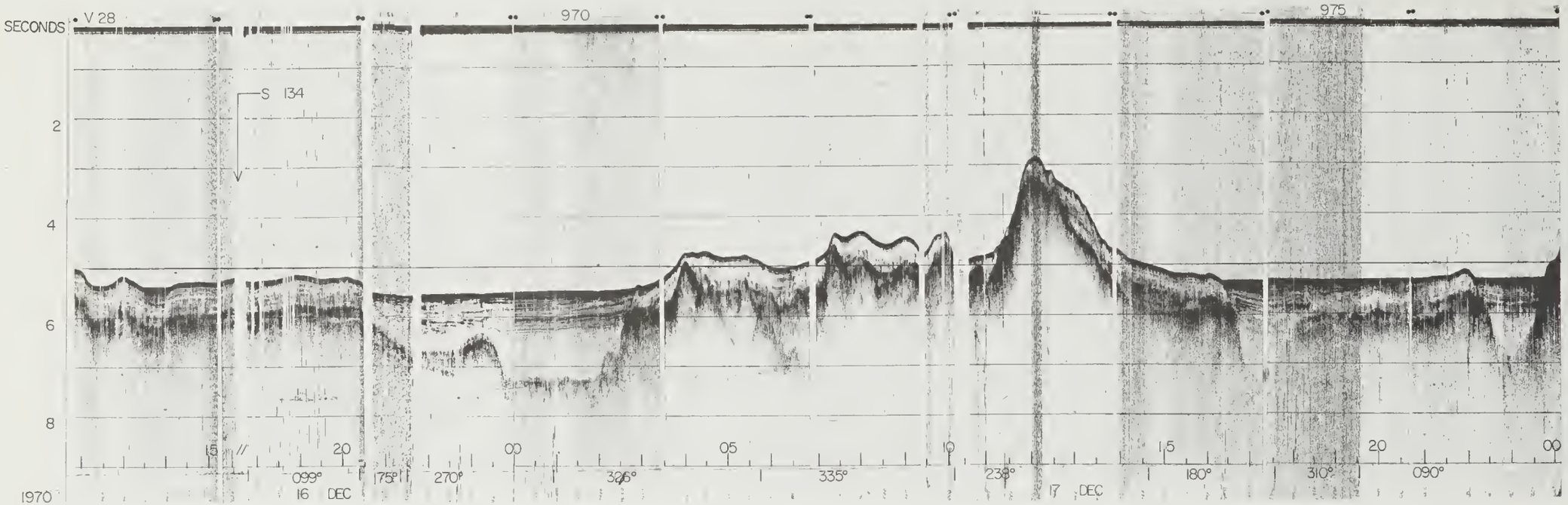

920
925
V 28
FATHOMS
S 129
800
1600
2400
3200
1970
07//
15
20
00
05
10//
16
20
00
143°
125°
118°
135°
090°
8 DEC
9 DEC
10 DEC

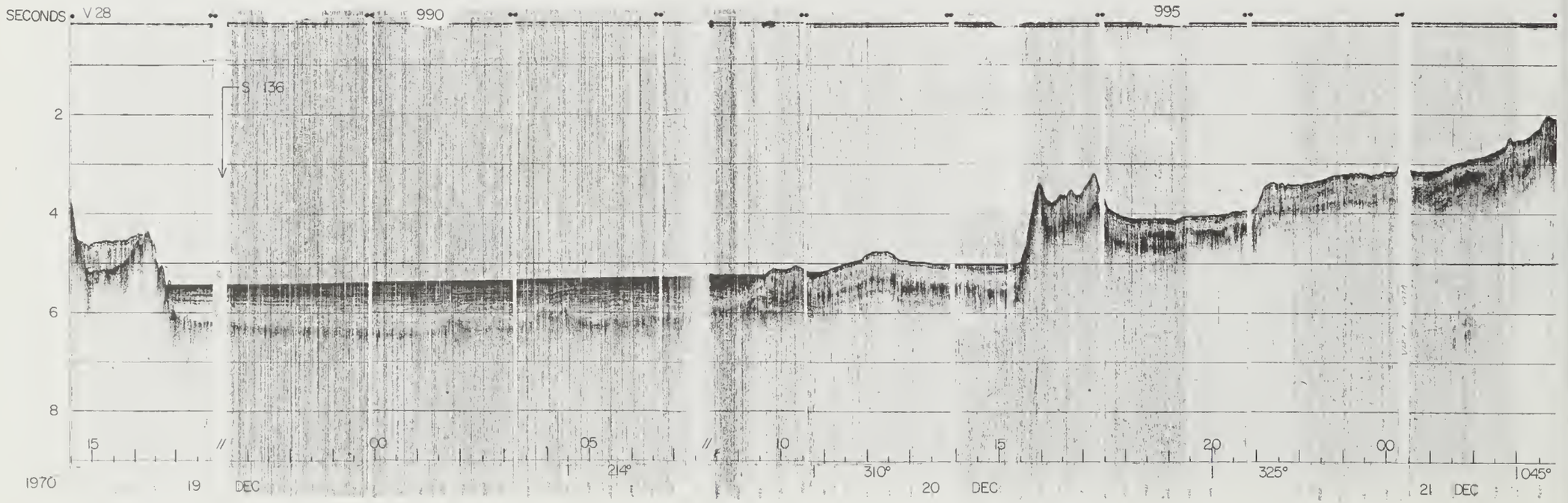

SECONDS
V 28
930
935
S 130
S 131
2
4
6
8
05
10
15
00
05
10
15
18
20
180°
270°
130°
005°
090°
175°
170°
090°
10
DEC
11
DEC
1970

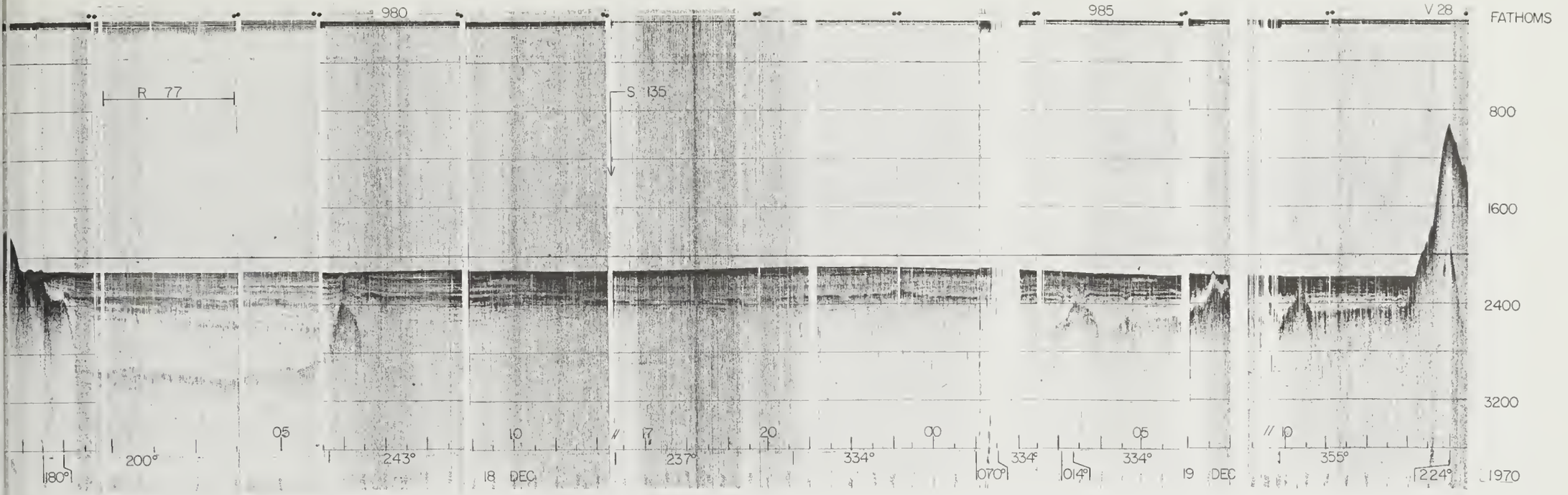

SECONDS
V 28
950
955
S 133
2
4
6
8
15
20
23
01
05
10
15
18
22
00
175°
270°
000°
270°
175°
270°
000°
090°
13
DEC
14
DEC
15
DEC
1970

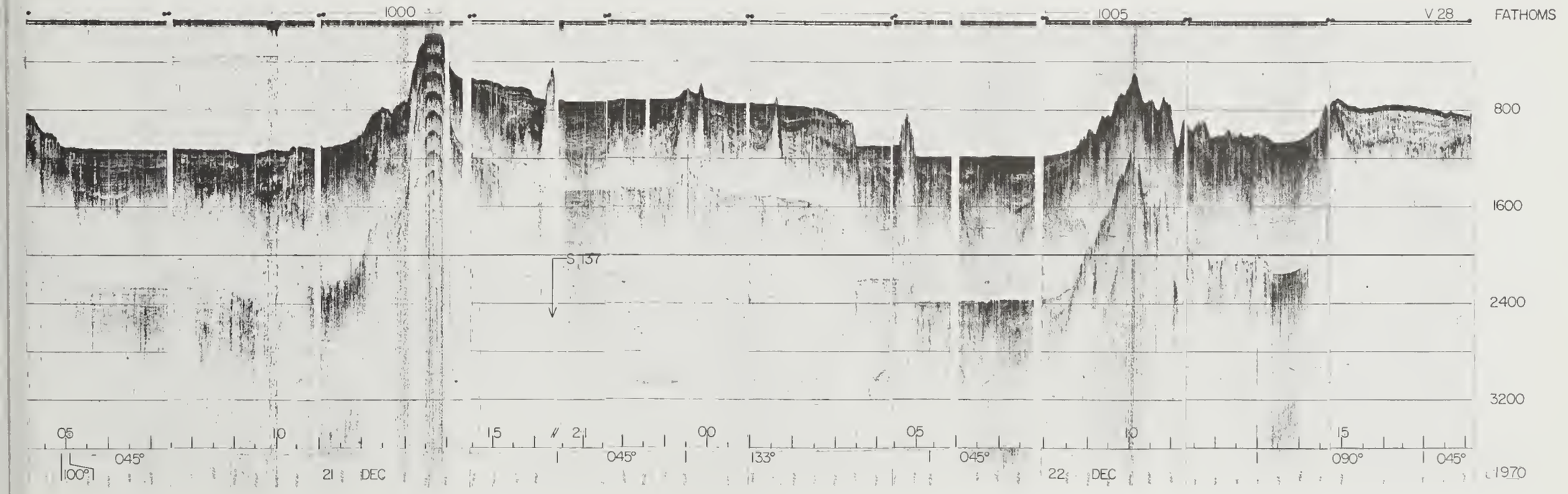

940
945
V 28
FATHOMS
S 132
800
1600
2400
3200
00
05
10
13 //
17
20
00
05
10
010°
270°
170°
090°
12 DEC
000°
270°
140°
13 DEC
045°
270°
1970

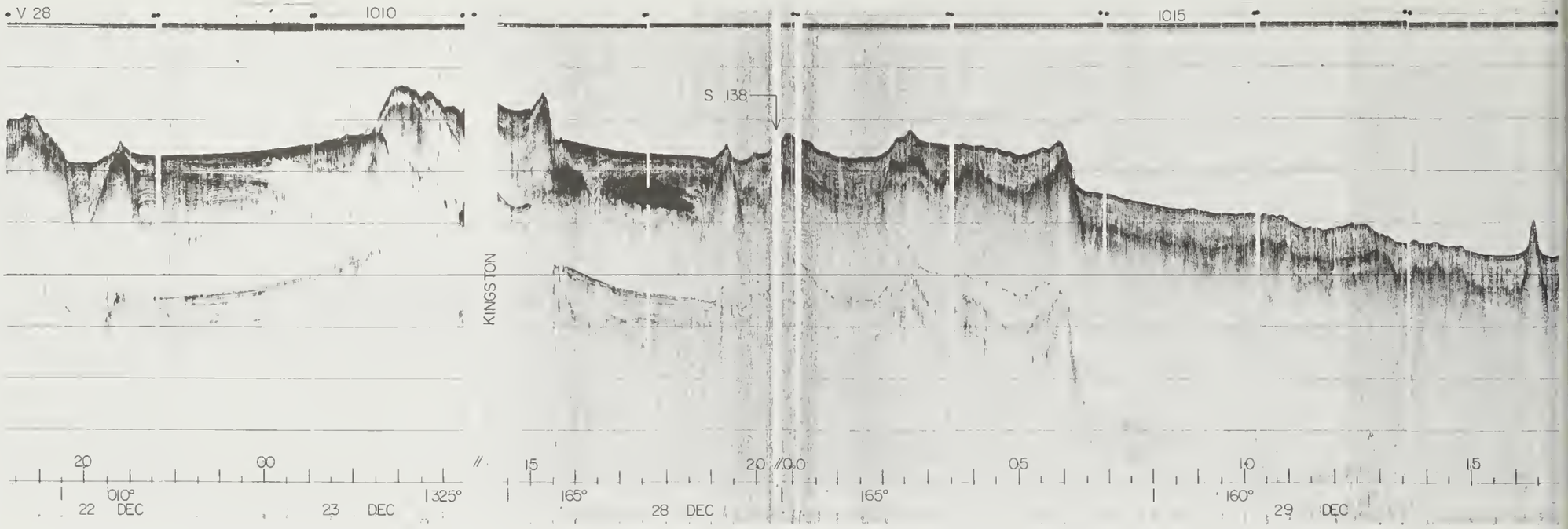

960
965
V 28
FATHOMS
800
1600
2400
3200
05
10
15
20
00
05
10
175°
090°
15 DEC
000°
015°
270°
260°
175°
095°
16 DEC
1970

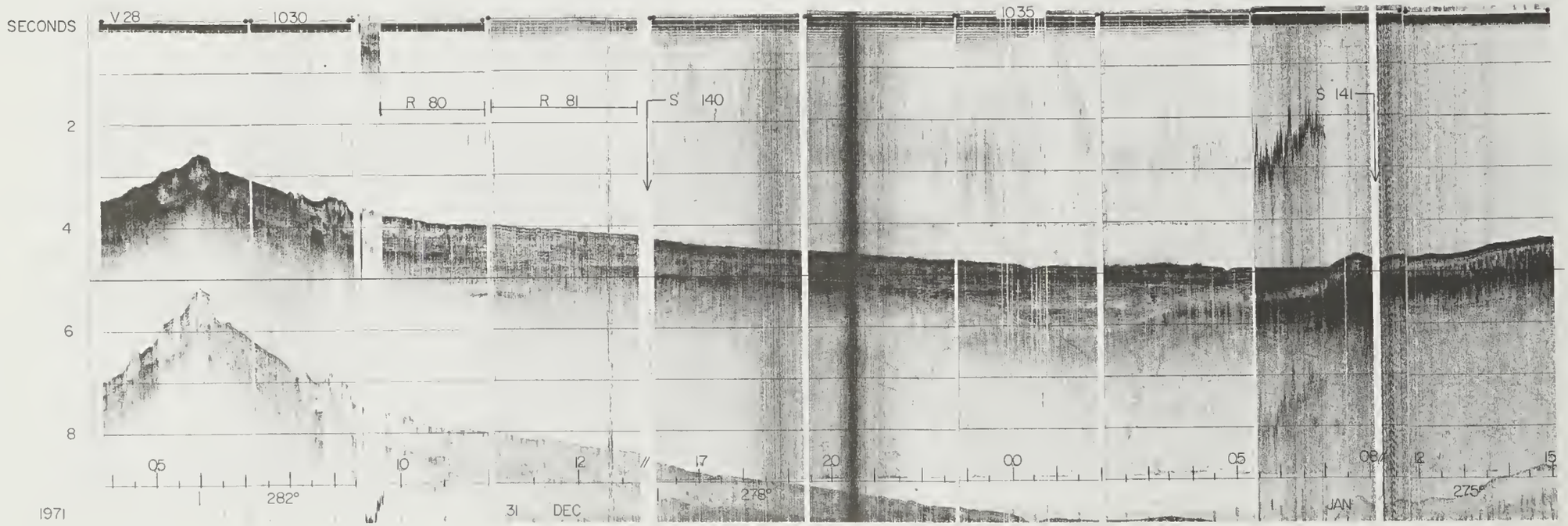

SECONDS
V 28
970
975
S 134
2
4
6
8
15
20
00
05
10
15
20
00
099°
175°
270°
326°
335°
238°
180°
310°
090°
1970
16 DEC
17 DEC

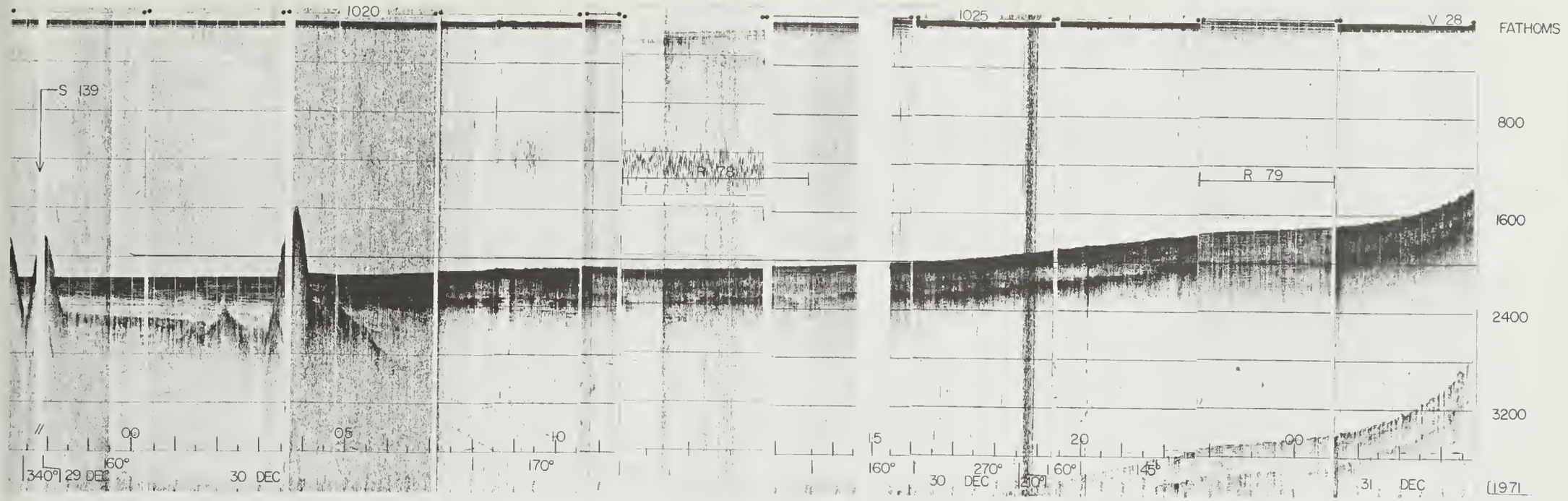

SECONDS
V 28
990
995
S 136
2
4
6
8
15
00
05
10
15
20
00
214°
310°
325°
1045°
1970
19 DEC
20 DEC
21 DEC

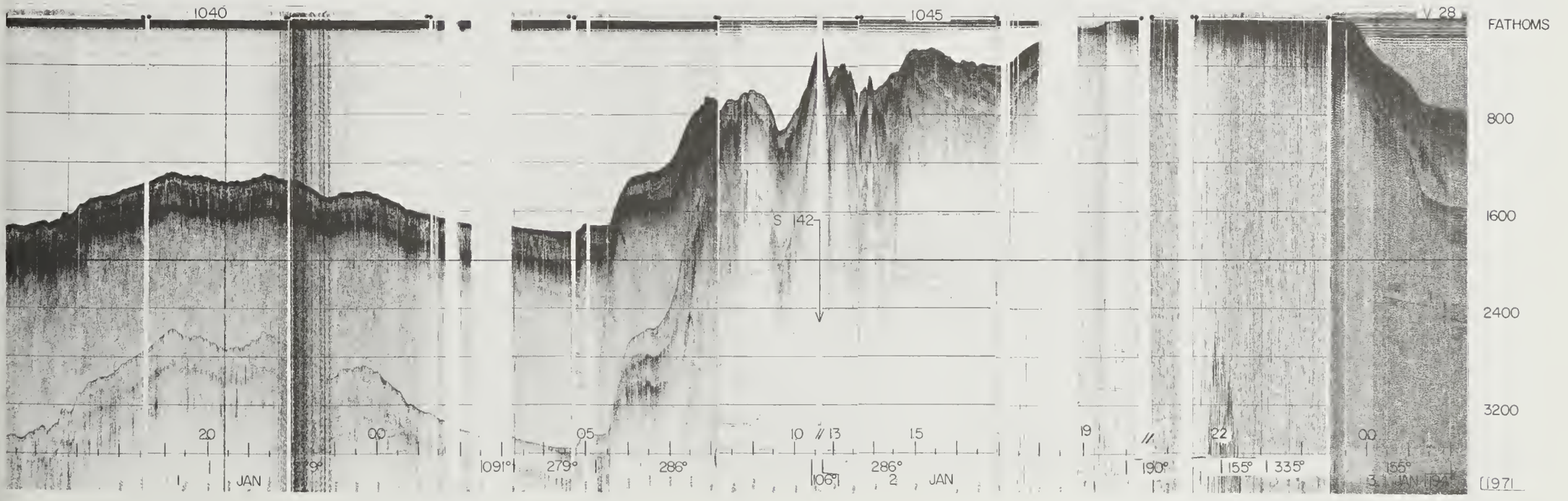

980
985
V 28
FATHOMS
R 77
S 135
800
1600
2400
3200
1970
05
10
15
20
00
05
10
180°
200°
243°
237°
334°
070°
334°
014°
334°
355°
224°
18 DEC
19 DEC

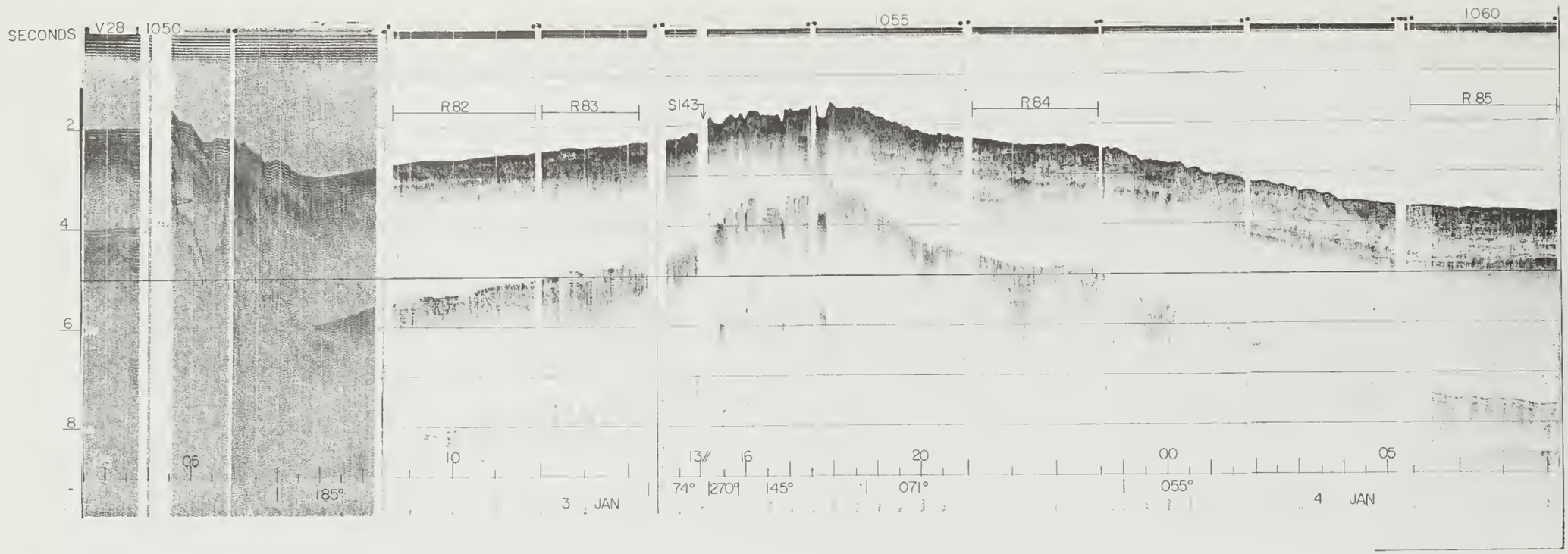

1000
1005
V 28
FATHOMS
S 137
800
1600
2400
3200
1970
05
10
15
21
00
05
10
15
100°
045°
045°
133°
045°
090°
045°
21 DEC
22 DEC

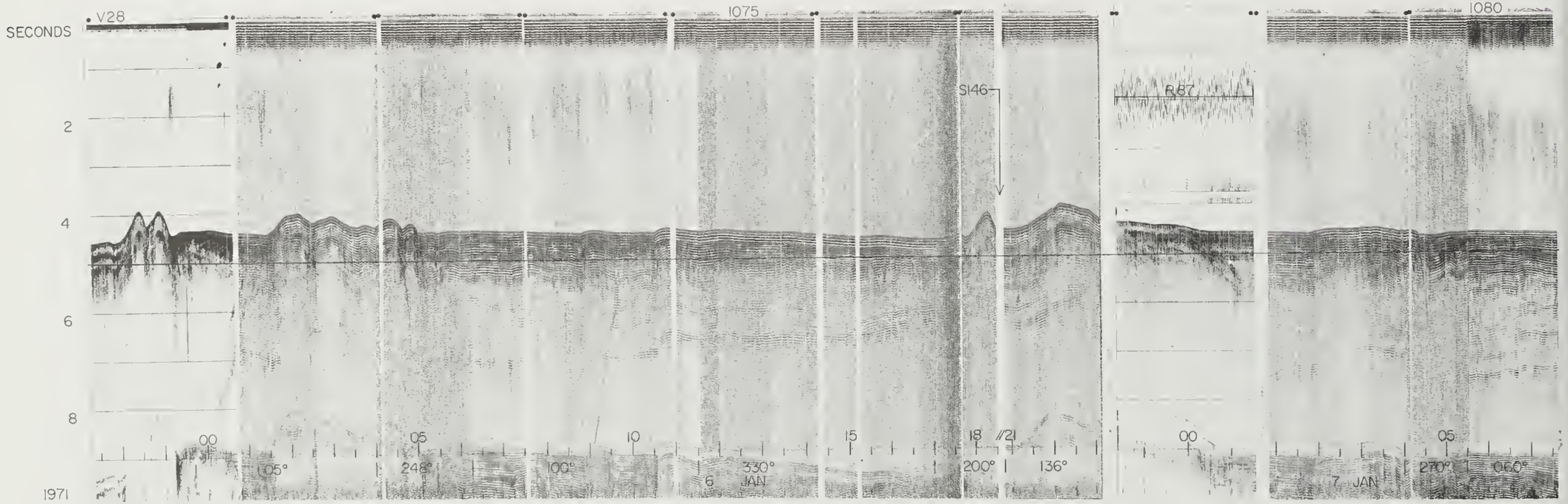

V 28
1010
1015
S 138
KINGSTON
20
00
15
20
00
05
10
15
010°
325°
165°
165°
160°
22 DEC
23 DEC
28 DEC
29 DEC

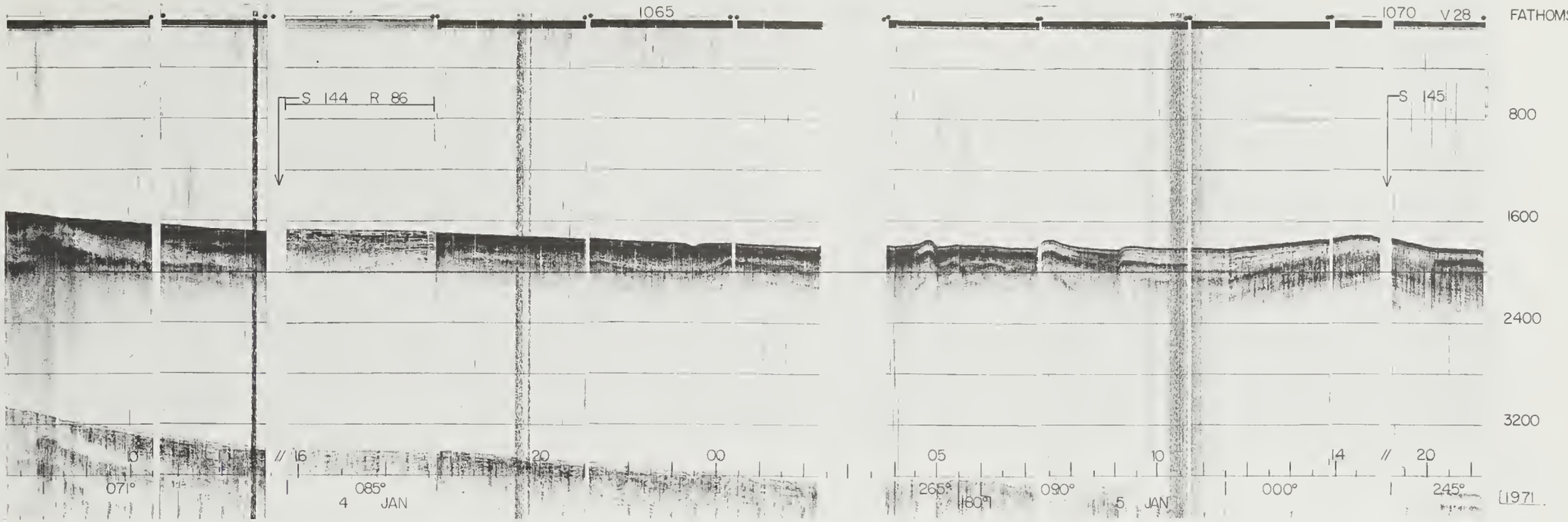

SECONDS
2
4
6
8
V 28
1030
1035
R 80
R 81
S 140
S 141
05
10
12
17
20
00
05
08
12
15
282°
278°
275°
31 DEC
JAN
1971

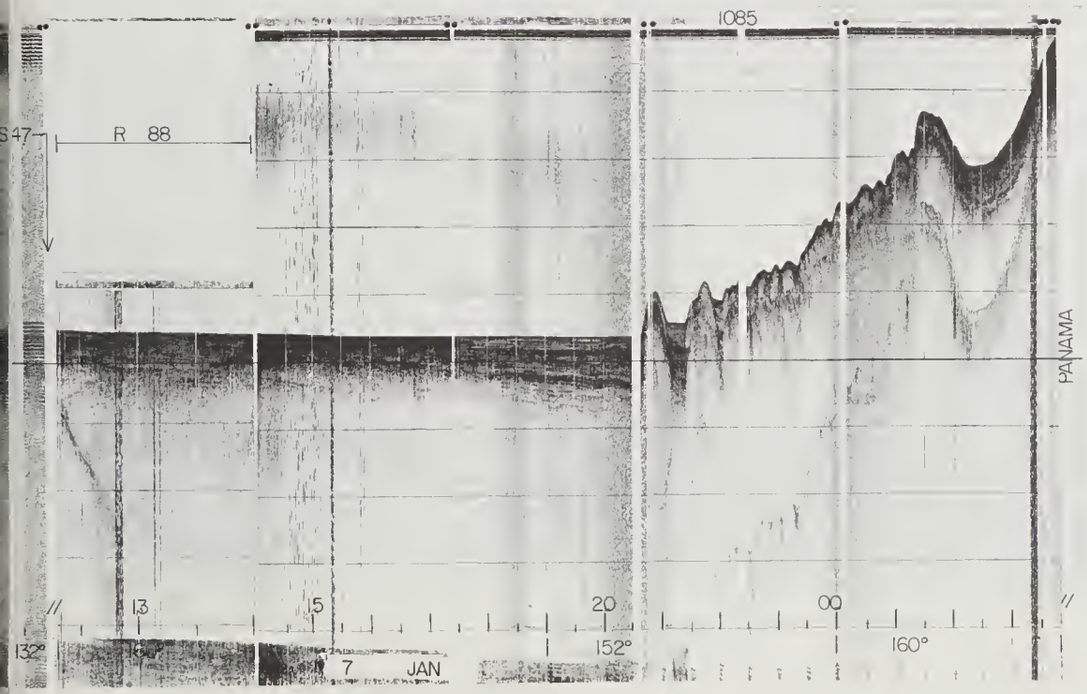

1020
S 139
R 78
1025
V 28
R 79
FATHOMS
800
1600
2400
3200
00
05
10
15
20
00
340°
29 DEC
160°
30 DEC
170°
160°
270°
30 DEC
260°
160°
45°
31 DEC
1971

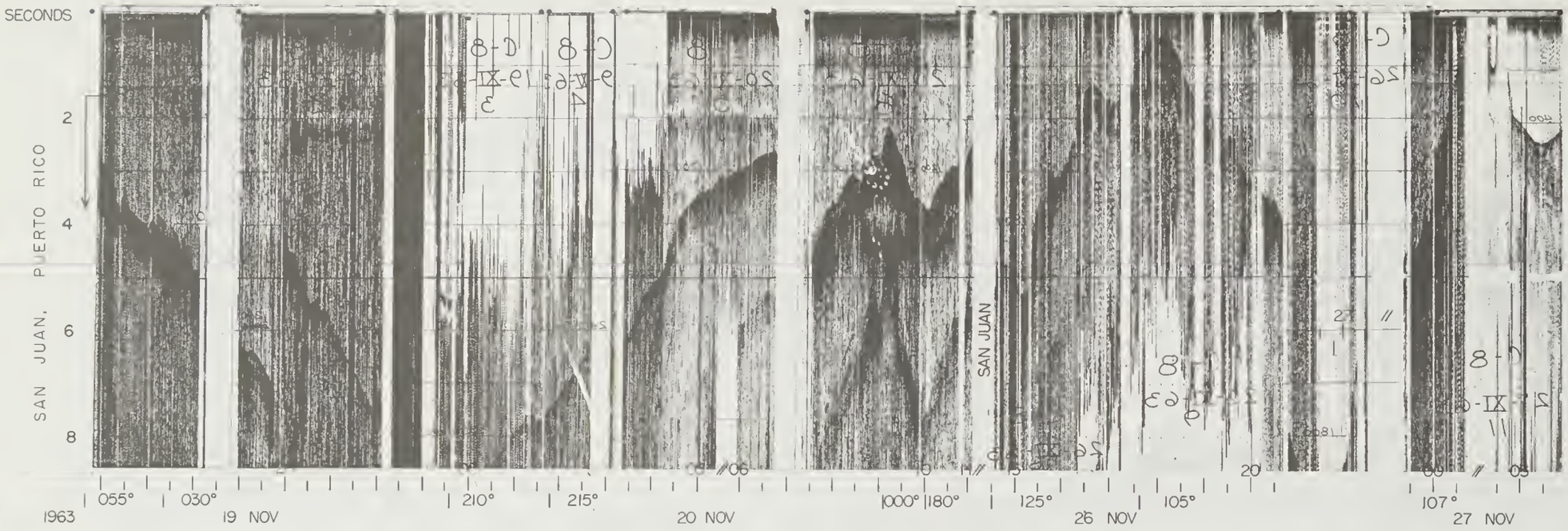

1040
1045
V 28
FATHOMS
800
1600
2400
3200
S 142
20
00
05
10
13
15
19
22
00
JAN
109°
279°
286°
106°
286°
2
JAN
190°
155°
335°
155°
3
JAN
1971

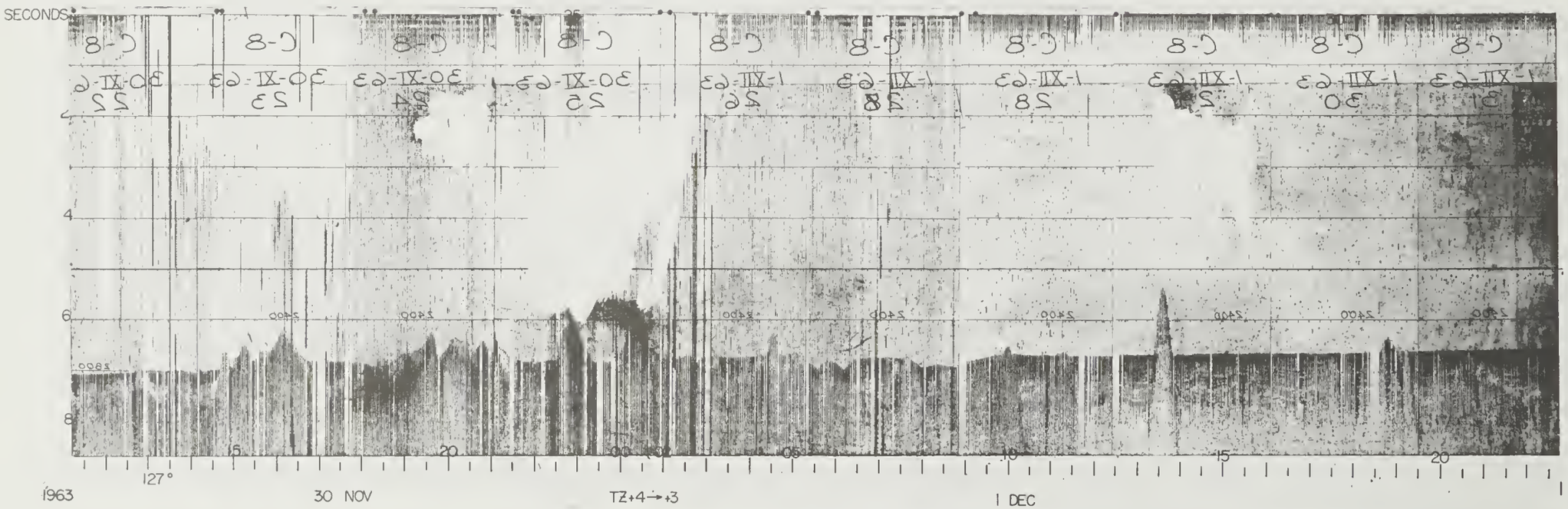

SECONDS
V28
1050
1055
1060
R82
R83
S143
R84
R85
2
4
6
8
05
185°
10
3 JAN
13
16
20
74°
270°
145°
071°
00
05
055°
4 JAN

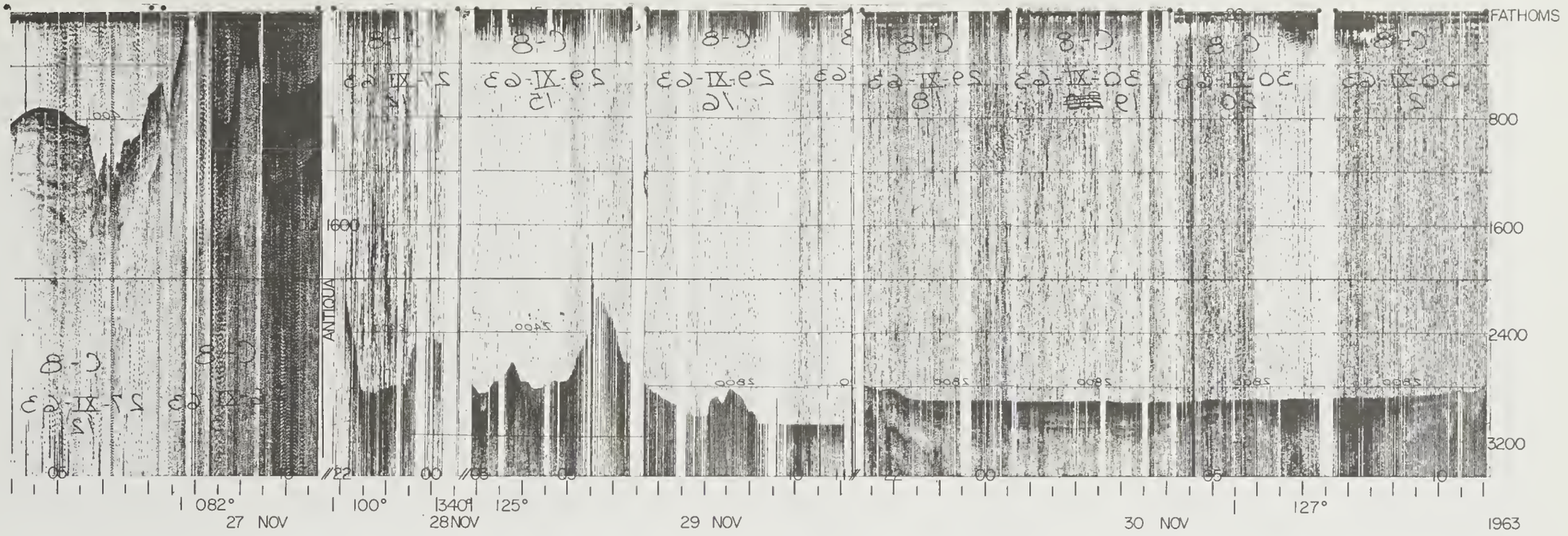

SECONDS
V28
1075
1080
S146
R87
2
4
6
8
00
05
10
15
18
21
105°
248°
100°
330°
6 JAN
200°
136°
00
05
7 JAN
270°
060°
1971

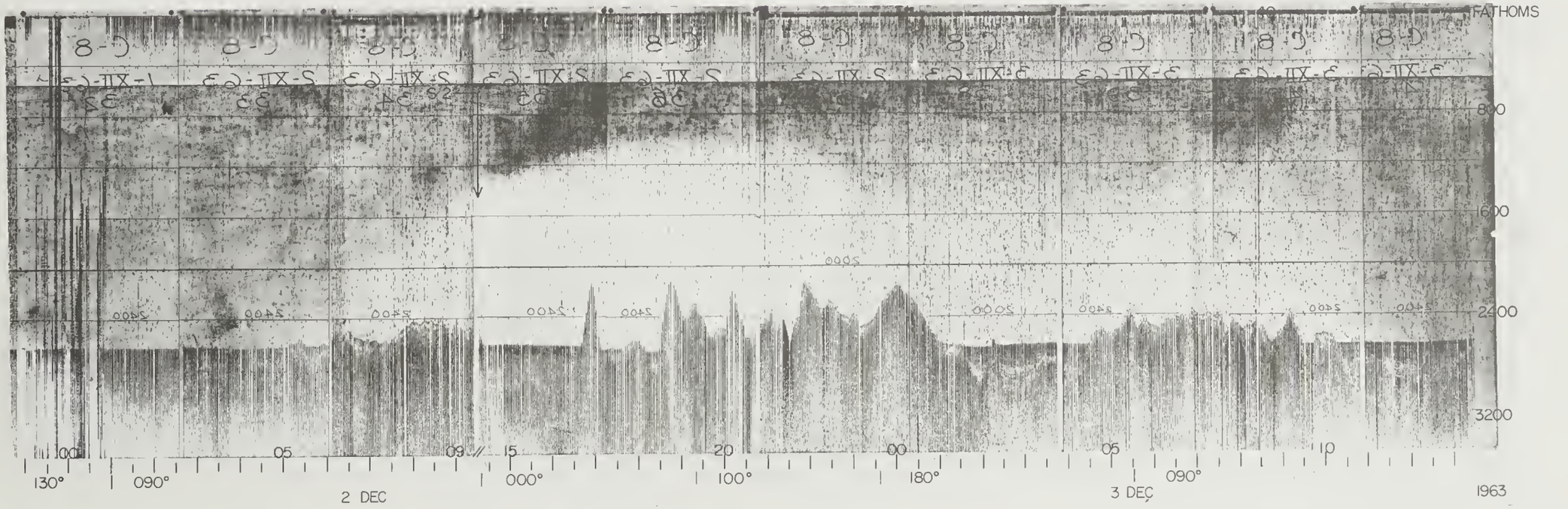

1065
S 144 R 86
1070 V 28
S 145
FATHOMS
800
1600
2400
3200
0
16
20
00
05
10
14
20
071°
085°
4 JAN
265°
180°
090°
5 JAN
000°
245°
1971

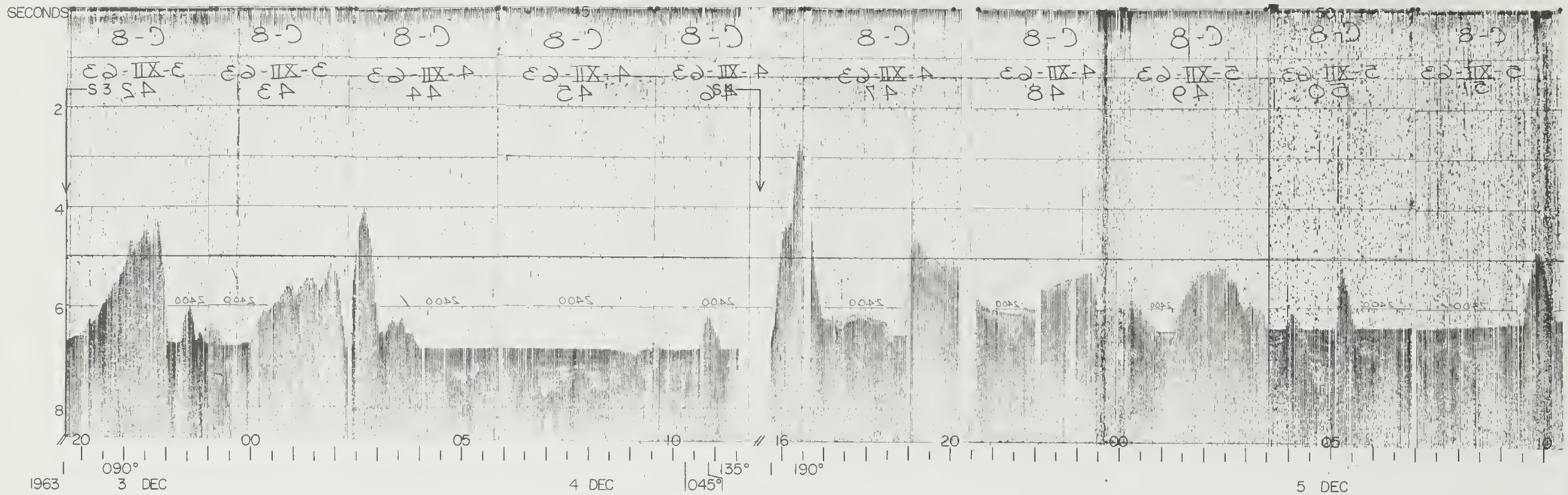

1085
S47
R 88
PANAMA
13
15
20
00
132°
152°
160°
7 JAN

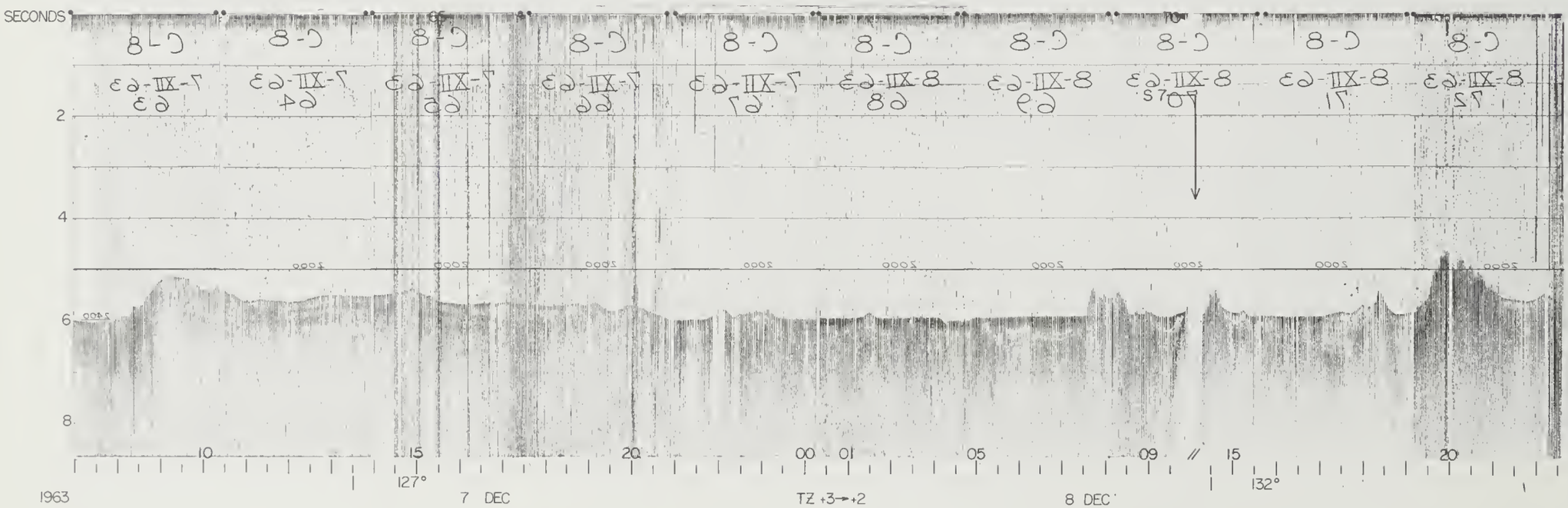

SECONDS
SAN JUAN, PUERTO RICO
2
4
6
8
SAN JUAN
055°
030°
210°
215°
000°
180°
125°
105°
107°
1963
19 NOV
20 NOV
26 NOV
27 NOV

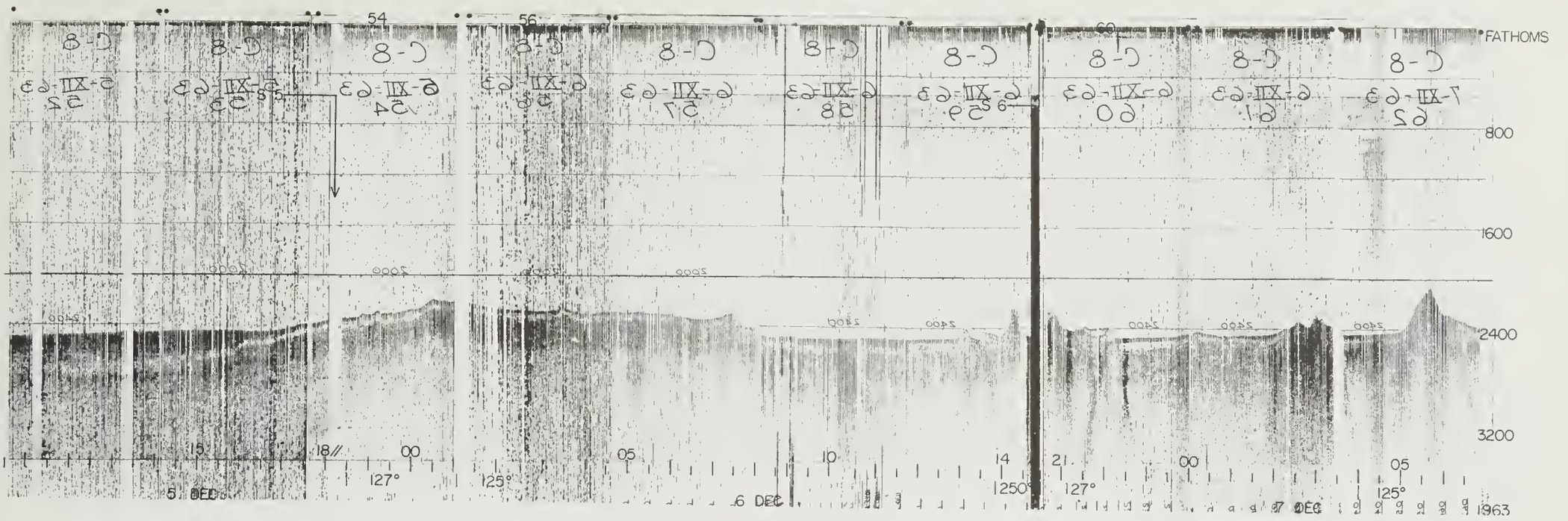

SECONDS
4
6
8
127°
1963
30 NOV
TZ+4→+3
1 DEC

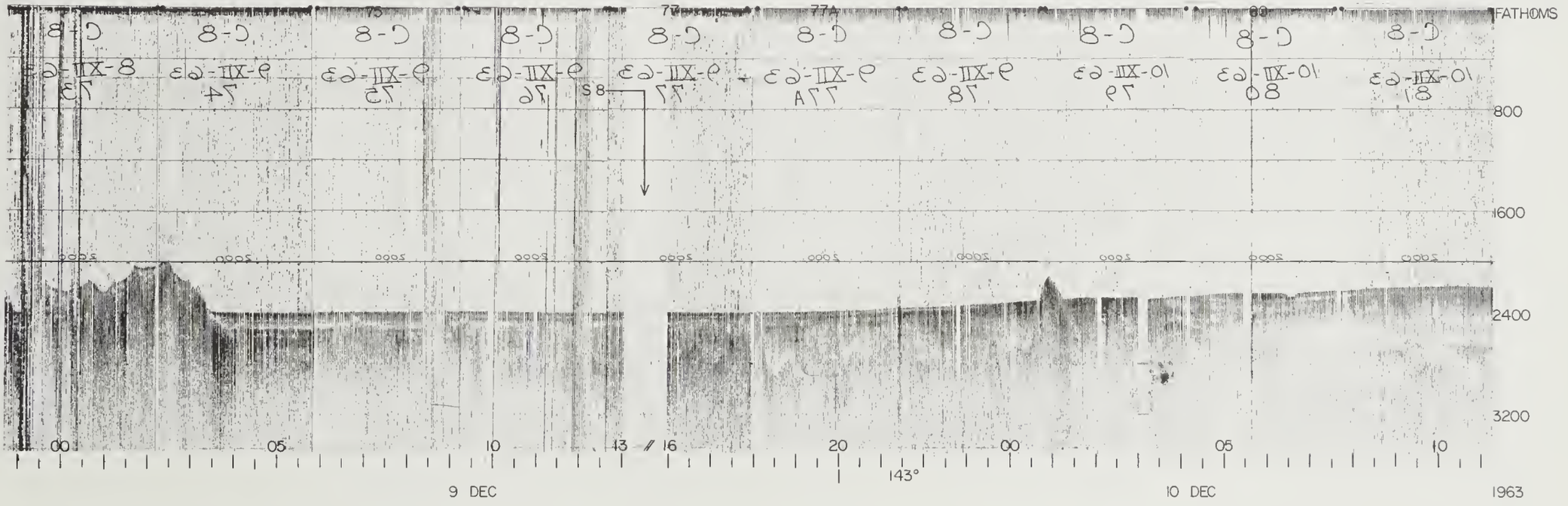

FATHOMS
800
1600
2400
3200
ANTIQUA
082°
100°
1340
125°
27 NOV
28 NOV
29 NOV
30 NOV
127°
1963

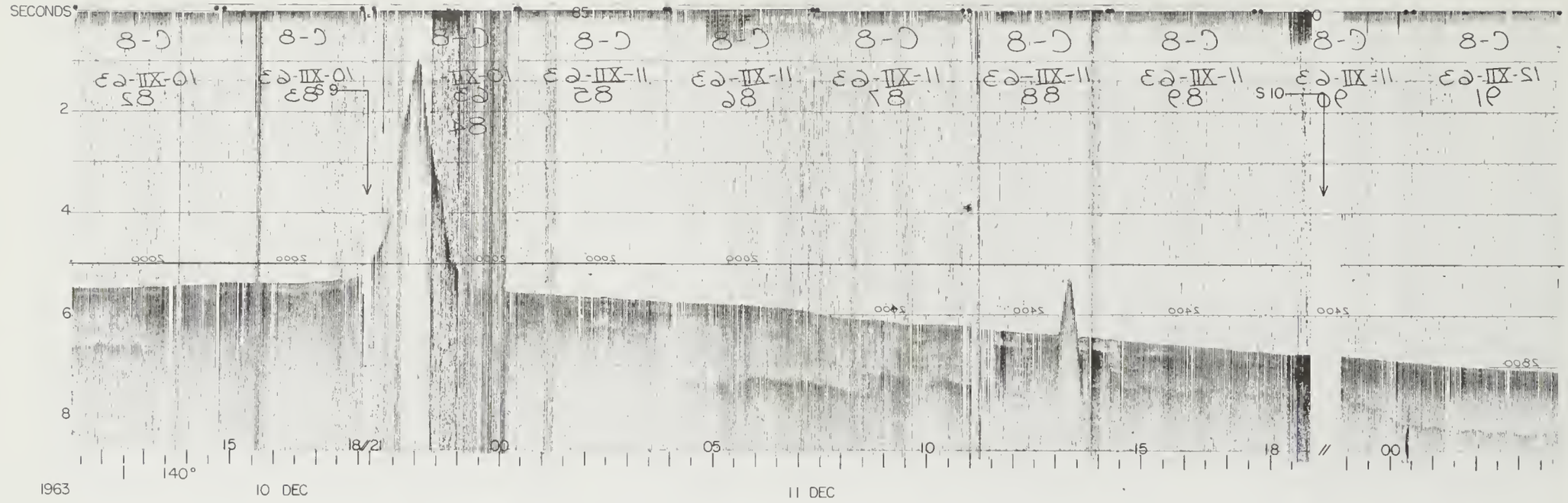

FATHOMS
800
1600
2400
3200
130°
090°
000°
100°
180°
090°
2 DEC
3 DEC
1963

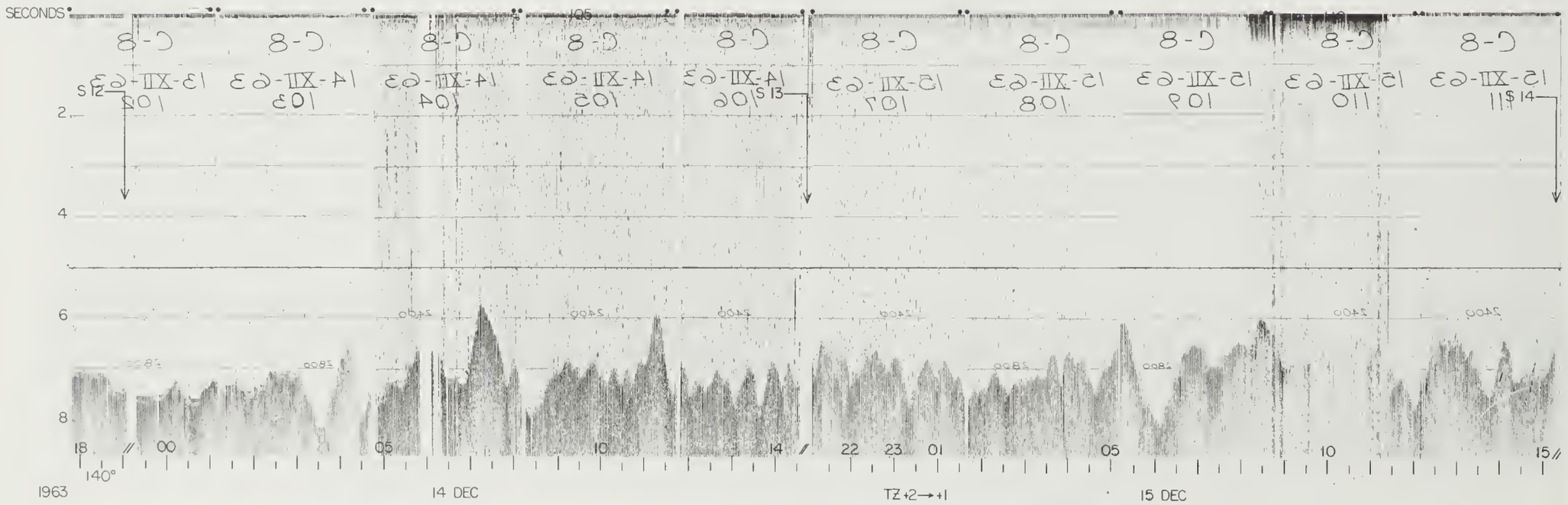

SECONDS
2
4
6
8
1963
3 DEC
4 DEC
5 DEC
090°
135°
045°
190°

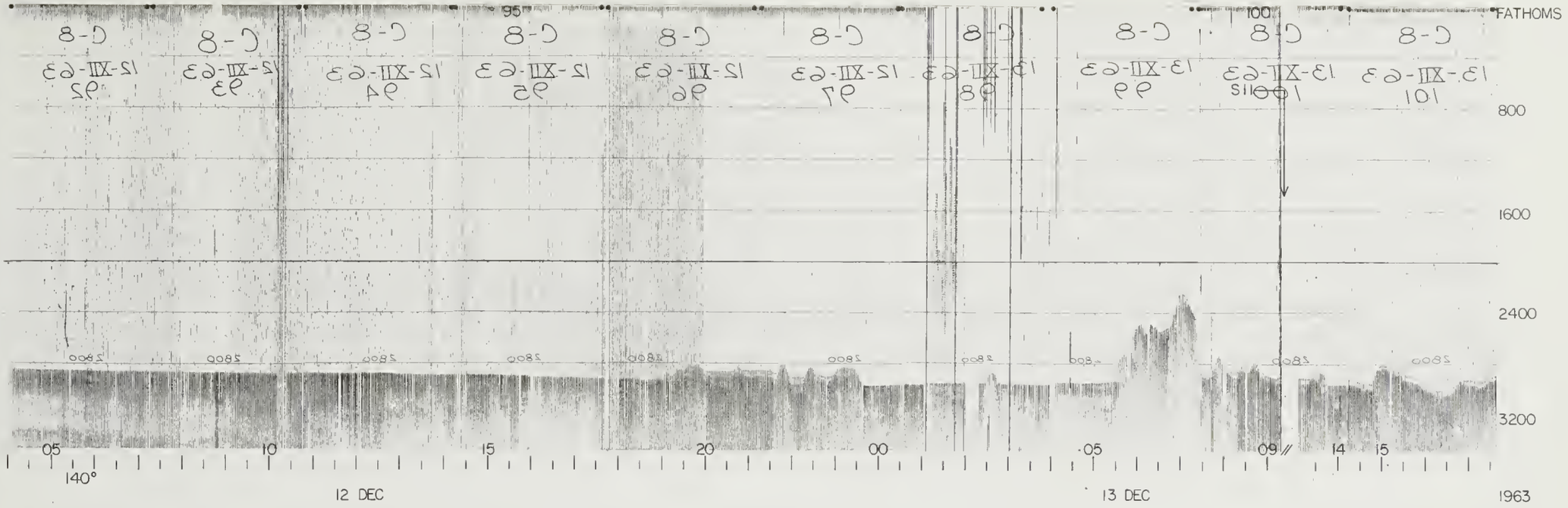

SECONDS
2
4
6
8
1963
7 DEC
TZ +3→+2
8 DEC
127°
132°

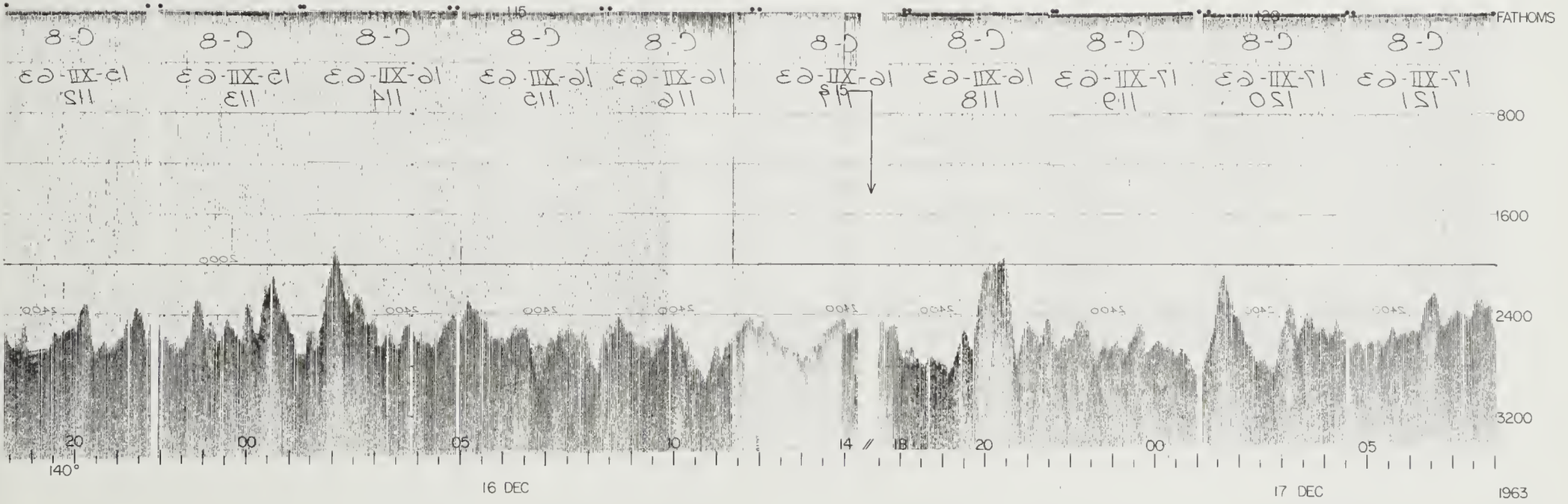

FATHOMS
800
1600
2400
3200
1963
5 DEC
6 DEC
7 DEC
127°
125°
125°

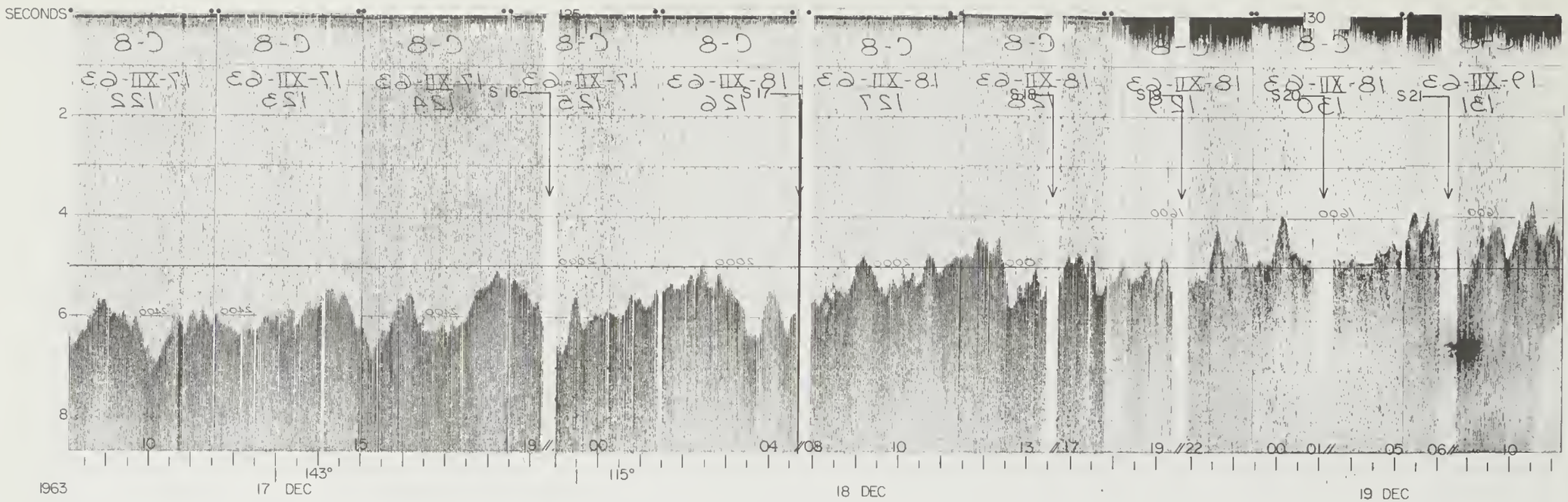

FATHOMS
800
1600
2400
3200
9 DEC
10 DEC
1963
143°

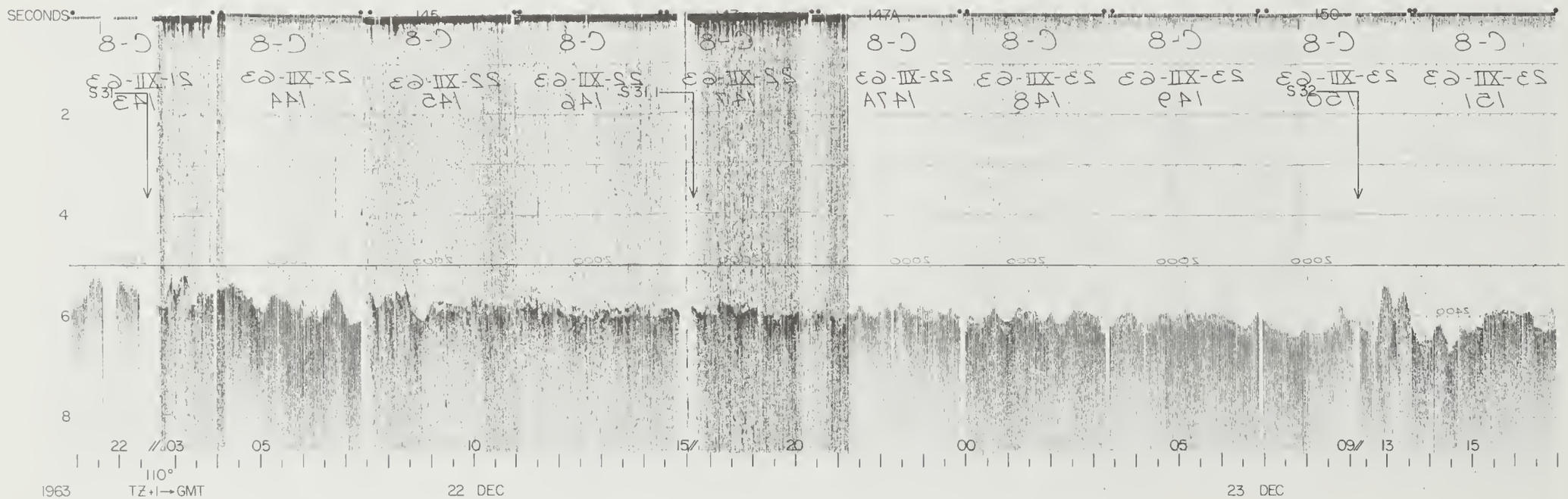

SECONDS
2
4
6
8
15
18/21
00
05
10
15
18
00
140°
1963
10 DEC
11 DEC

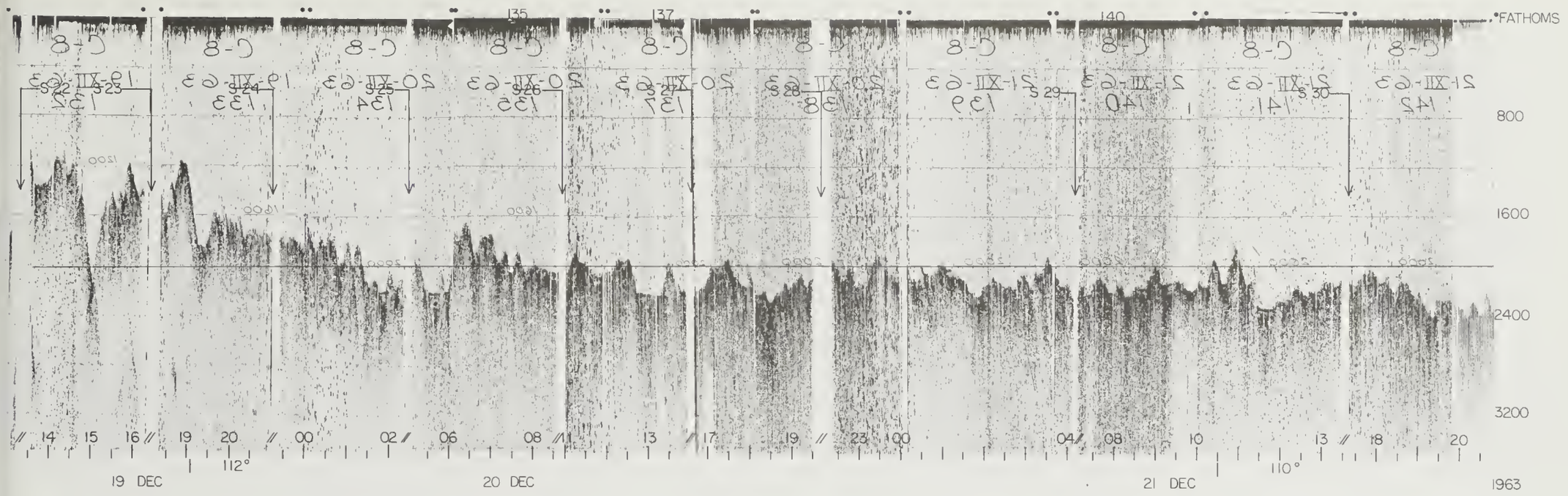

SECONDS
2
4
6
8
18
00
05
10
14
22
23
01
05
10
15
140°
1963
14 DEC
TZ+2→+1
15 DEC

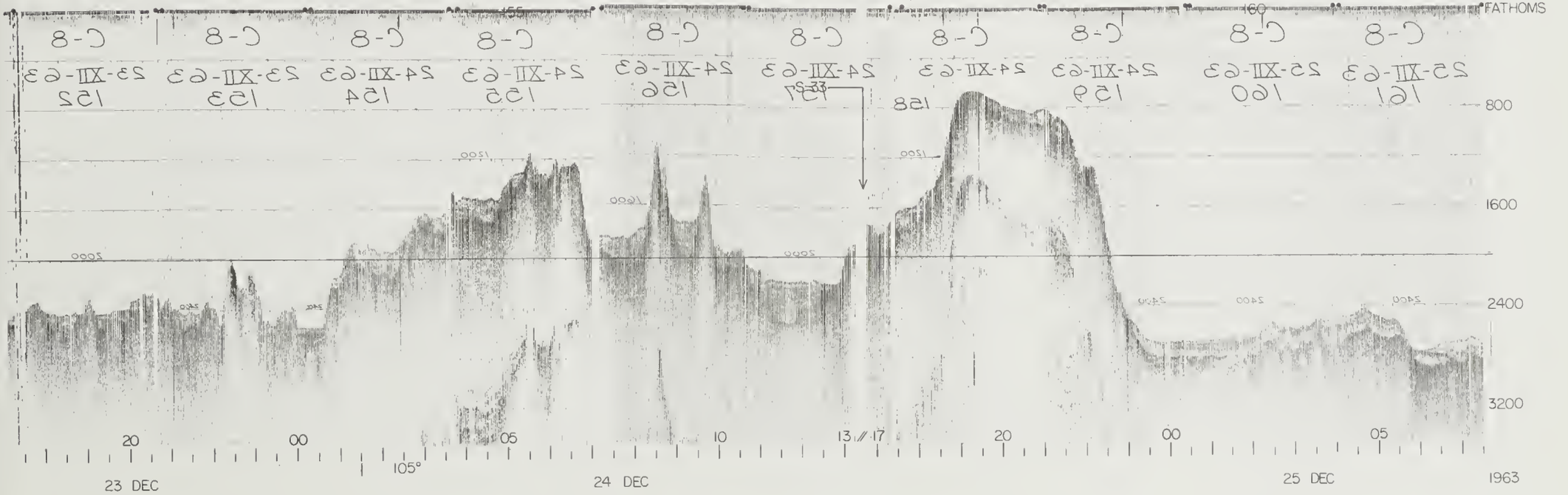

FATHOMS
800
1600
2400
3200
140°
05
10
15
20
00
05
09
14
15
12 DEC
13 DEC
1963

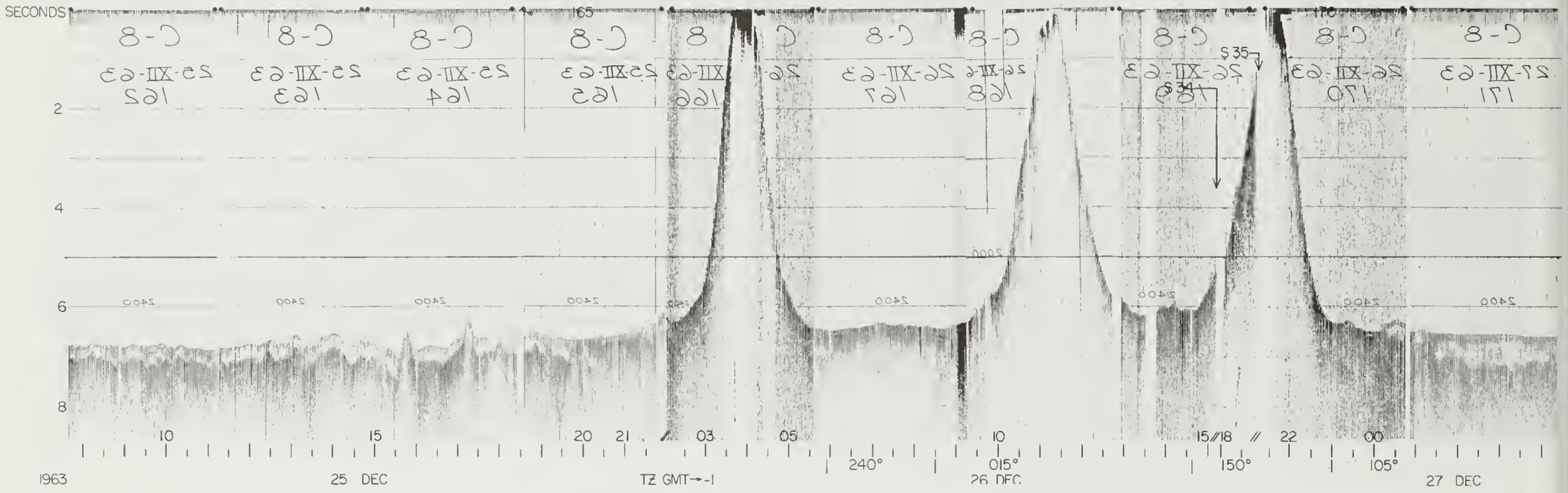

FATHOMS
800
1600
2400
3200
140°
20
00
05
10
14
18
20
00
05
16 DEC
17 DEC
1963

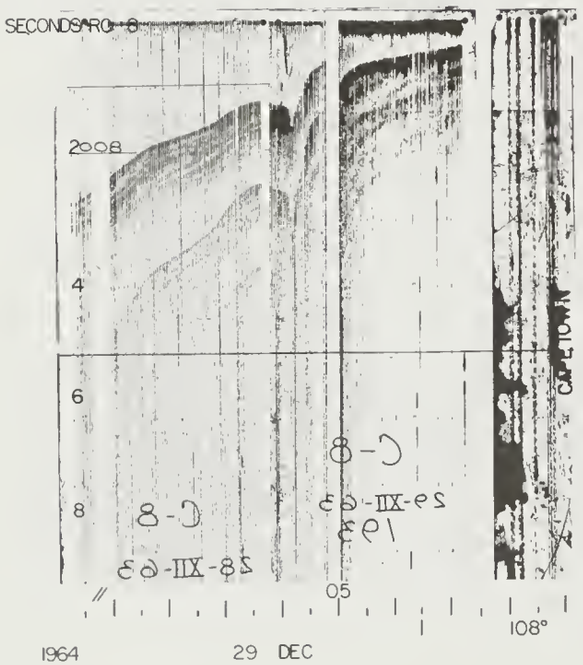

SECONDS
2
4
6
8
1963
17 DEC
18 DEC
19 DEC
143°
115°


SECONDS
2
4
6
8
1963
TZ+1→GMT
22 DEC
23 DEC
110°


FATHOMS
800
1600
2400
3200
19 DEC
20 DEC
21 DEC
1963
112°
110°

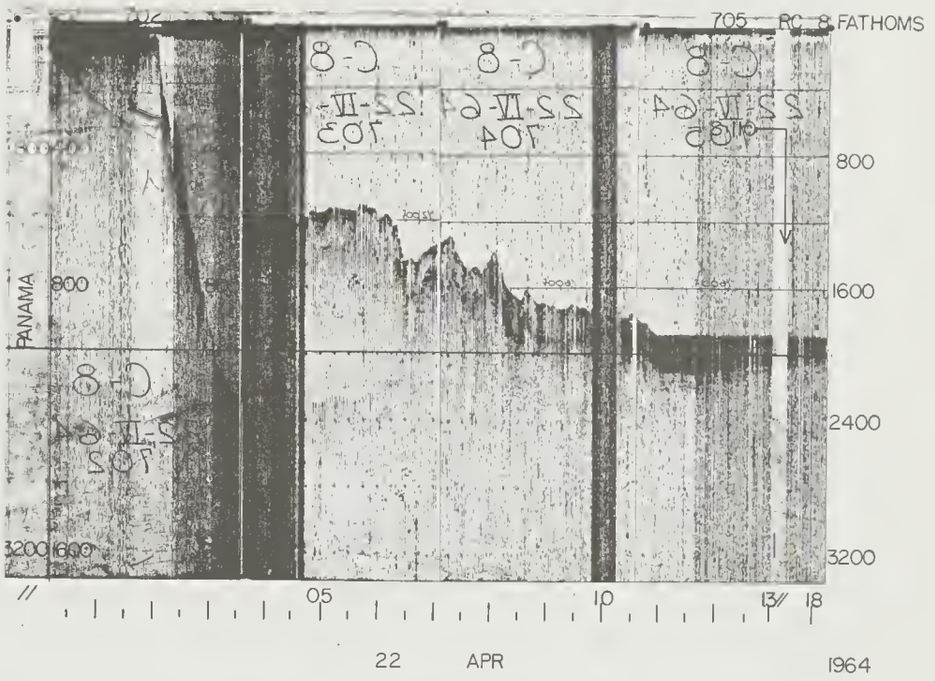

FATHOMS
800
1600
2400
3200
23 DEC
24 DEC
25 DEC
1963
105°

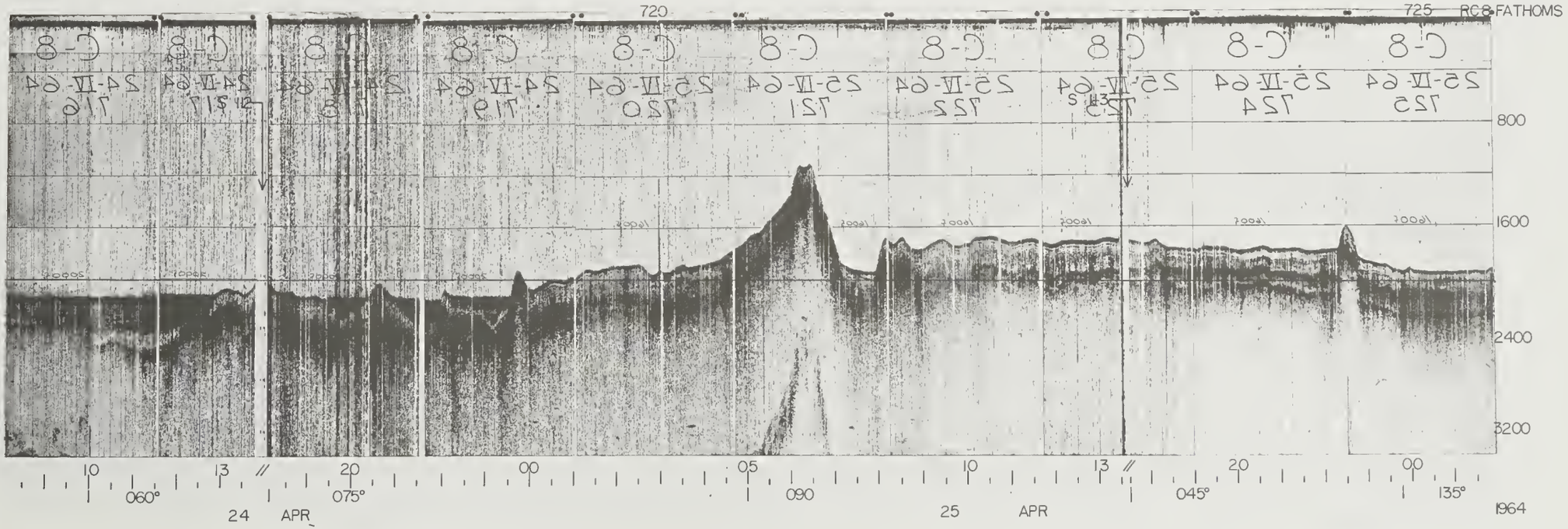

SECONDS
2
4
6
8
10
15
20
21
03
05
10
15/18
22
00
1963
25 DEC
TZ GMT→-1
240°
015°
26 DEC
150°
105°
27 DEC
S 35
S 34

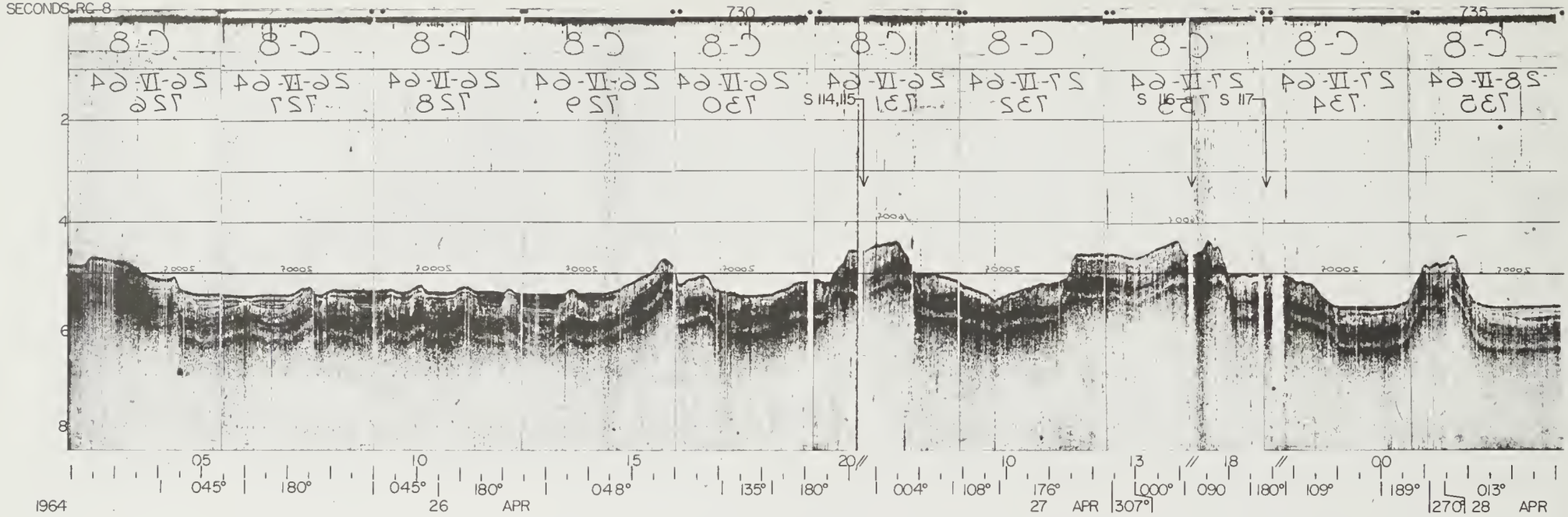

SECONDS@RO-8
2008
4
6
8
05
108°
1964
29 DEC
CAPE TOWN

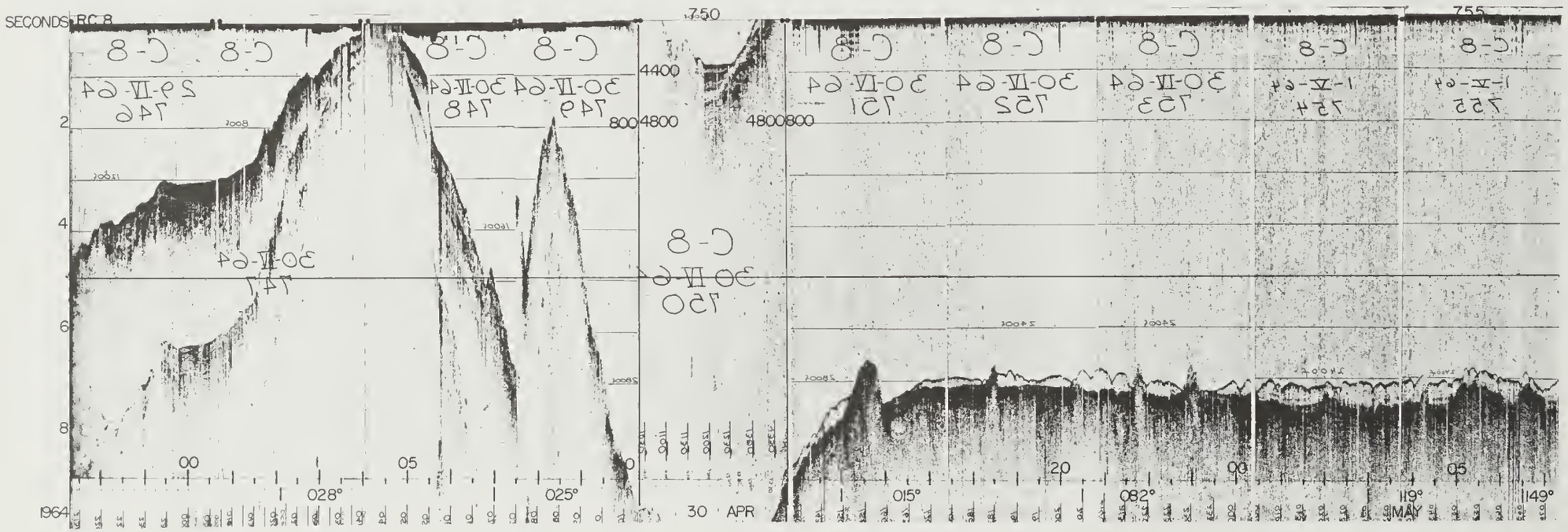
C-8
28-XII-63
189
190
191
FATHOMS
800
1600
2400
3200
05
10
15
20
103°
106°
28 DEC
1963

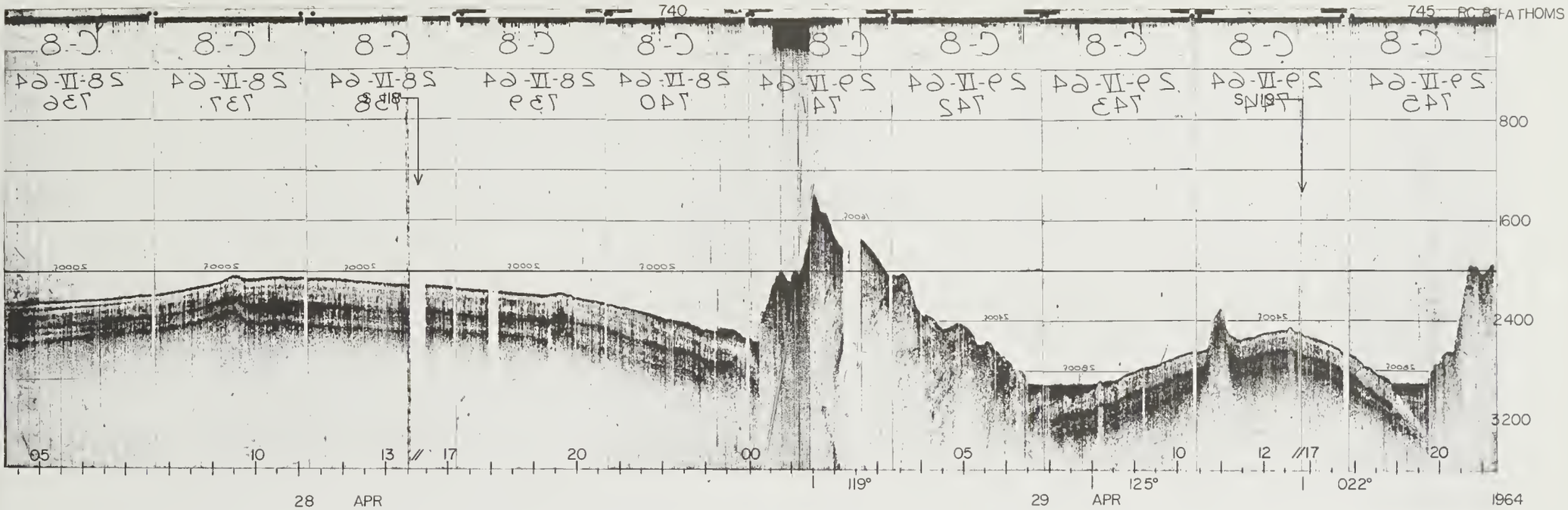
SECONDS
2
4
6
8
20
00
05
10
13
20
00
05
066°
1964
22 APR
23 APR
24 APR

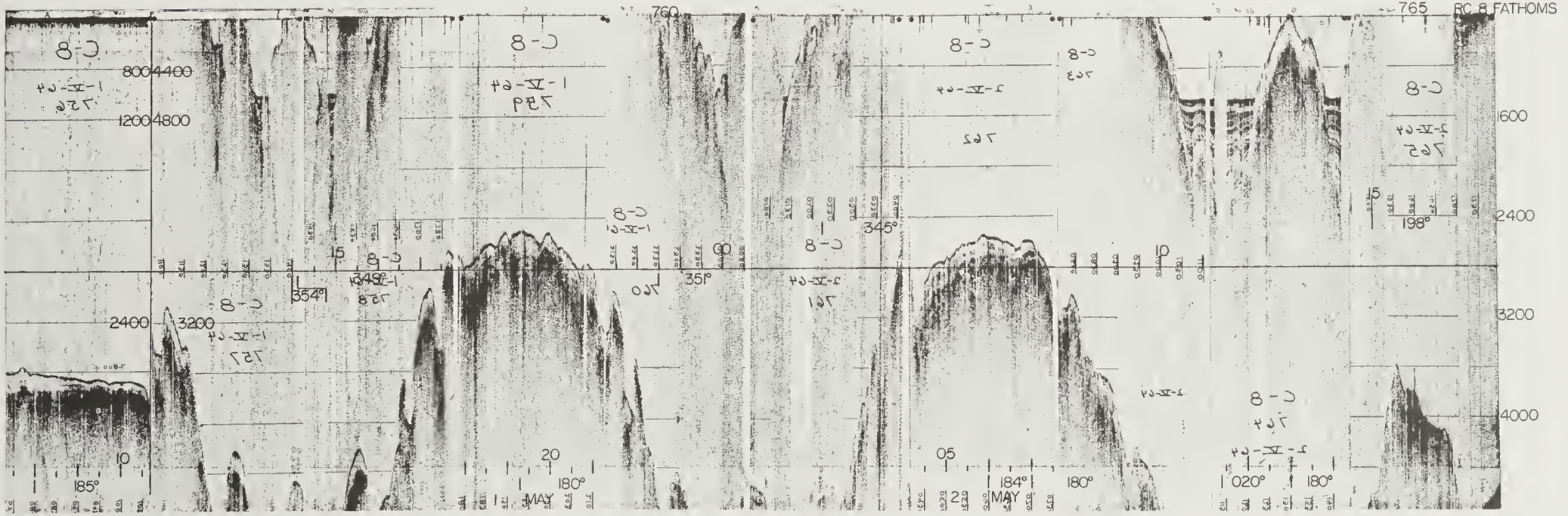

705 RC 8 FATHOMS
800
1600
2400
3200
05
10
13
18
22 APR
1964

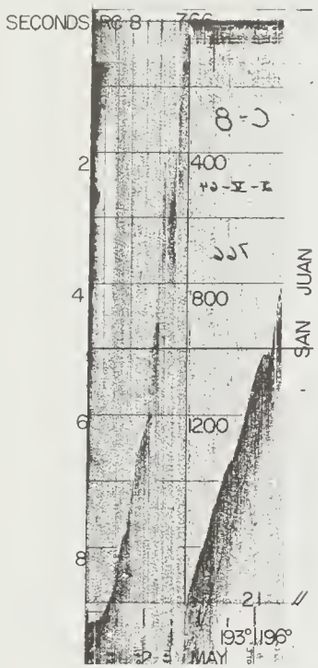

720
725 RC 8 FATHOMS
800
1600
2400
3200
10
13
20
00
05
10
13
20
00
060°
075°
090
045°
135°
24 APR
25 APR
1964

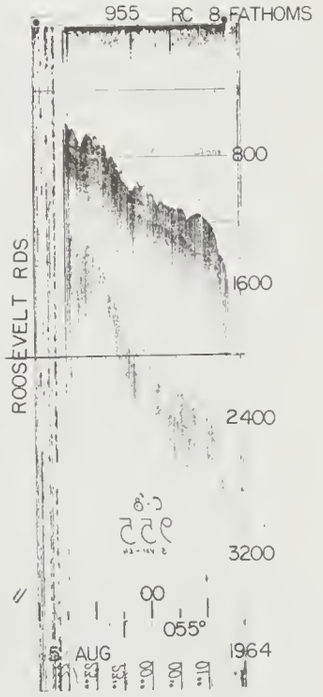

SECONDS RC-8
730
735
C-8
2
4
6
8
05
10
15
20
10
13
18
00
045°
180°
045°
180°
048°
135°
180°
004°
108°
176°
090
180°
109°
189°
013°
1964
26 APR
27 APR
28 APR

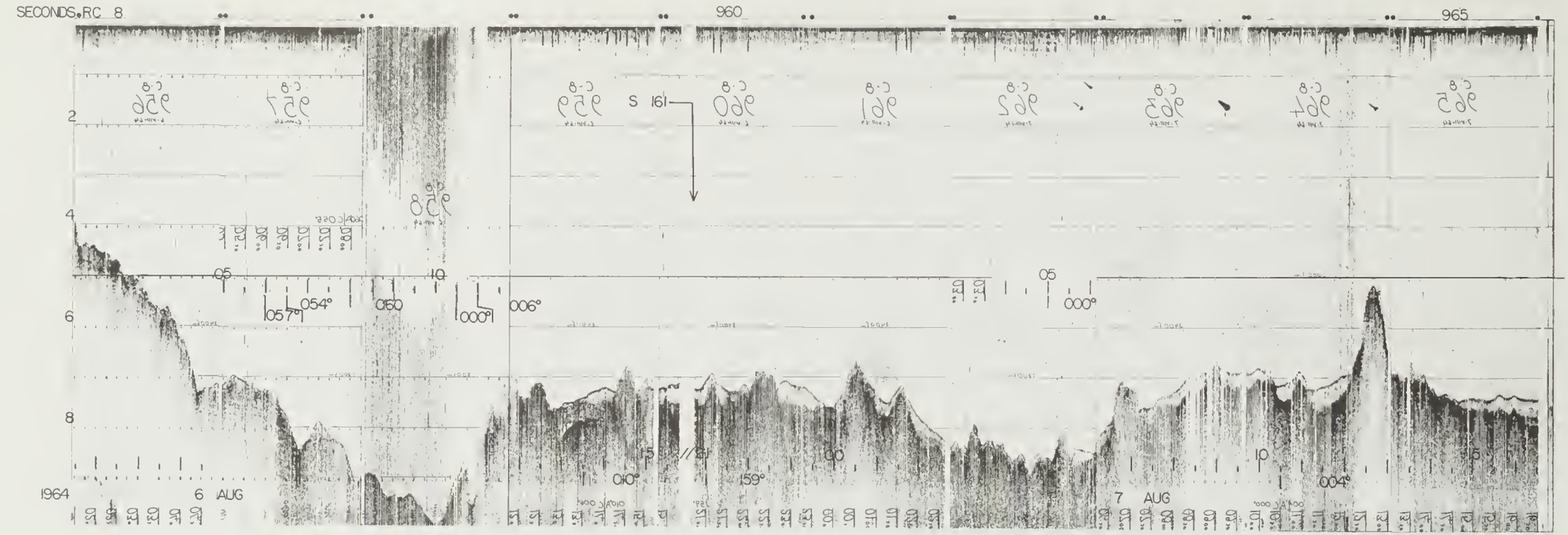

SECONDS RC-8
750
755
C-8
2
4
6
8
00
05
20
00
028°
025°
015°
082°
119°
149°
1964
30 APR
MAY

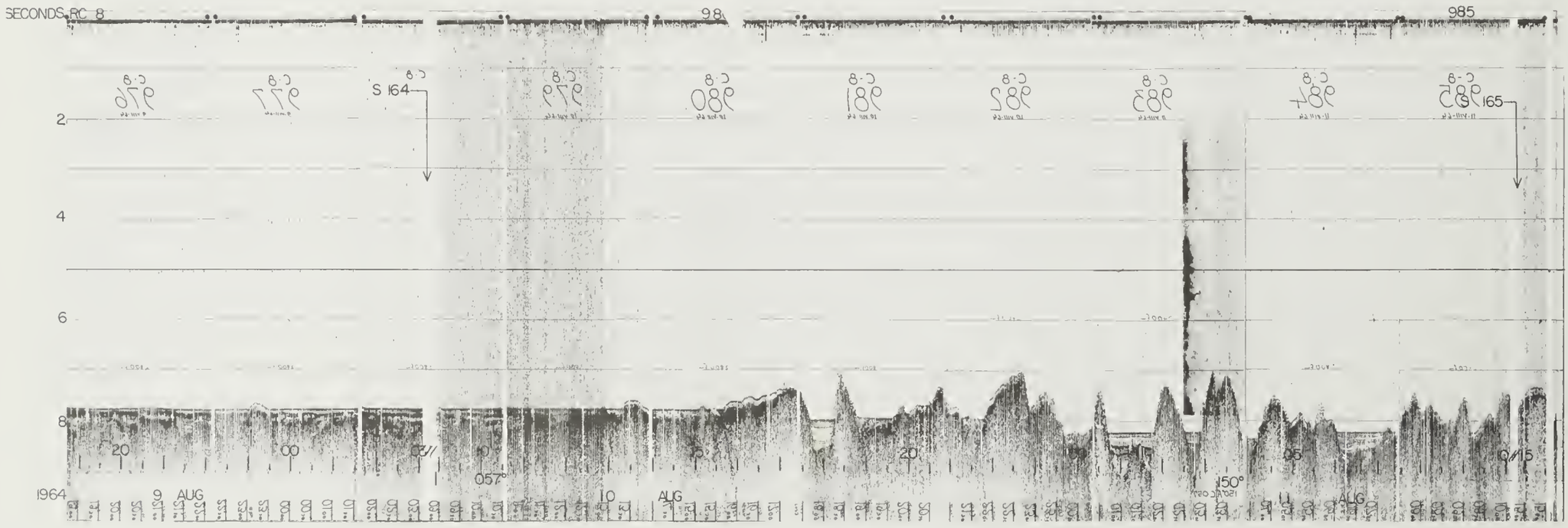

740
745
RC 8 FATHOMS
C-8
28-IX-64
29-IX-64
800
1600
2400
3200
05
10
13
17
20
00
05
10
12
17
20
119°
125°
022°
28 APR
29 APR
1964

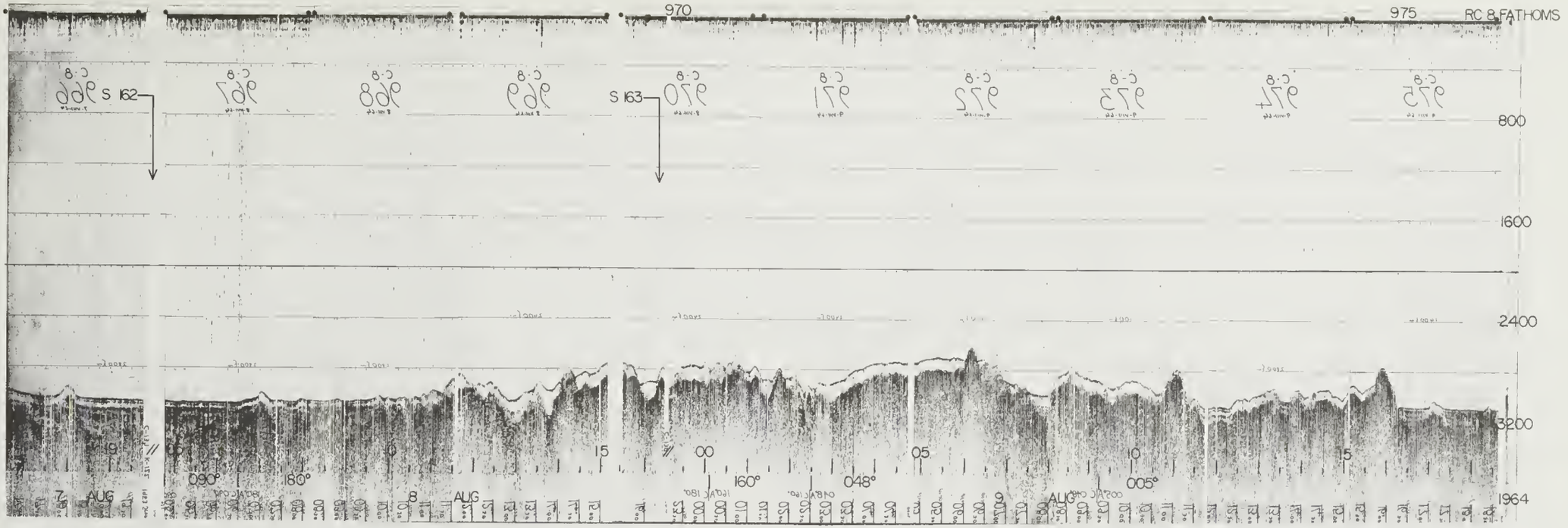

760
765
RC 8 FATHOMS
C-8
1-X-64
7-X-64
4800
8004400
1200
2400
3200
4000
1600
10
15
20
05
10
185°
180°
184°
180°
345°
351°
198°
020°
180°
MAY
MAY

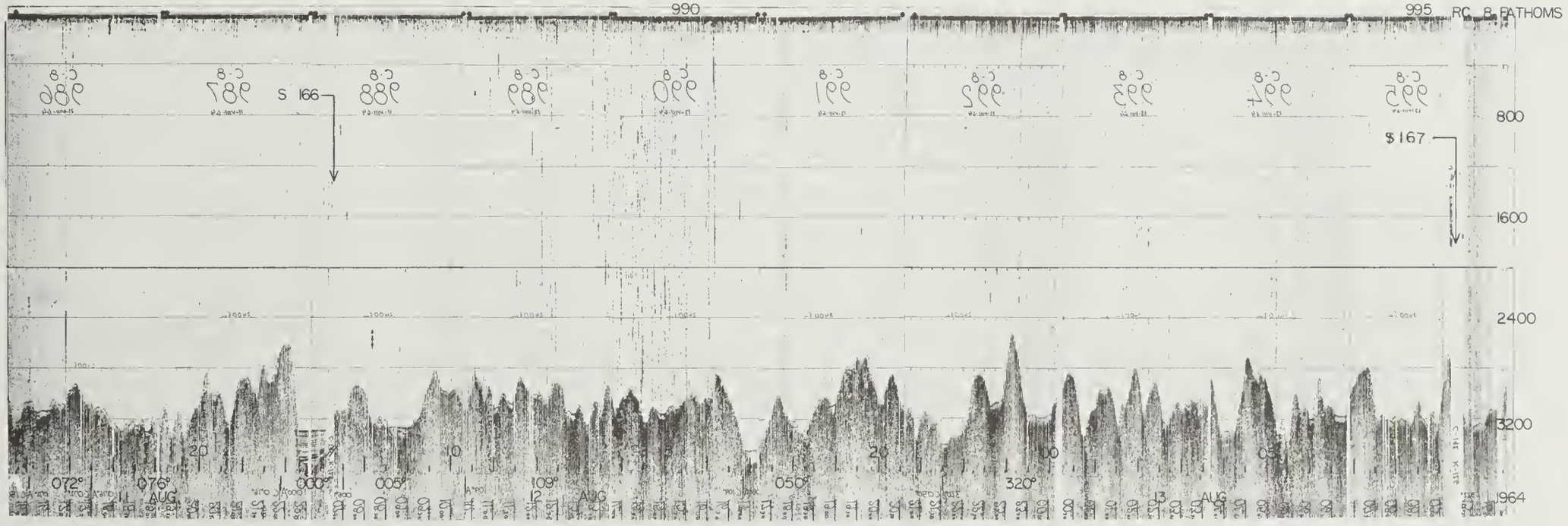

SECONDS
RC-8
8-C
400
800
1200
2
4
6
8
SAN JUAN
MAY
193°
196°

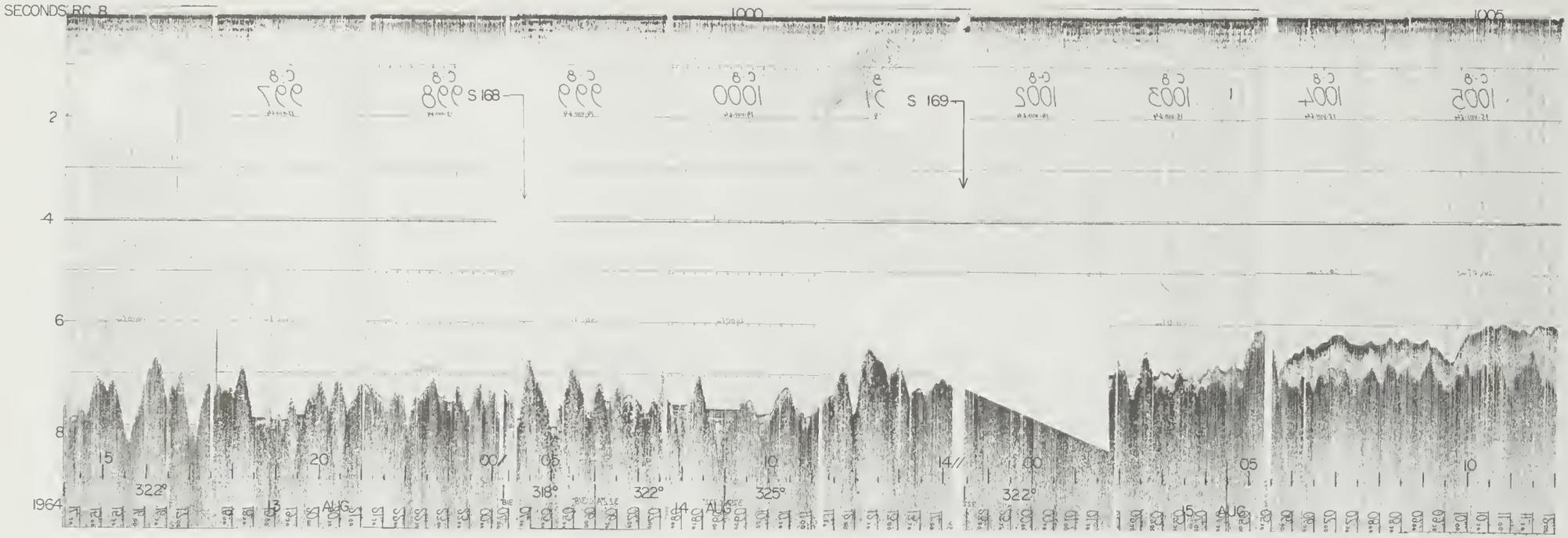

955 RC 8 FATHOMS
800
1600
ROOSEVELT RDS
2400
955
3200
055°
5 AUG
1964

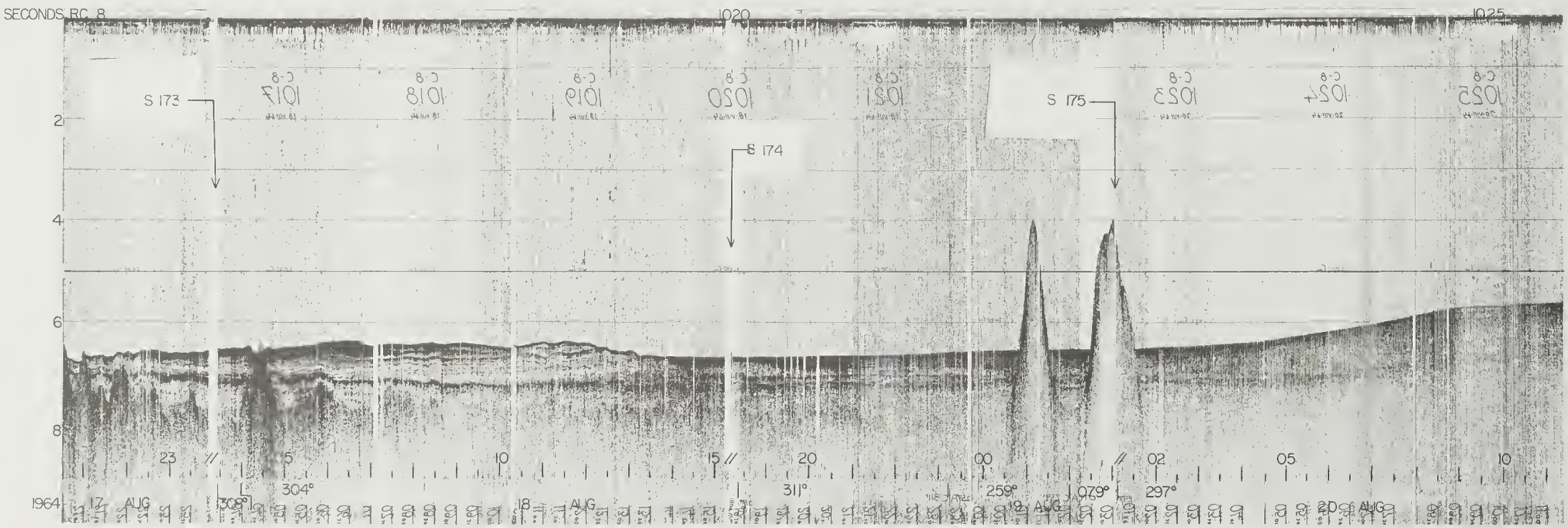

SECONDS RC 8
960
965
S 161
2
4
6
8
05
10
057°
054°
060
000°
05
010°
15
159°
00
7 AUG
004°
1964
6 AUG

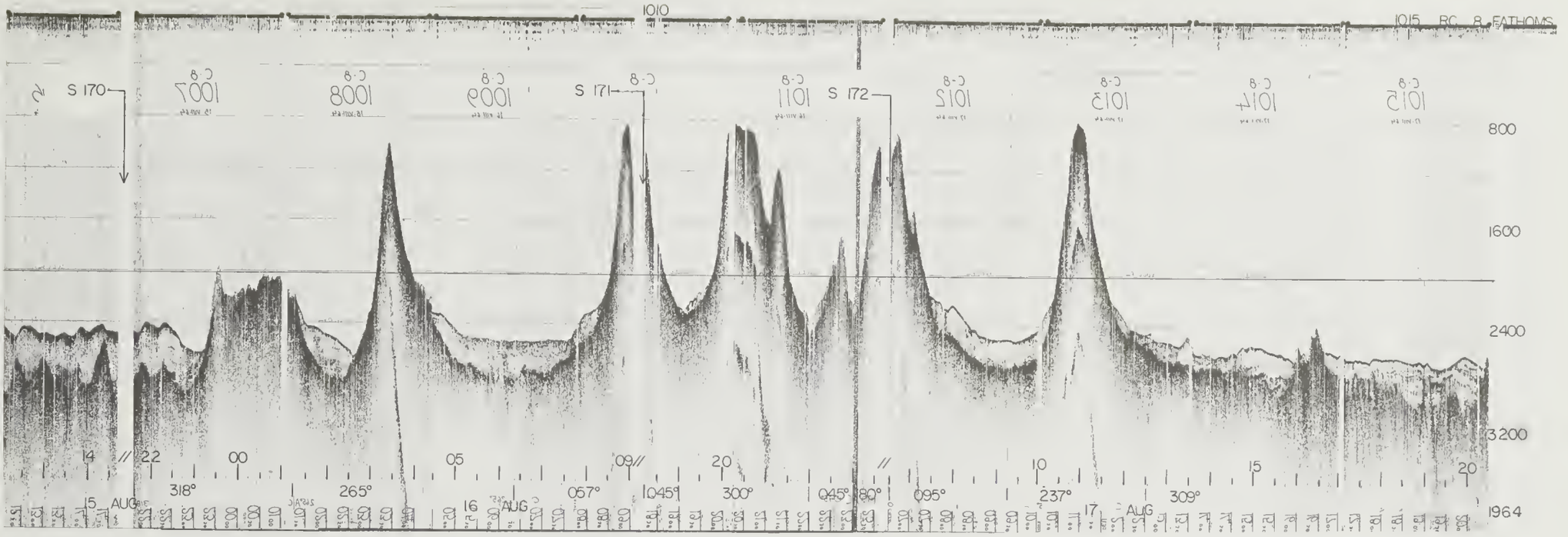

SECONDS RC 8
985
S 164
S 165
2
4
6
8
20
00
057°
10
AUG
20
15
05
150°
AUG
1964
9 AUG

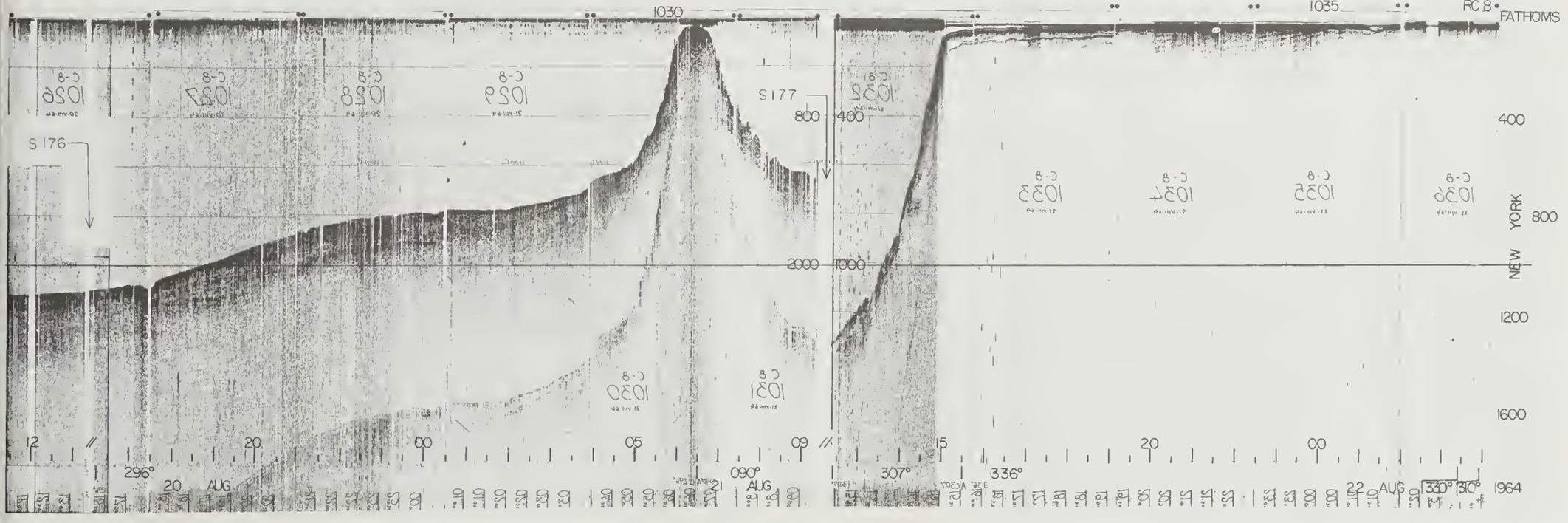

970
975
RC 8 FATHOMS
S 162
S 163
800
1600
2400
3200
1964
090°
180°
160°
048°
005°
7 AUG
8 AUG
8 AUG

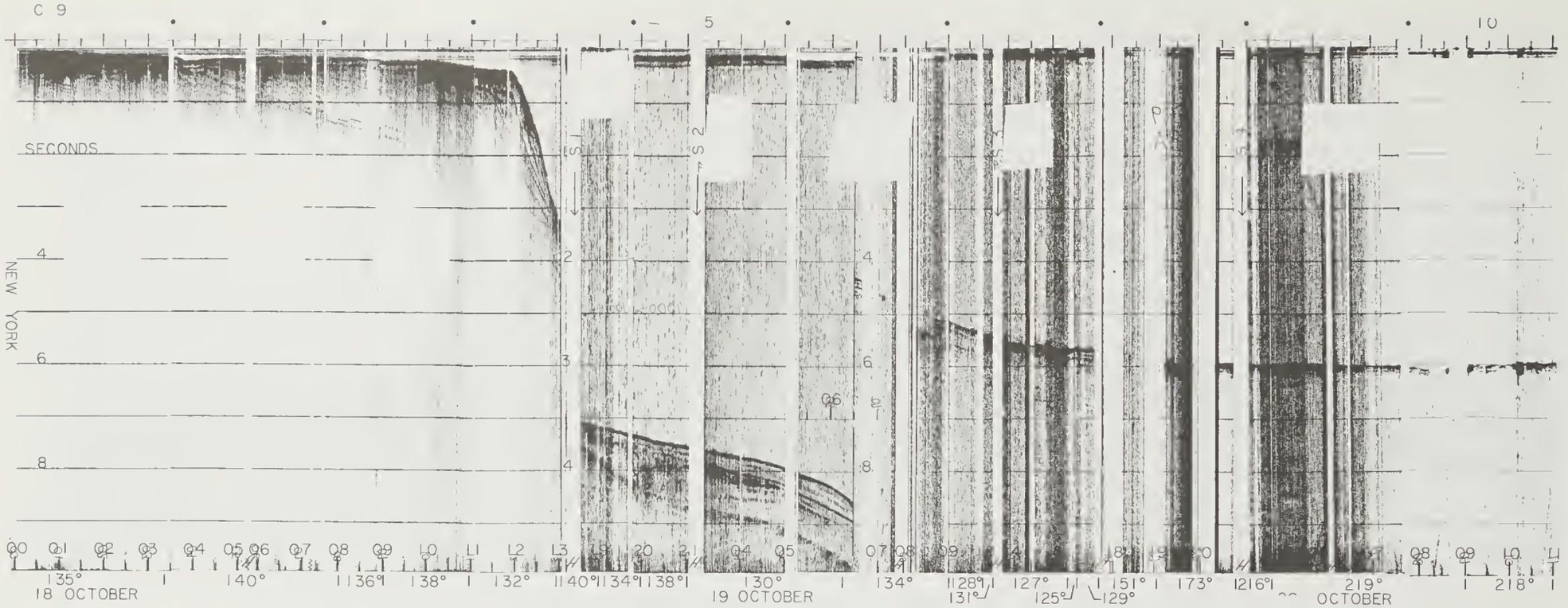

990
995
RC 8 FATHOMS
S 166
S 167
800
1600
2400
3200
1964
072°
076°
060°
005°
109°
050°
320°
11 AUG
12 AUG
13 AUG

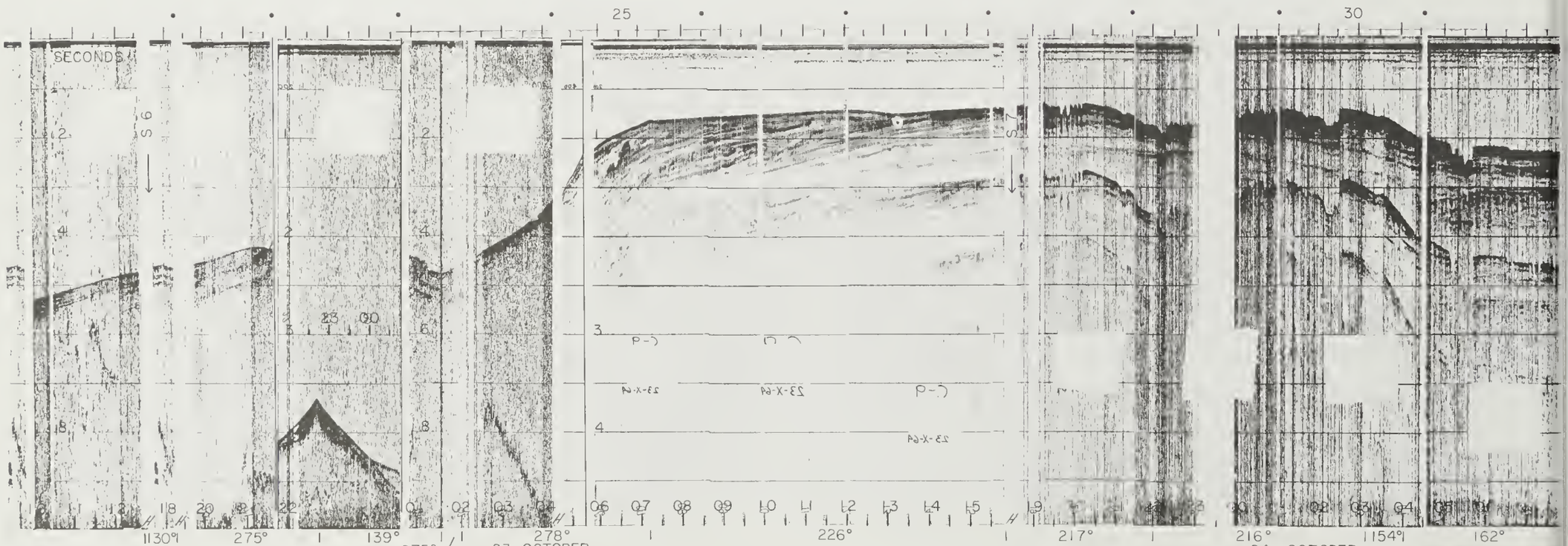

SECONDS RC 8
1000
1005
S 168
S 169
2
4
6
8
15
20
00
05
10
14
00
05
10
322°
318°
322°
325°
322°
1964
13 AUG
14 AUG
15 AUG

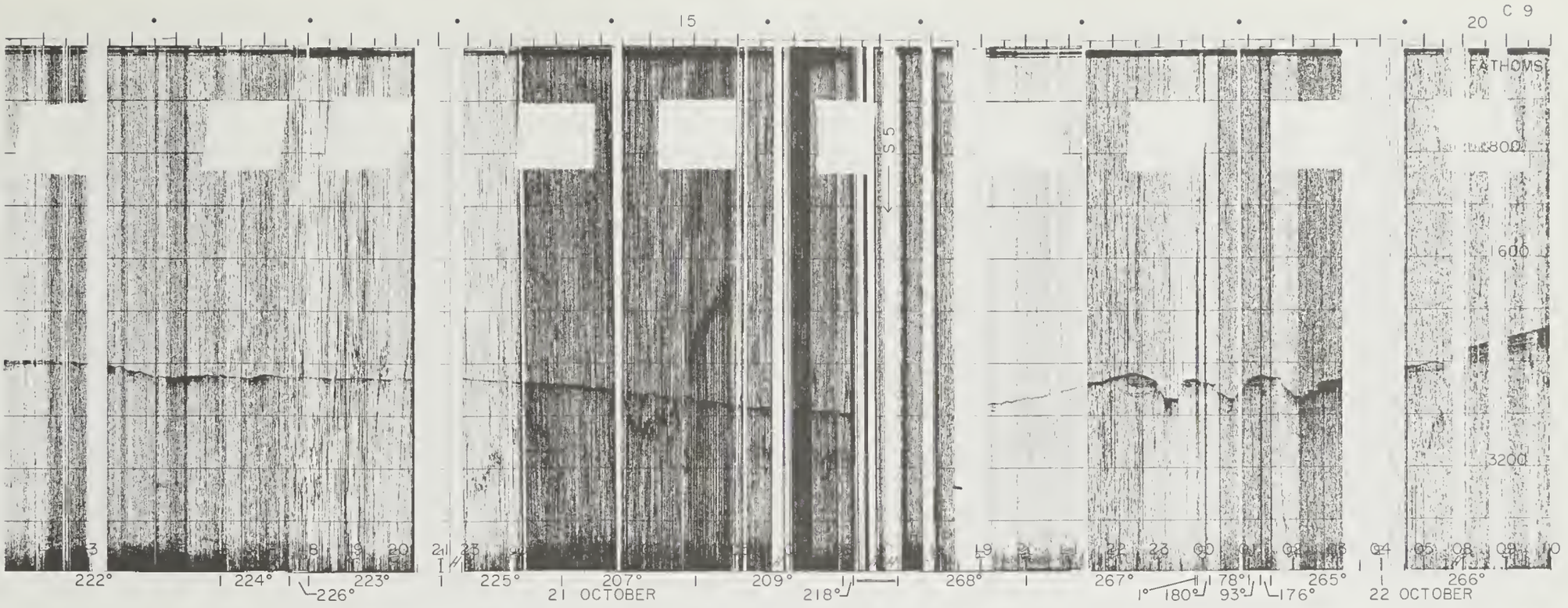

SECONDS RC 8
1020
1025
S 173
S 174
S 175
2
4
6
8
23
5
10
15
20
00
02
05
10
304°
308°
311°
259°
079°
297°
1964
17 AUG
18 AUG
19 AUG
20 AUG

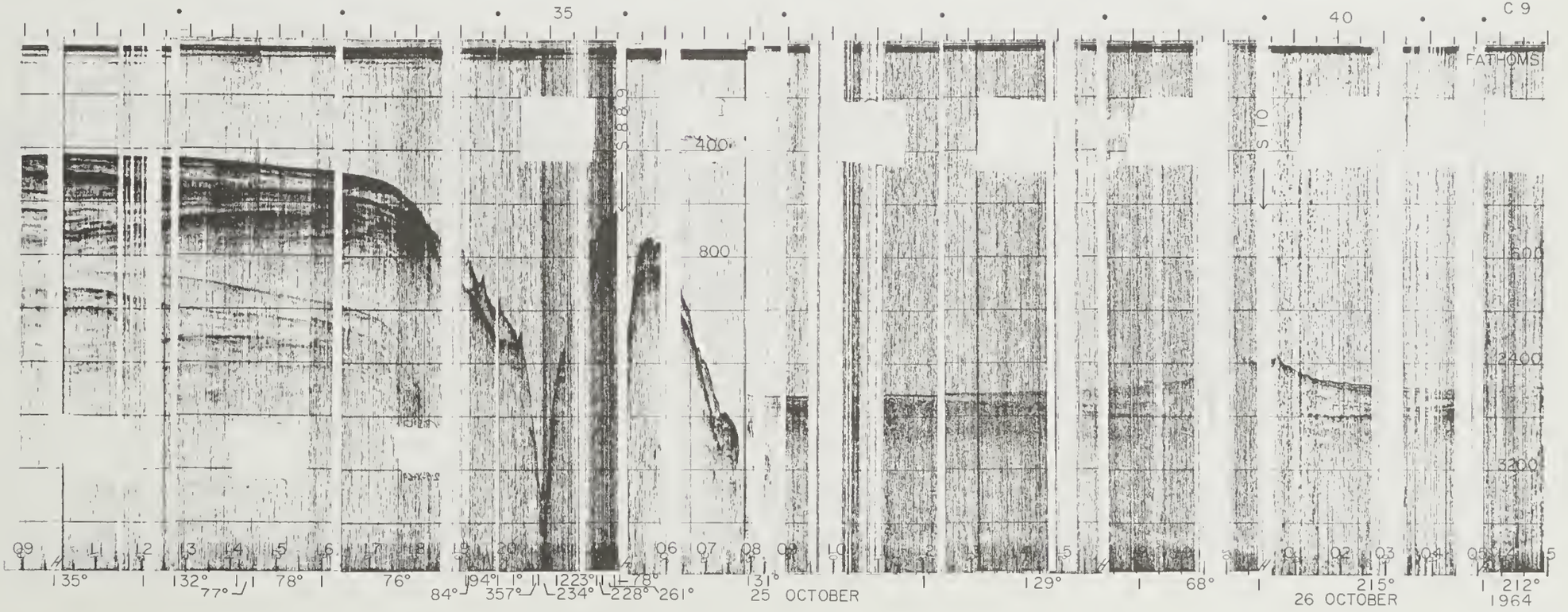

1010
1015 RC 8 FATHOMS
S 170
S 171
S 172
800
1600
2400
3200
1964
14
22
00
05
09
20
10
15
20
318°
265°
057°
045°
300°
080°
095°
237°
309°
15 AUG
16 AUG
17 AUG

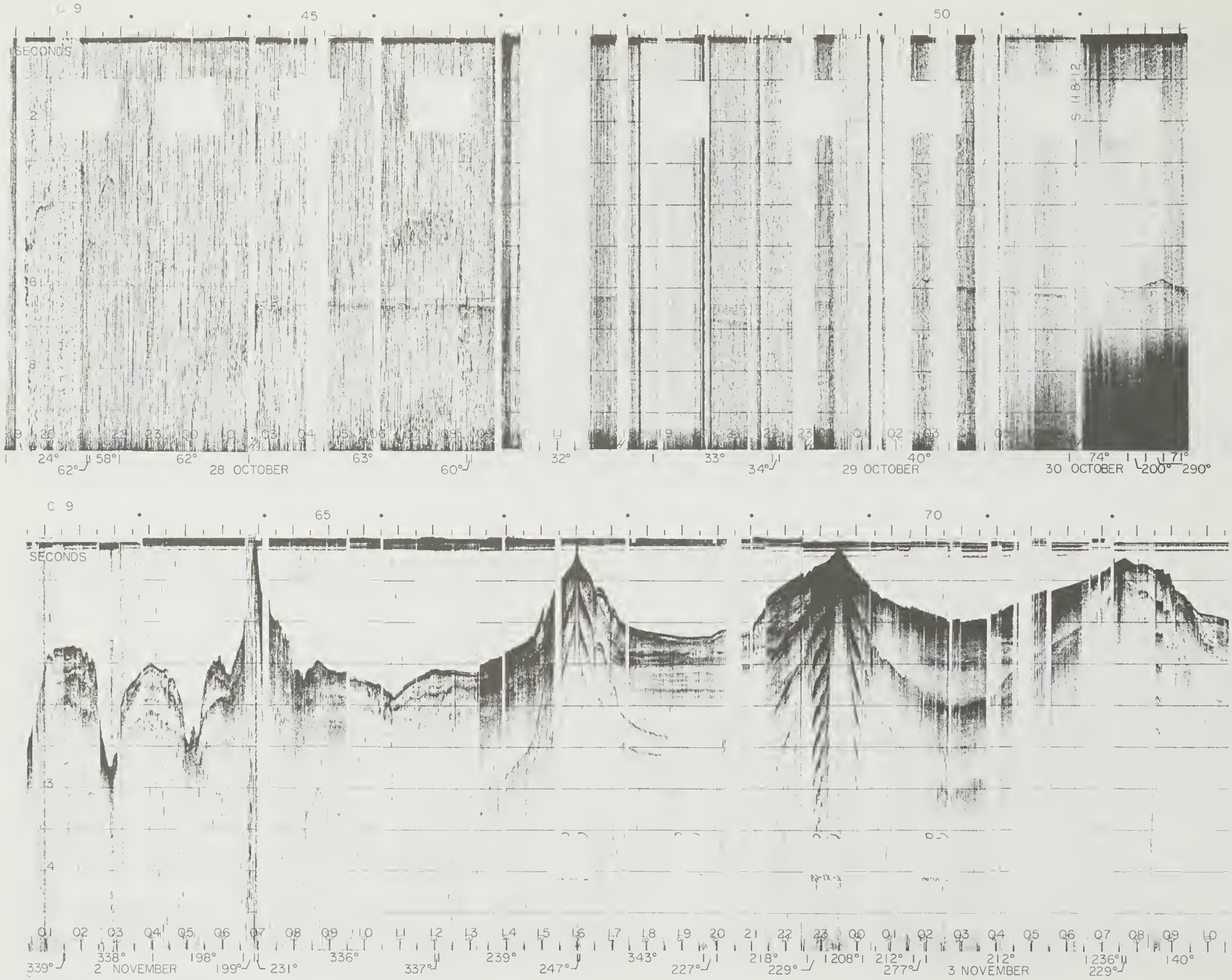

1030
1035
RC 8
FATHOMS
S 176
S 177
800
400
2000
1000
NEW YORK
800
1200
1600
1964
12
20
00
05
09
15
20
00
296°
090°
307°
336°
330°
310°
20 AUG
21 AUG
22 AUG

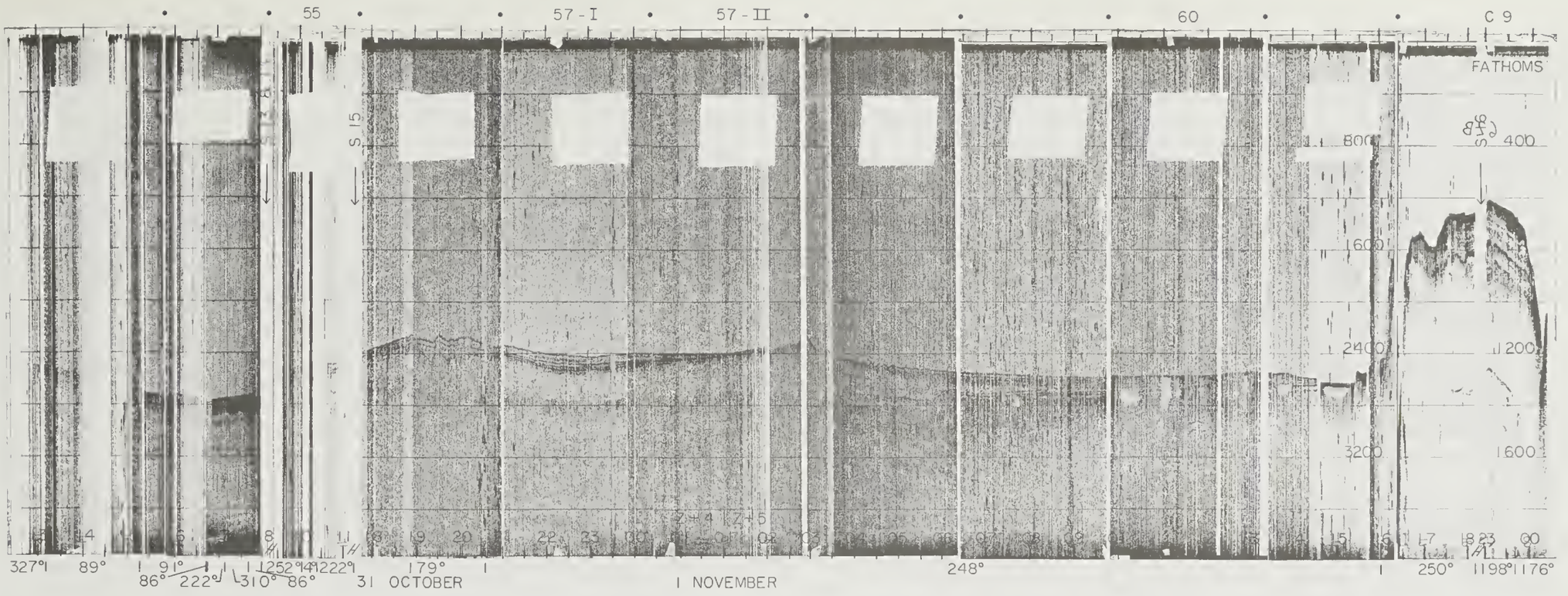

C 9
5
10
SECONDS
NEW YORK
135°
140°
136°
138°
132°
140°
134°
138°
18 OCTOBER
130°
19 OCTOBER
134°
128°
131°
127°
125°
151°
129°
173°
216°
219°
OCTOBER
218°

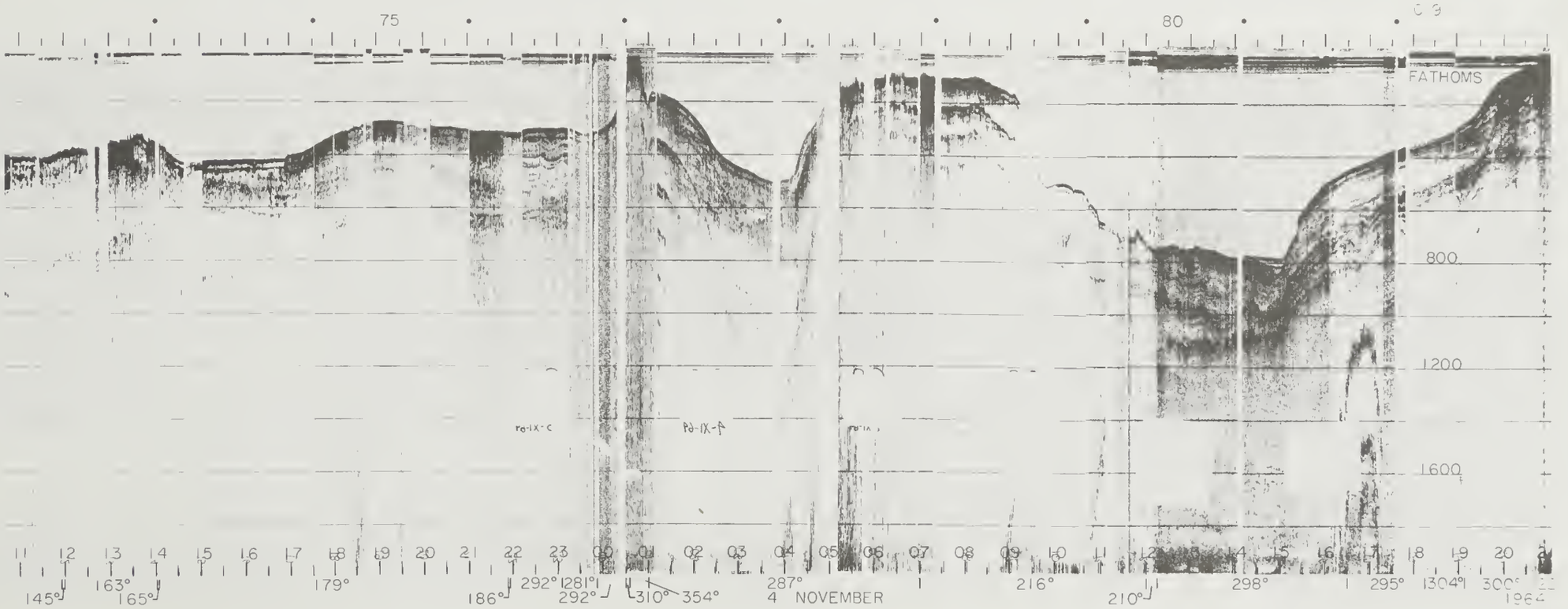

25
30
SECONDS
130°
275°
139°
275°
278°
23 OCTOBER
226°
217°
216°
154°
162°
24 OCTOBER

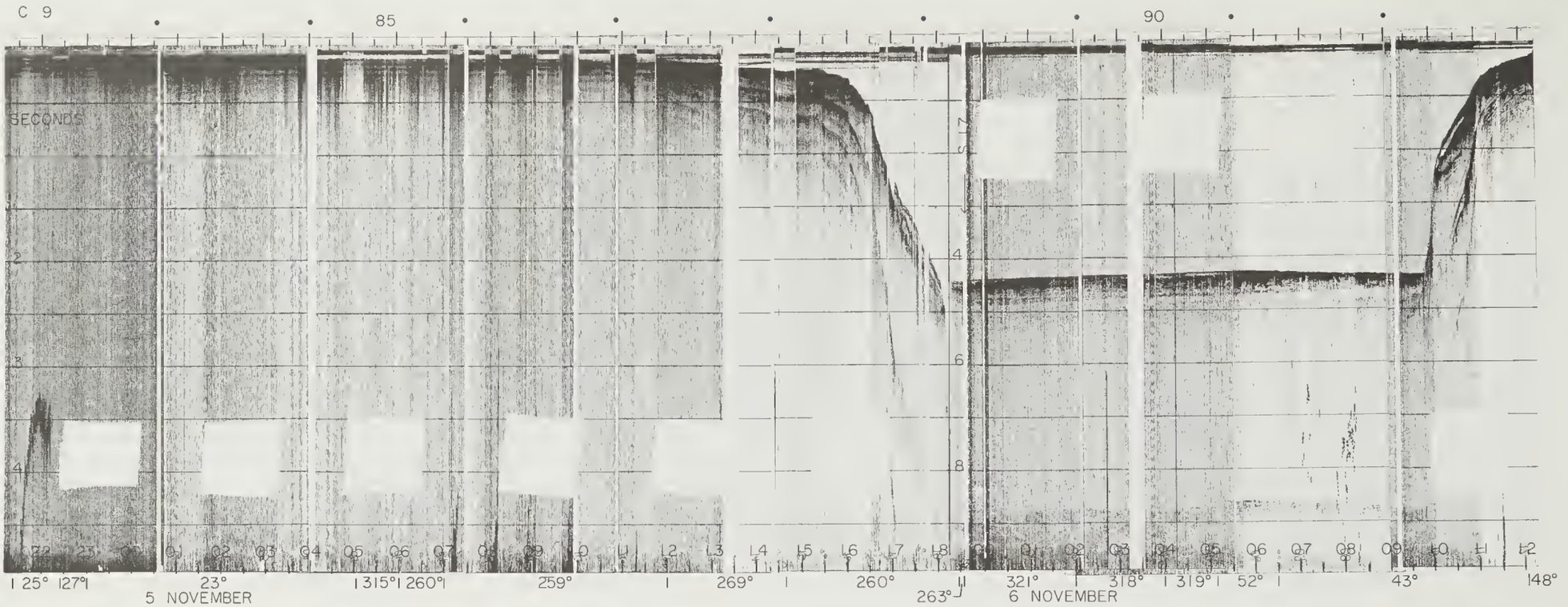

C 9
15
20
FATHOMS
S 5
800
600
3200
222°
224°
226°
223°
225°
207°
209°
218°
268°
267°
180°
78°
93°
176°
265°
266°
21 OCTOBER
22 OCTOBER

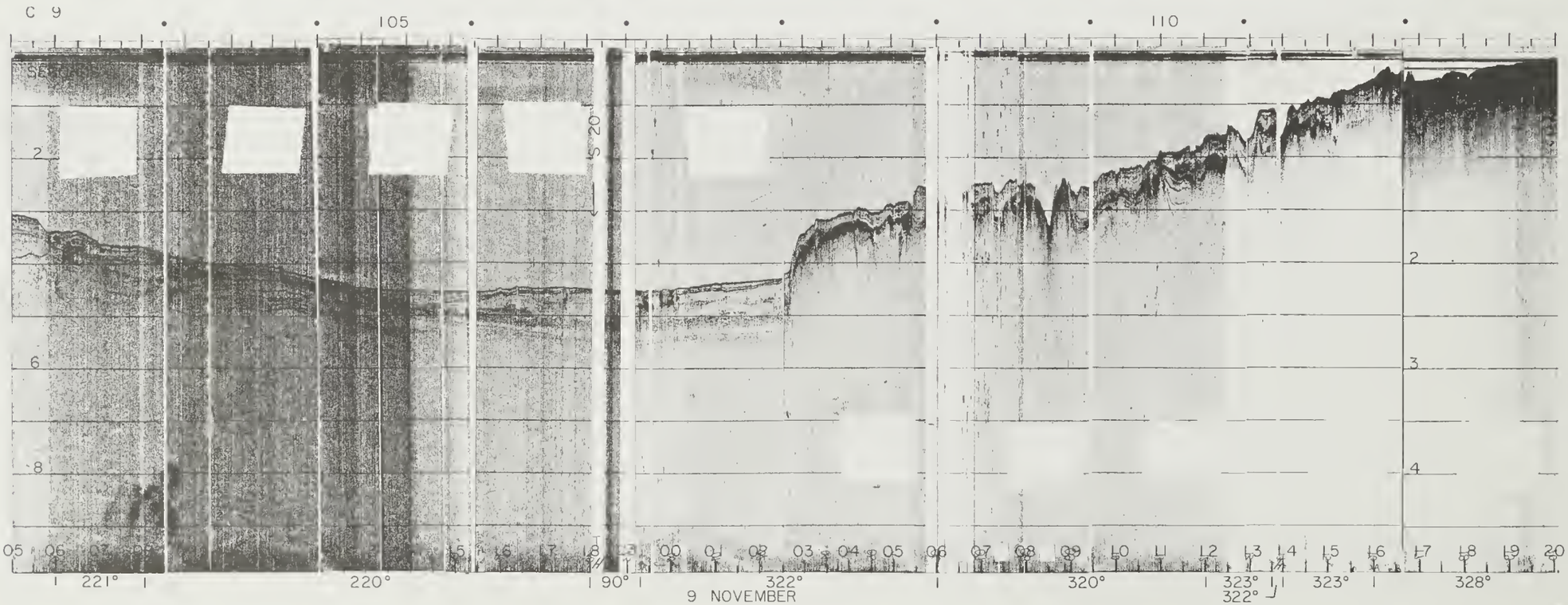

C 9
35
40
FATHOMS
S 8
S 10
400
800
600
2400
3200
135°
132°
77°
78°
76°
84°
94°
357°
123°
234°
78°
228°
261°
131°
129°
68°
215°
212°
25 OCTOBER
26 OCTOBER
1964

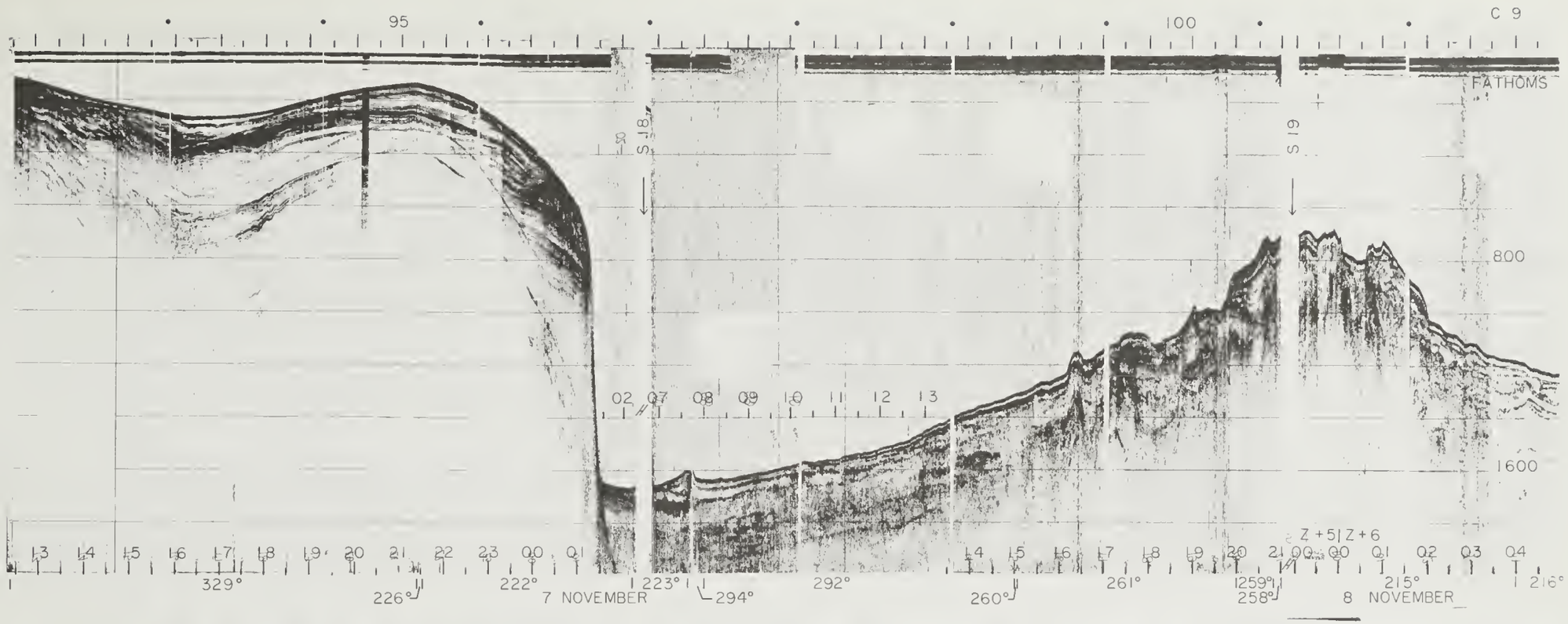

C 9
45
50
SECONDS
S 11 8 12
24°
58°
62°
62°
28 OCTOBER
63°
60°
32°
33°
34°
40°
29 OCTOBER
74°
71°
30 OCTOBER
200°
290°
C 9
65
70
SECONDS
339°
338°
2 NOVEMBER
198°
199°
231°
336°
337°
239°
247°
343°
227°
218°
229°
208°
212°
277°
212°
3 NOVEMBER
236°
229°
140°

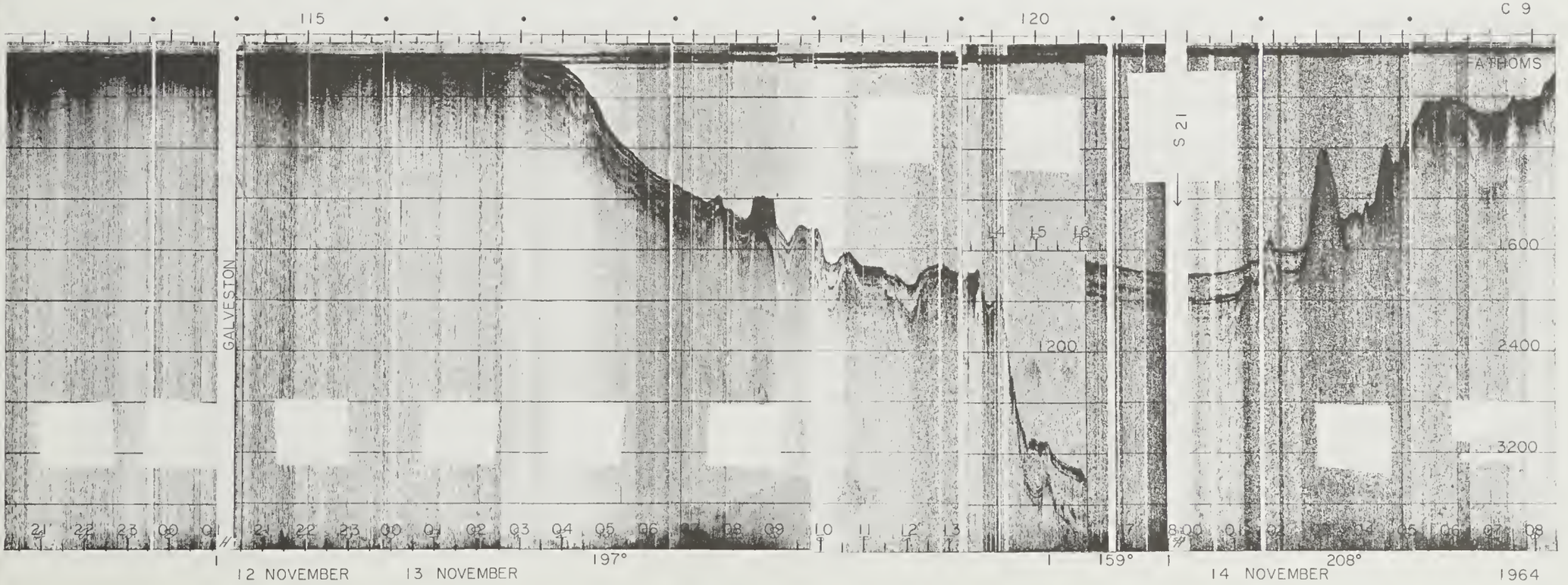

55
57 - I
57 - II
60
C 9
FATHOMS
800
1600
2400
3200
400
1200
1600
S 15
327°
89°
91°
86°
222°
252°
310°
86°
222°
179°
31 OCTOBER
1 NOVEMBER
248°
250°
1198°
1176°

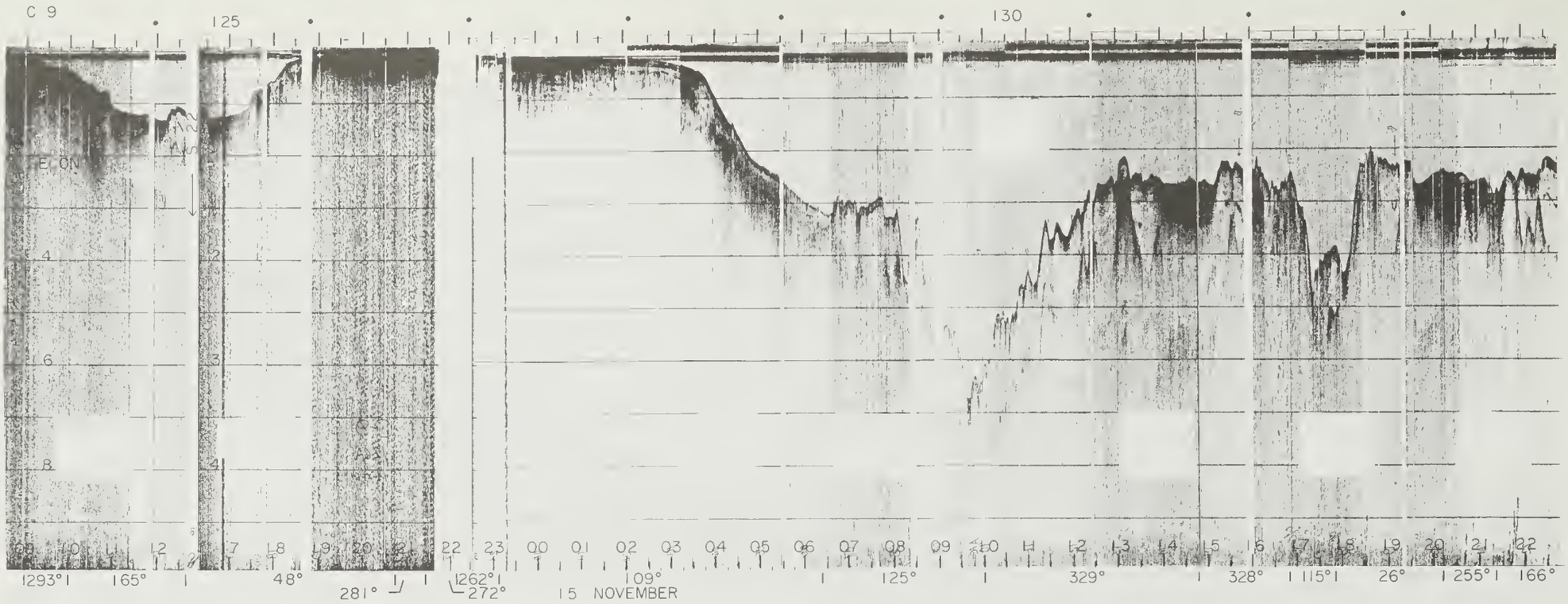

75
80
C 9
FATHOMS
800
1200
1600
145°
163°
165°
179°
186°
292°
281°
292°
310°
354°
287°
4 NOVEMBER
216°
210°
298°
295°
1304°

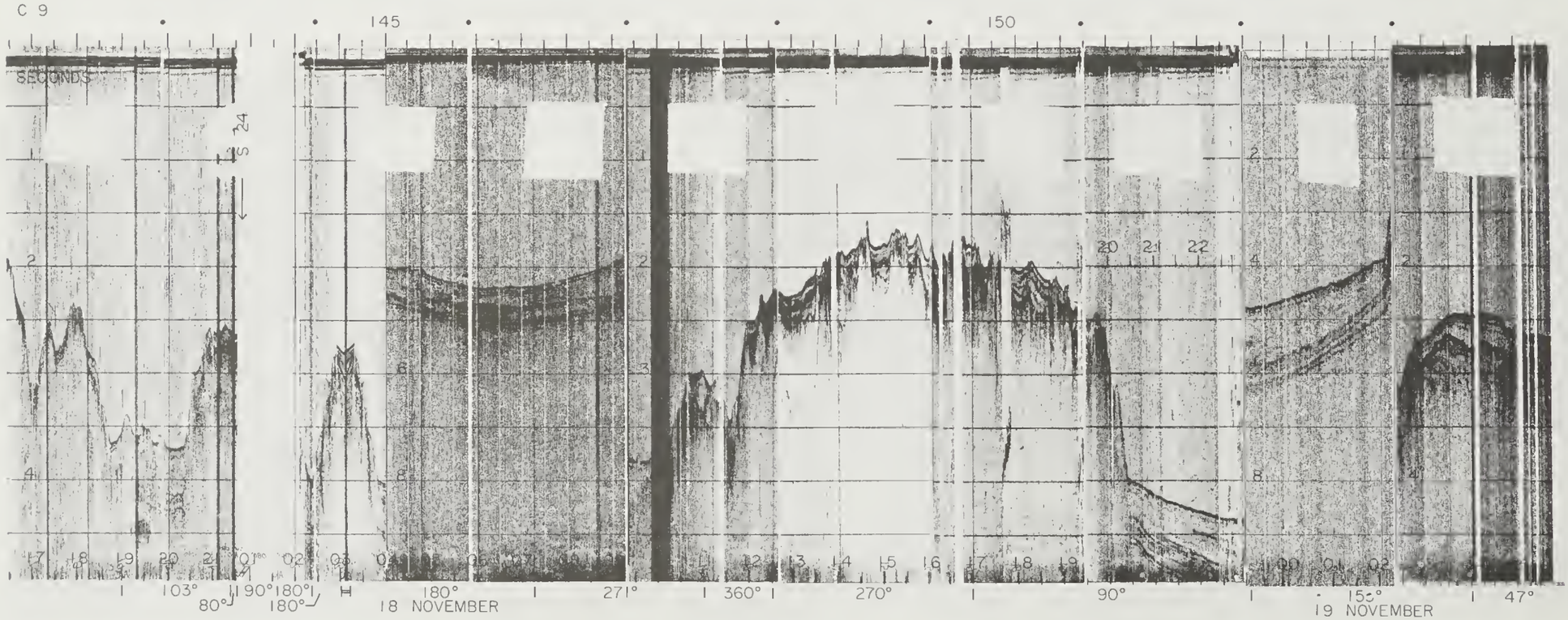

C 9
85
90
SECONDS
125° 127°
23°
315° 260°
259°
269°
260°
263°
321°
318°
319°
52°
43°
148°
5 NOVEMBER
6 NOVEMBER

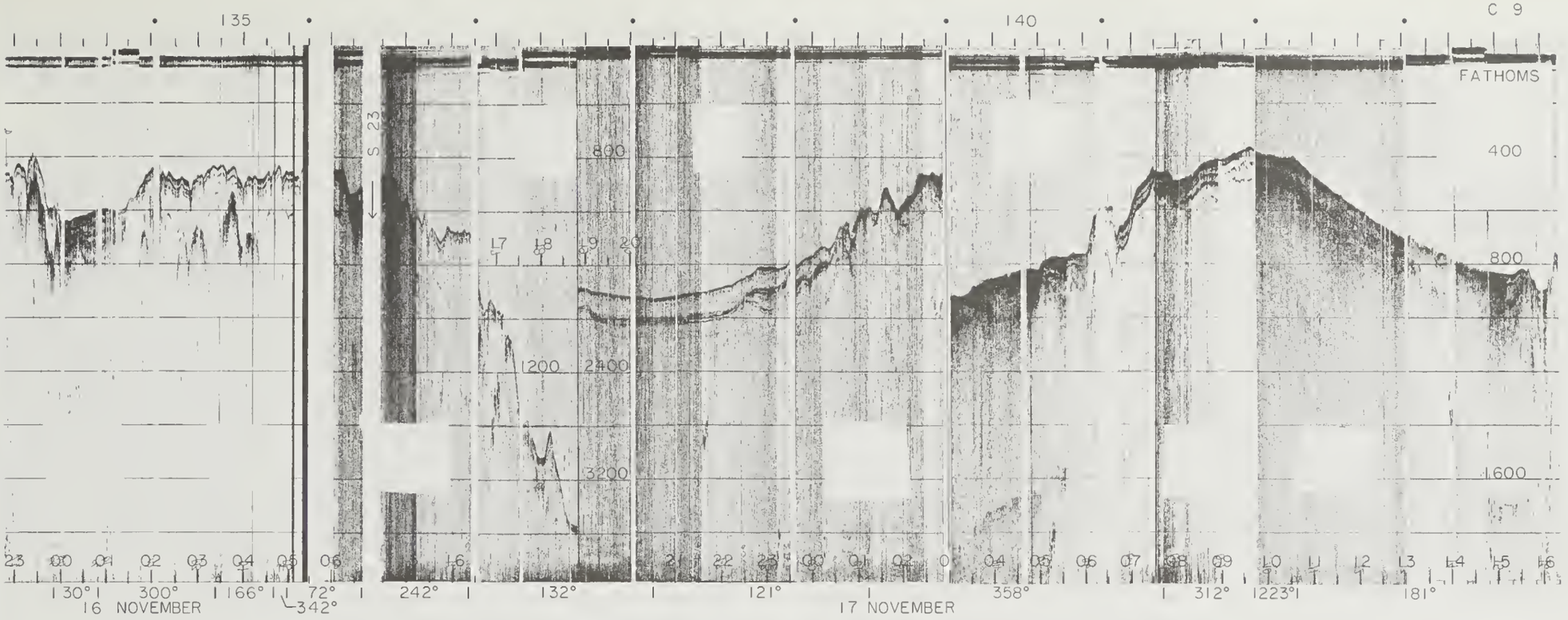

C 9
105
110
SECONDS
S 20°
221°
220°
90°
322°
320°
323°
322°
323°
328°
9 NOVEMBER

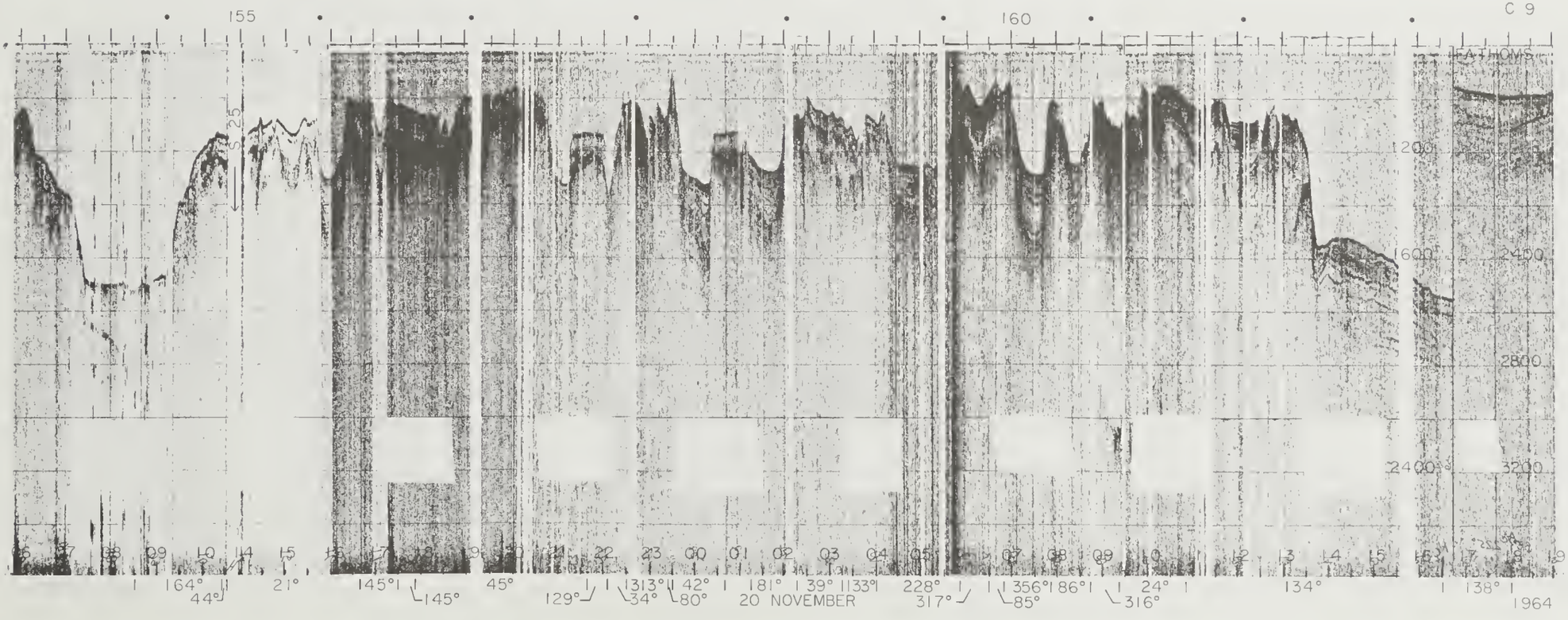

C 9
95
100
FATHOMS
S 18
S 19
800
1600
02 07 08 09 10 11 12 13
13 14 15 16 17 18 19 20 21 22 23 00 01
Z+5 Z+6
14 15 16 17 18 19 20 21 00 00 01 02 03 04
329°
226°
222°
223°
294°
292°
260°
261°
259°
258°
215°
216°
7 NOVEMBER
8 NOVEMBER

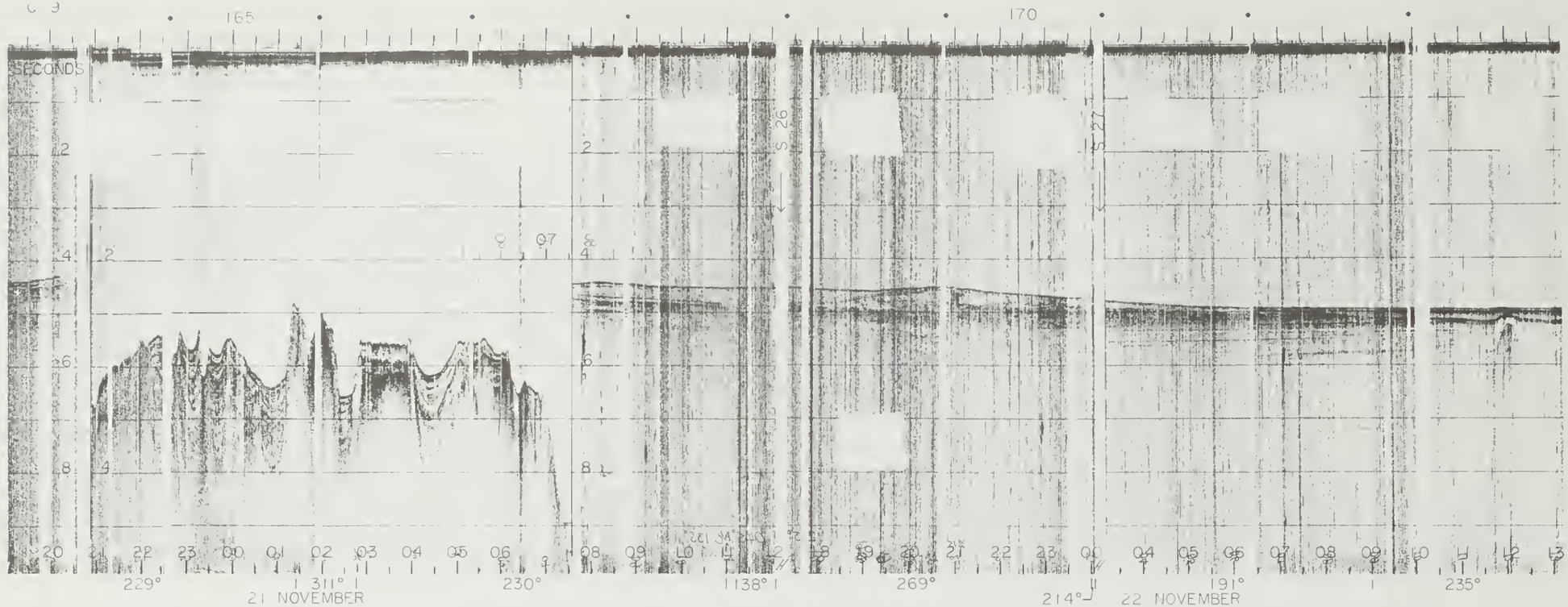

C 9
115
120
FATHOMS
S 21
GALVESTON
1600
1200
2400
3200
21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13
197°
159°
208°
12 NOVEMBER
13 NOVEMBER
14 NOVEMBER
1964

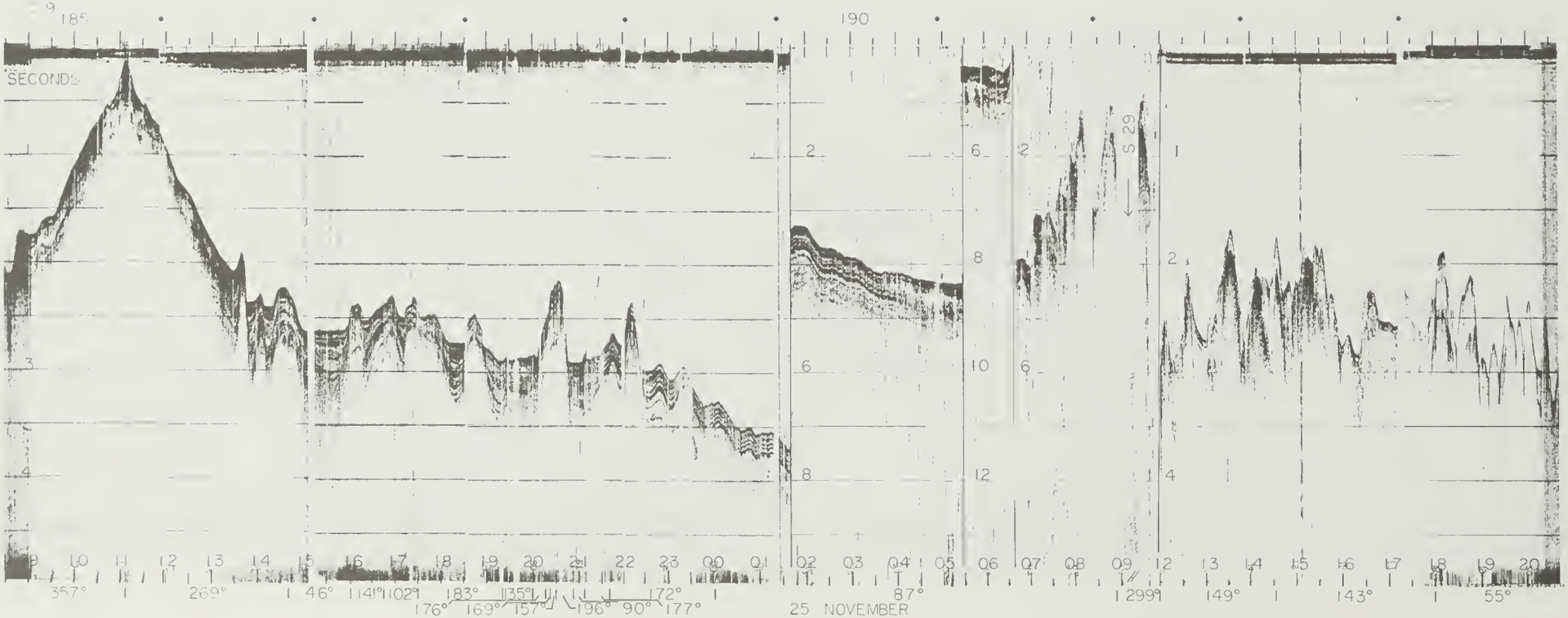

C 9
125
130
E ON
1293° 165° 48° 281° 1262° 272° 109° 125° 329° 328° 115° 26° 255° 166°
15 NOVEMBER

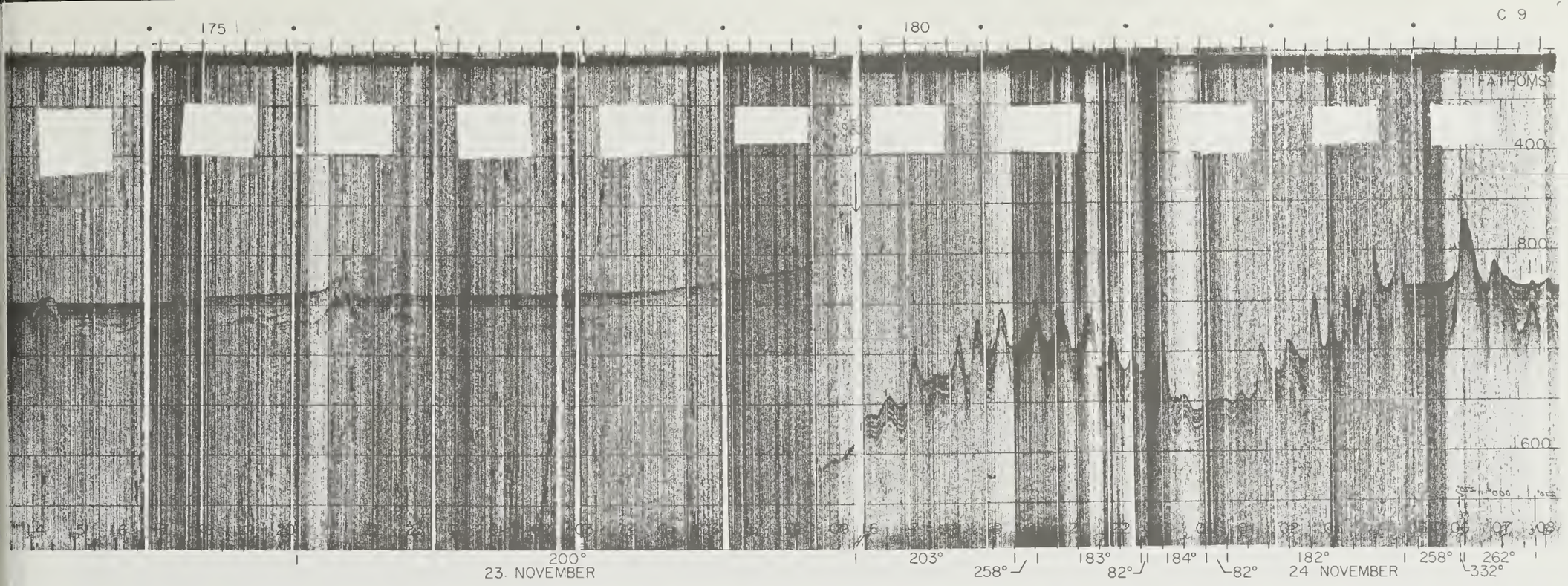

C 9
145
150
SECONDS
S 24
103° 80° 190° 180° 180° 180° 271° 360° 270° 90° 150° 47°
18 NOVEMBER
19 NOVEMBER

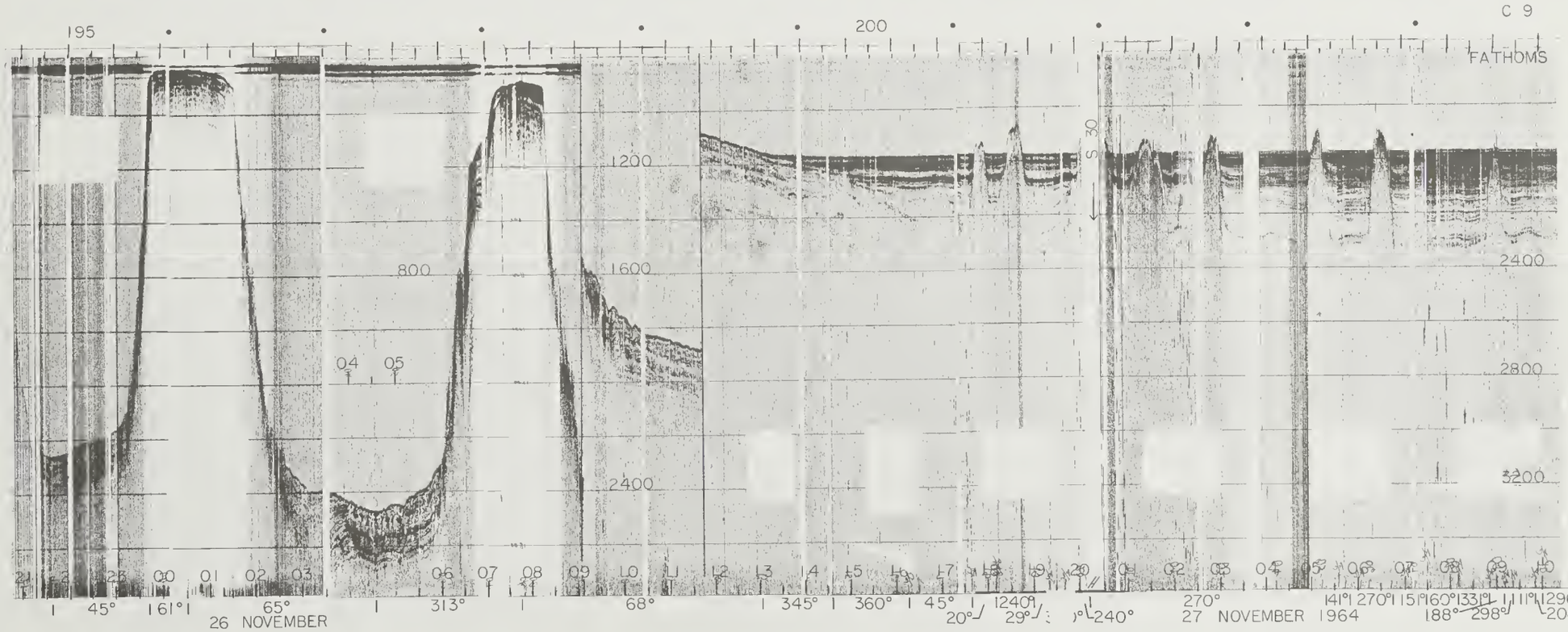

C 9
135
140
FATHOMS
400
800
1600
S 23
800
1200
2400
3200
16 NOVEMBER
17 NOVEMBER

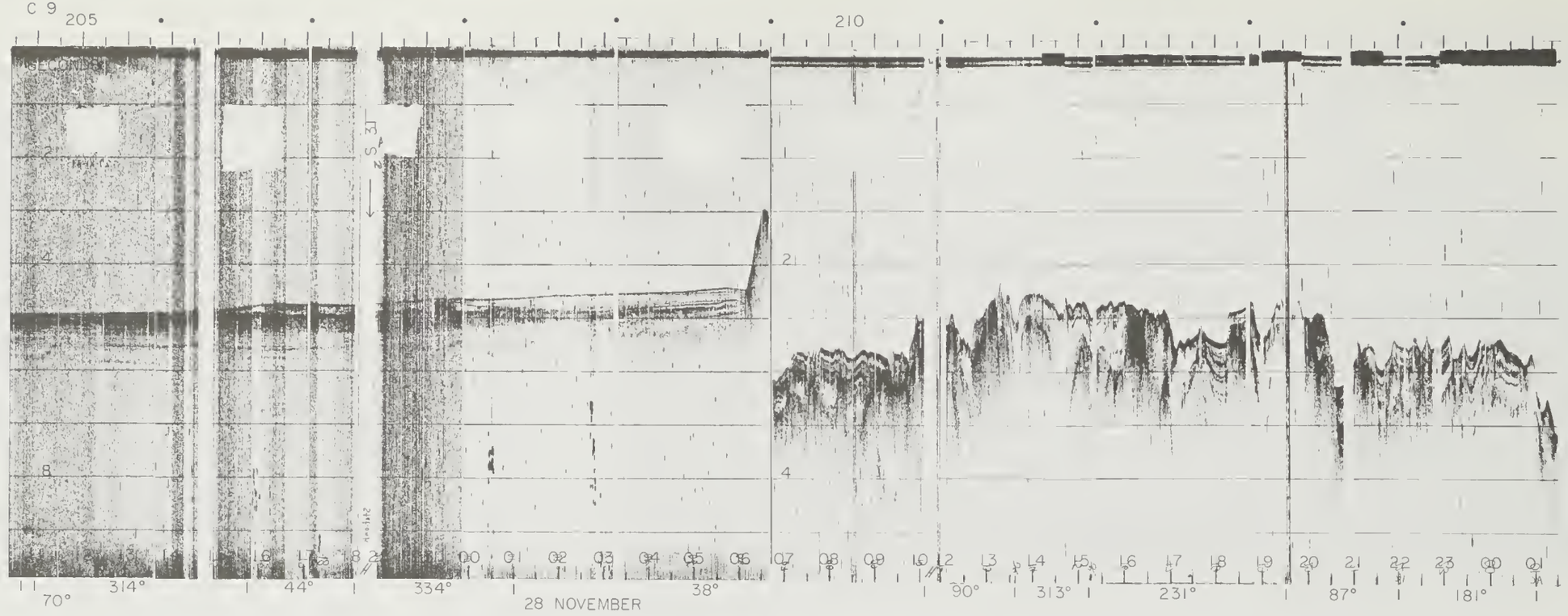

C 9
155
160
FATHOMS
S 25
1200
1600
2400
2800
3200
1964

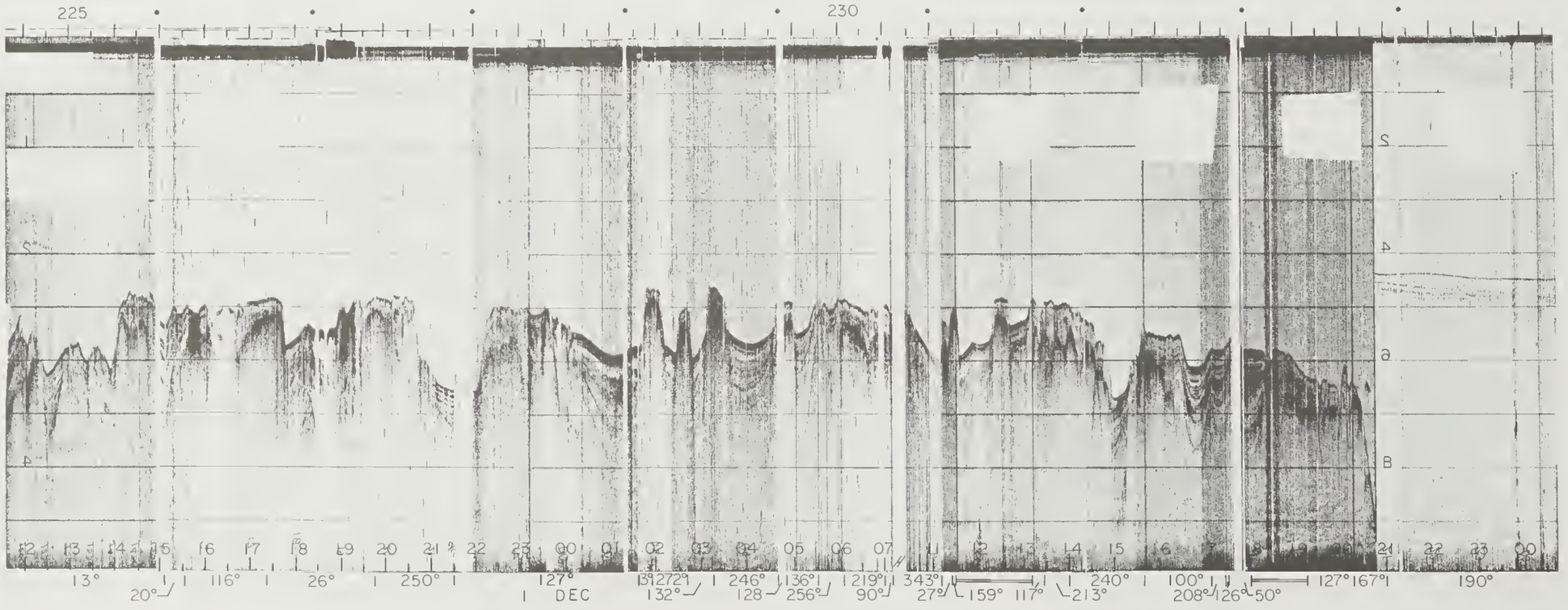

SECONDS
165
170
S 26
S 27
229°
311°
230°
138°
269°
214°
191°
235°
21 NOVEMBER
22 NOVEMBER

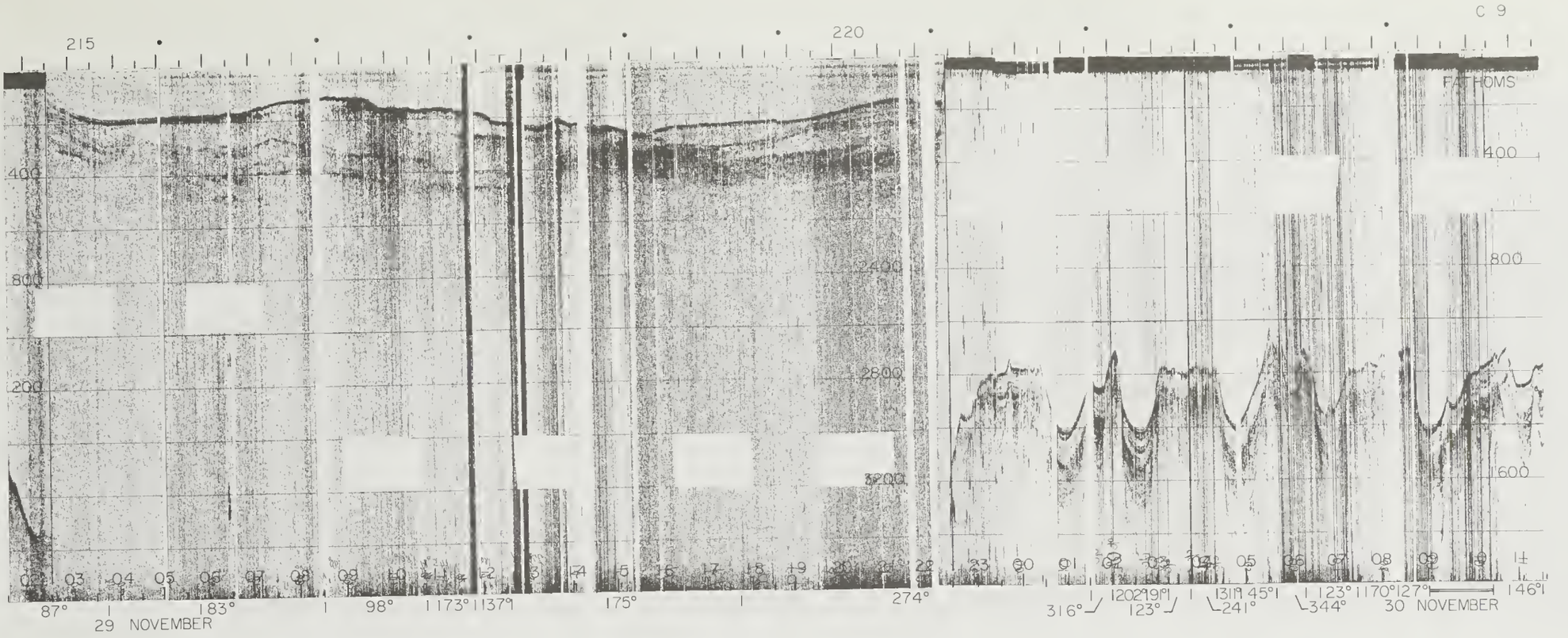

SECONDS
185
190
S 28
S 29
357°
269°
46°
141°
102°
183°
135°
172°
176°
169°
157°
196°
90°
177°
87°
299°
149°
143°
55°
25 NOVEMBER

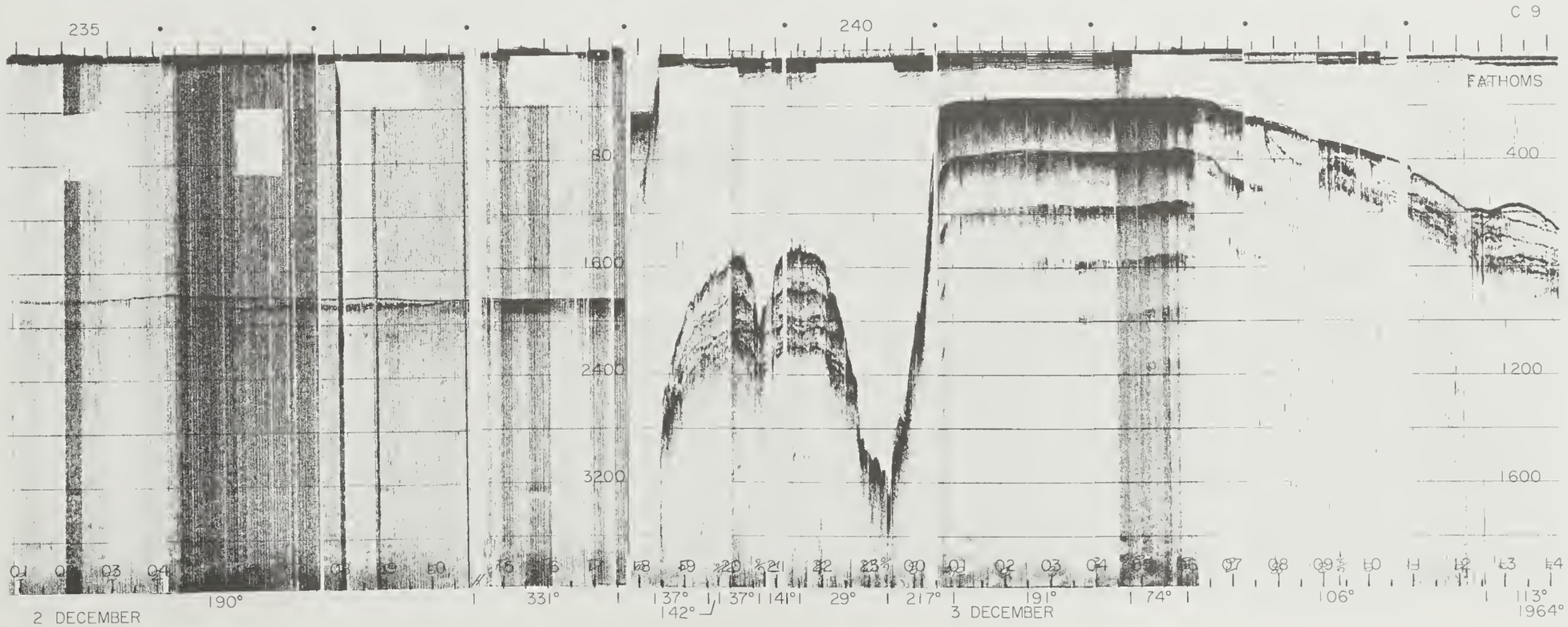

C 9
175
180
FATHOMS
400
800
1600
200°
23. NOVEMBER
203°
258°
183°
82°
184°
82°
182°
24 NOVEMBER
258°
262°
332°

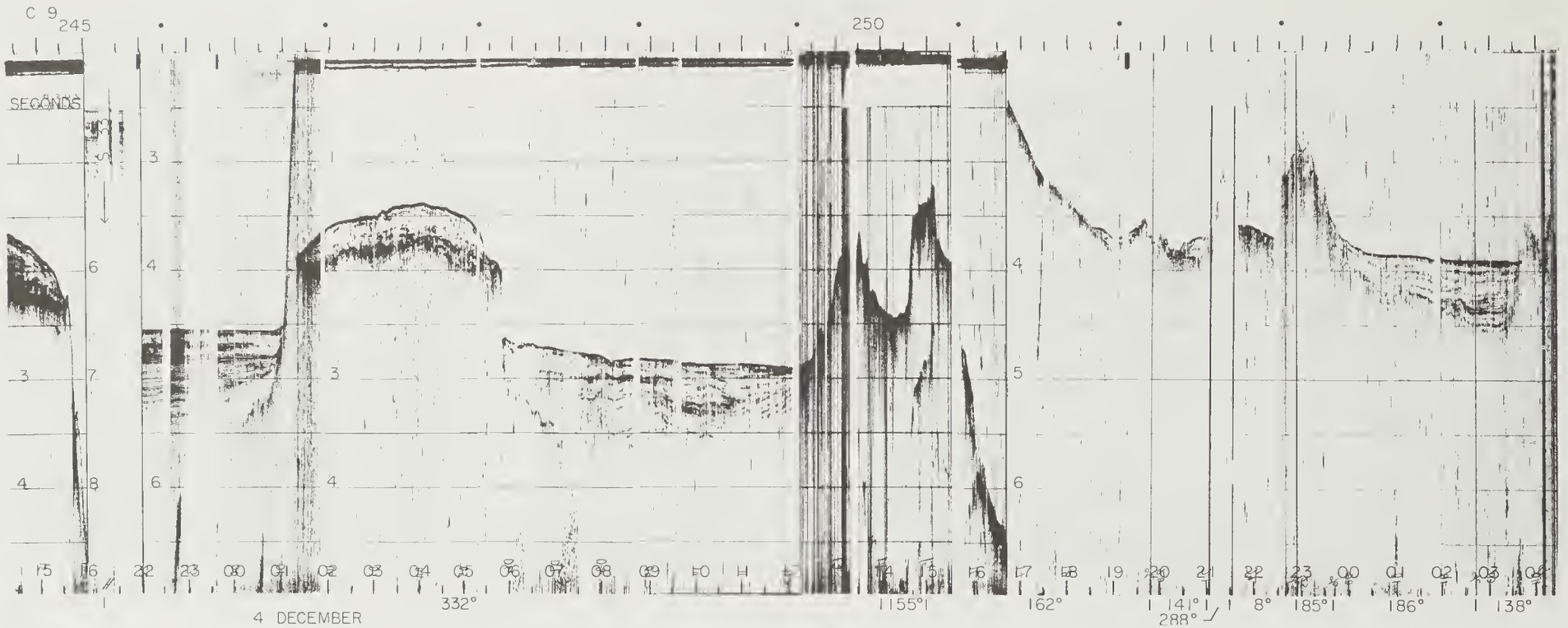

C 9
195
200
FATHOMS
1200
800
1600
2400
2800
3200
S 30
04
05
45°
161°
65°
26 NOVEMBER
313°
68°
345°
360°
45°
20°
29°
240°
270°
27 NOVEMBER 1964
141°
270°
15°
160°
331°
188°
298°
296°
208°

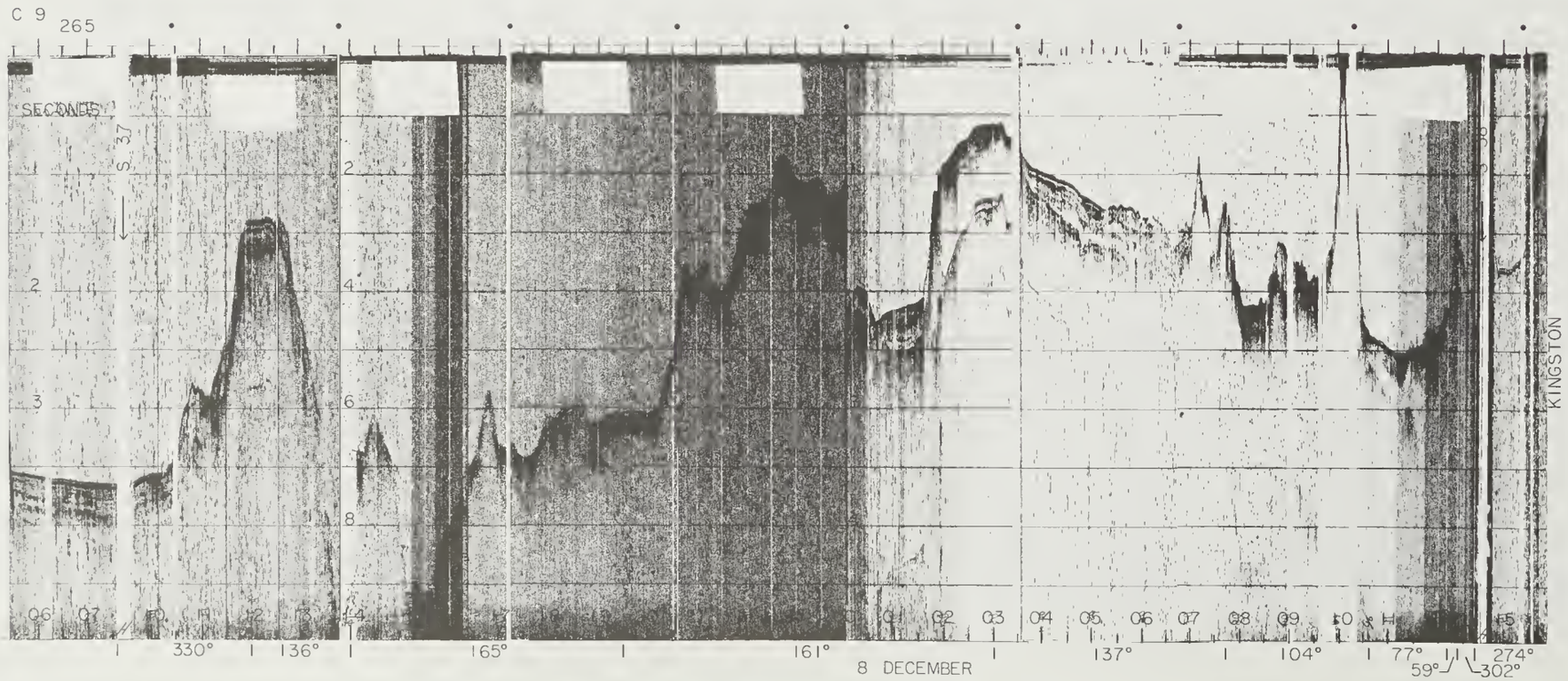

205
210
SECONDS
70°
314°
44°
334°
38°
90°
313°
231°
87°
181°
28 NOVEMBER

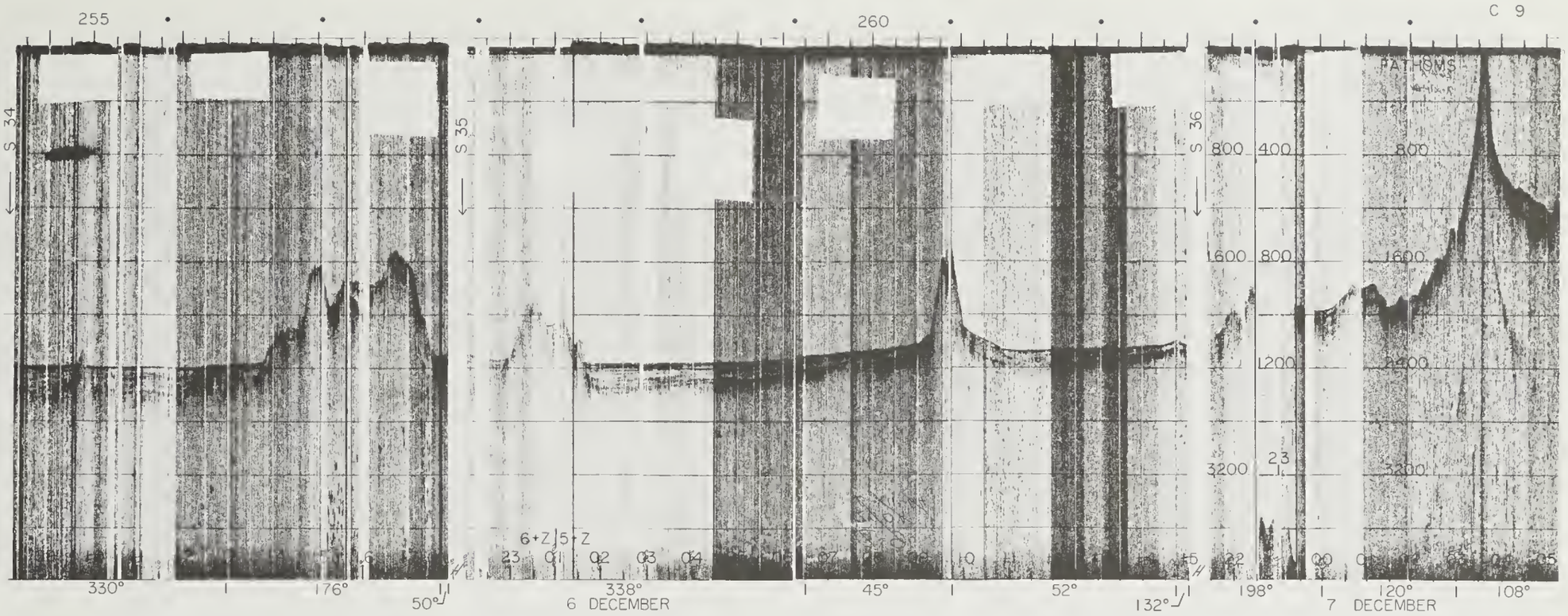

225
230
13°
20°
116°
26°
250°
127°
DEC
132°
128
256°
90°
27°
159°
117°
213°
208°
126°
50°
127°
167°
190°

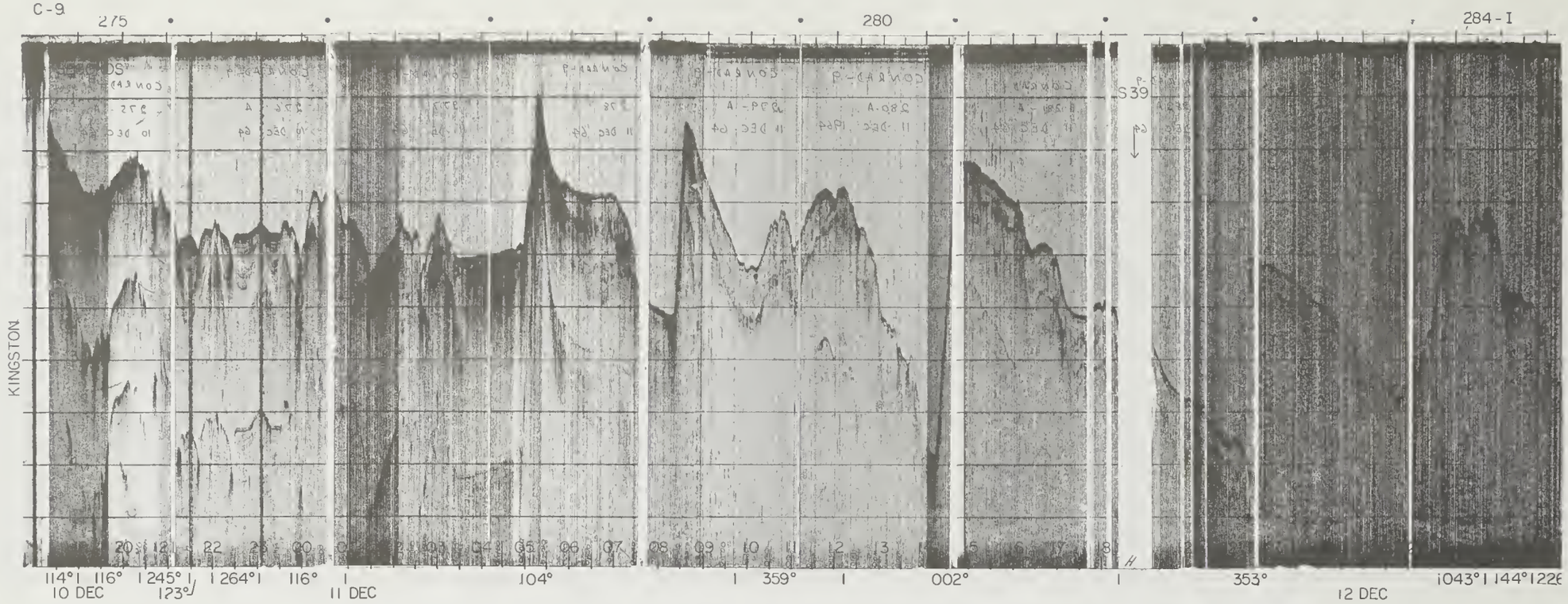

C 9
215
220
FATHOMS
400
800
2400
2800
3200
1600
87°
183°
98°
173°
137°
175°
274°
316°
120°
219°
123°
131°
241°
45°
123°
344°
170°
127°
30 NOVEMBER
146°
29 NOVEMBER

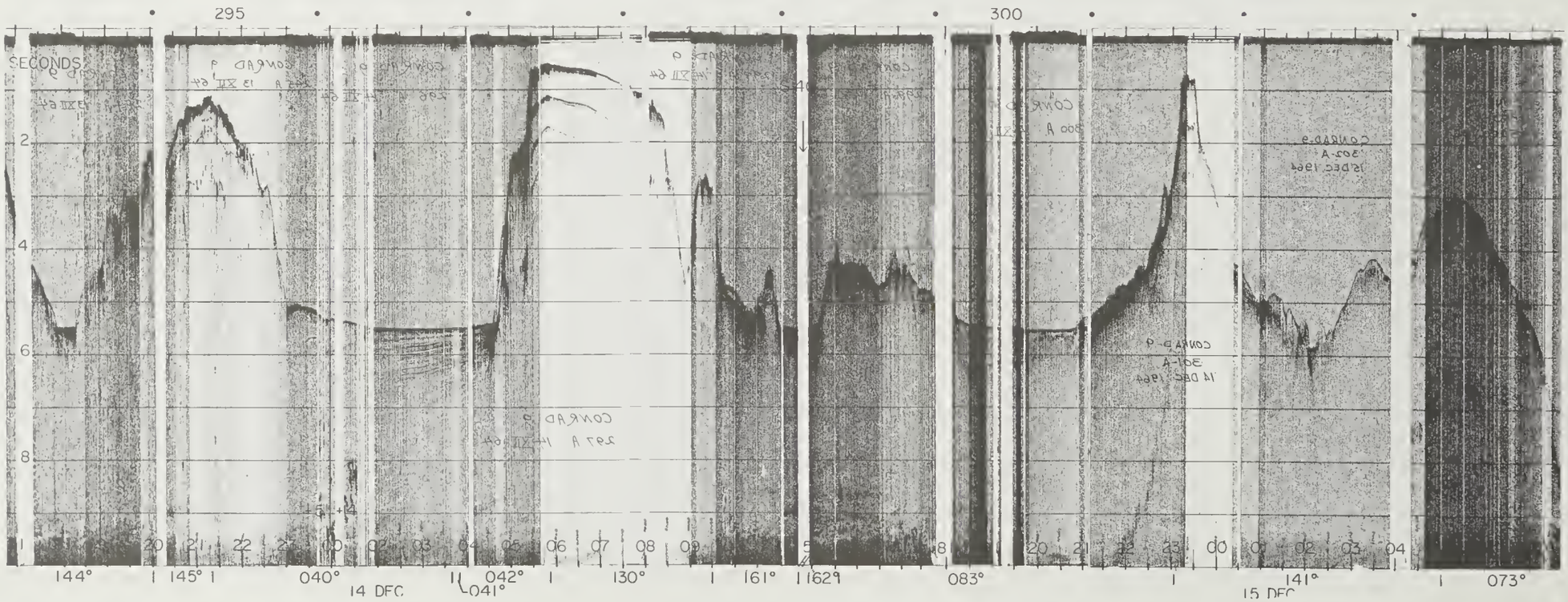

C 9
235
240
FATHOMS
400
800
1200
1600
2400
3200
190°
331°
137°
142°
37°
141°
29°
217°
191°
74°
106°
113°
1964°
2 DECEMBER
3 DECEMBER

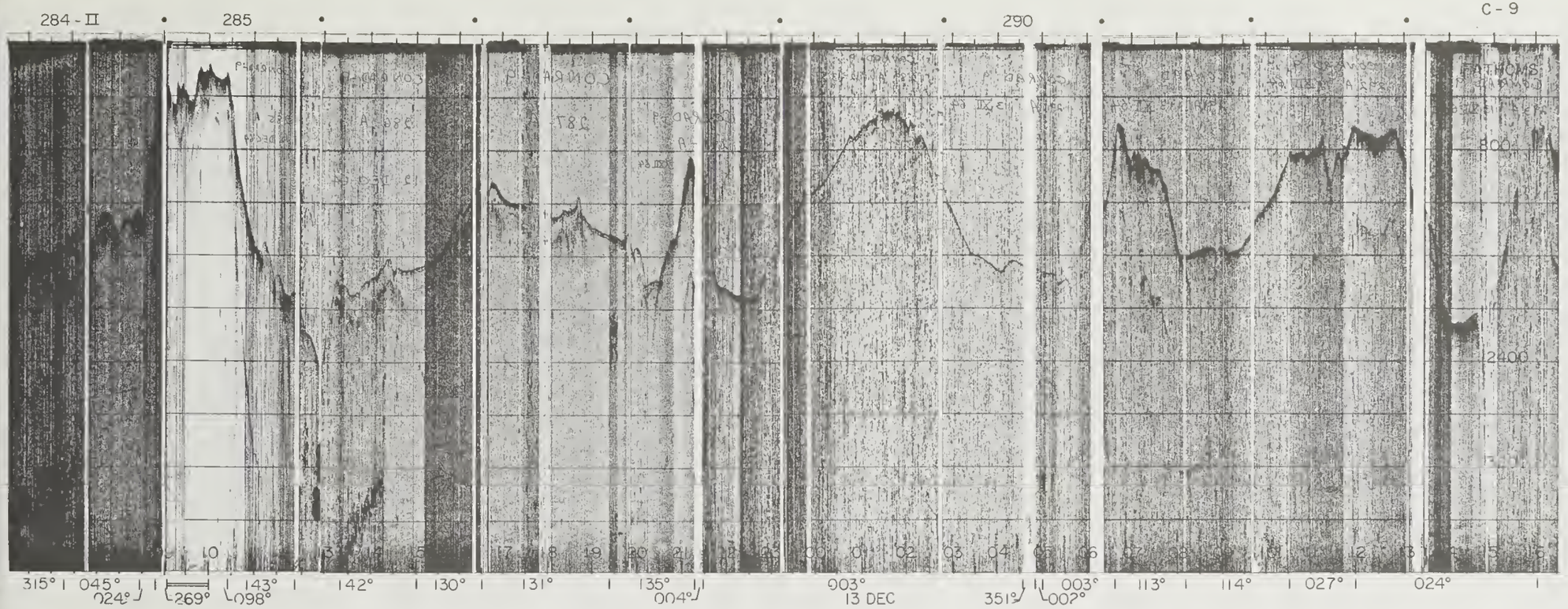

C 9
245
250
SECONDS
332°
155°
162°
141°
288°
8°
185°
186°
138°
4 DECEMBER

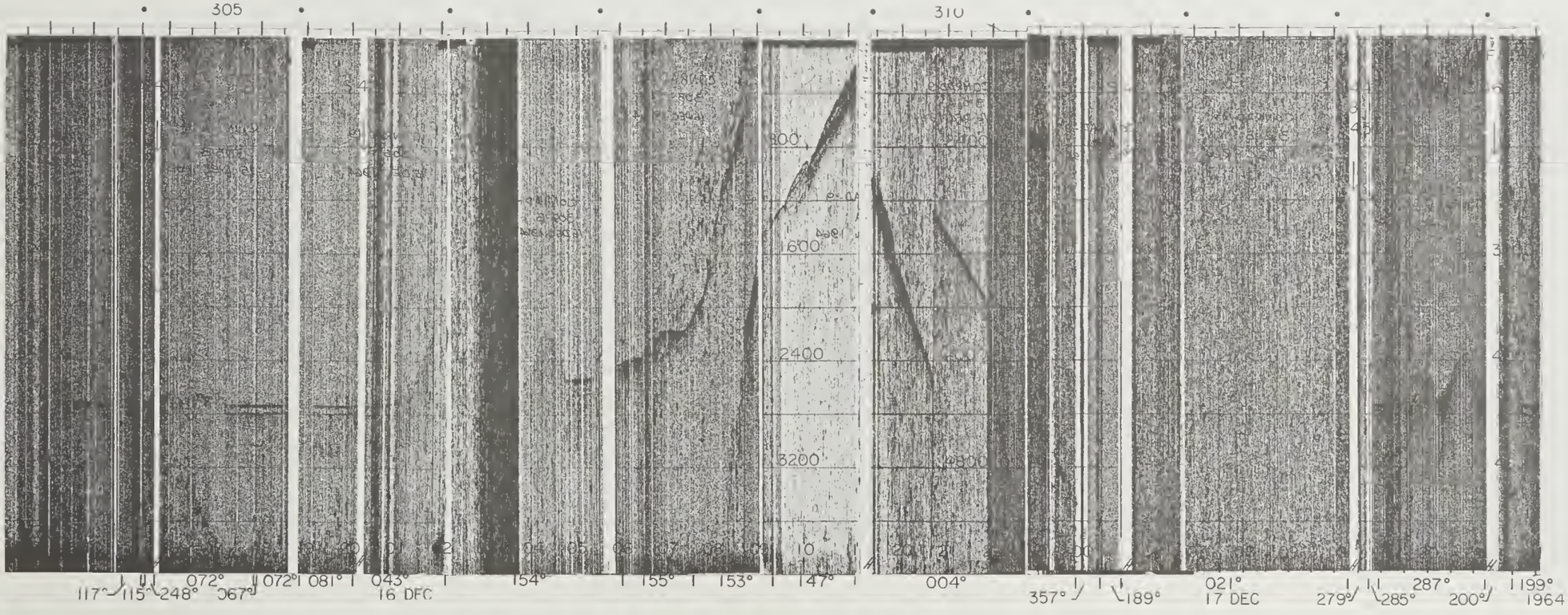

C 9
265
SECONDS
S 37
330°
136°
165°
161°
137°
104°
77°
59°
274°
302°
8 DECEMBER
KINGSTON

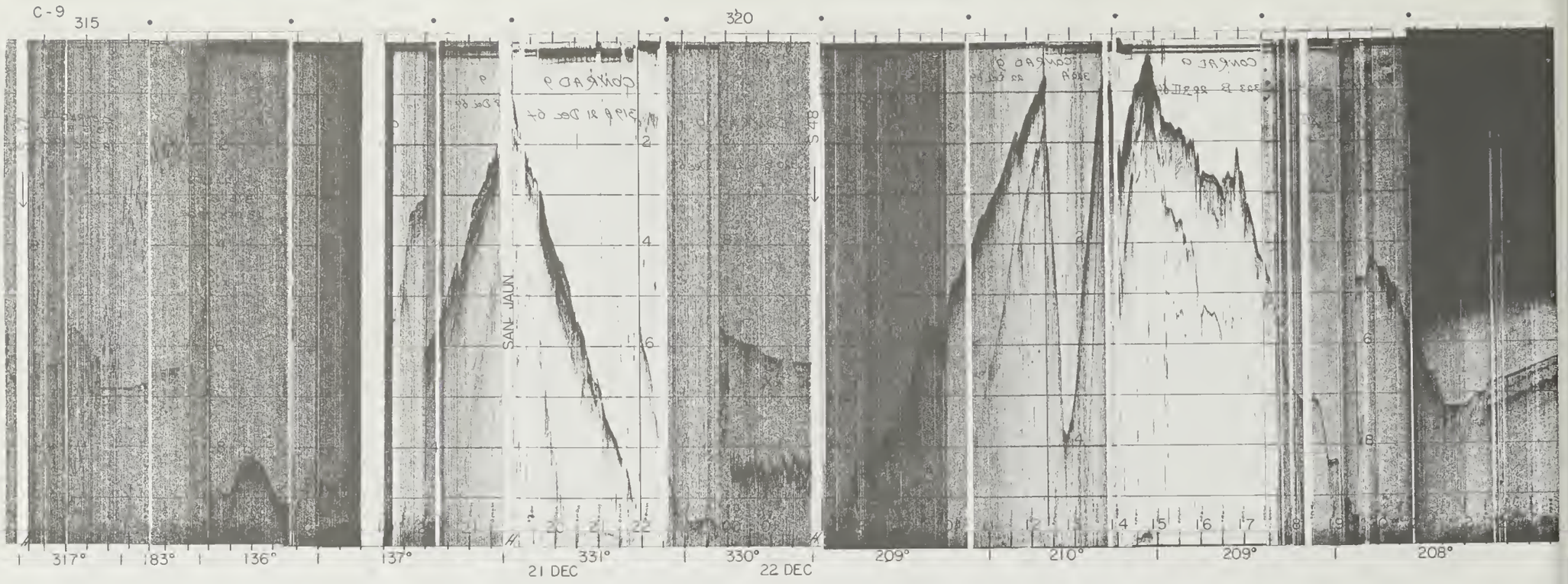

C 9
255
260
S 34
S 35
S 36
PATHOMS
800
400
800
1600
800
1600
1200
2400
3200
23
3200
6+Z 5+Z
23
01
02
03
04
330°
176°
50°
338°
6 DECEMBER
45°
52°
132°
198°
120°
108°
7 DECEMBER

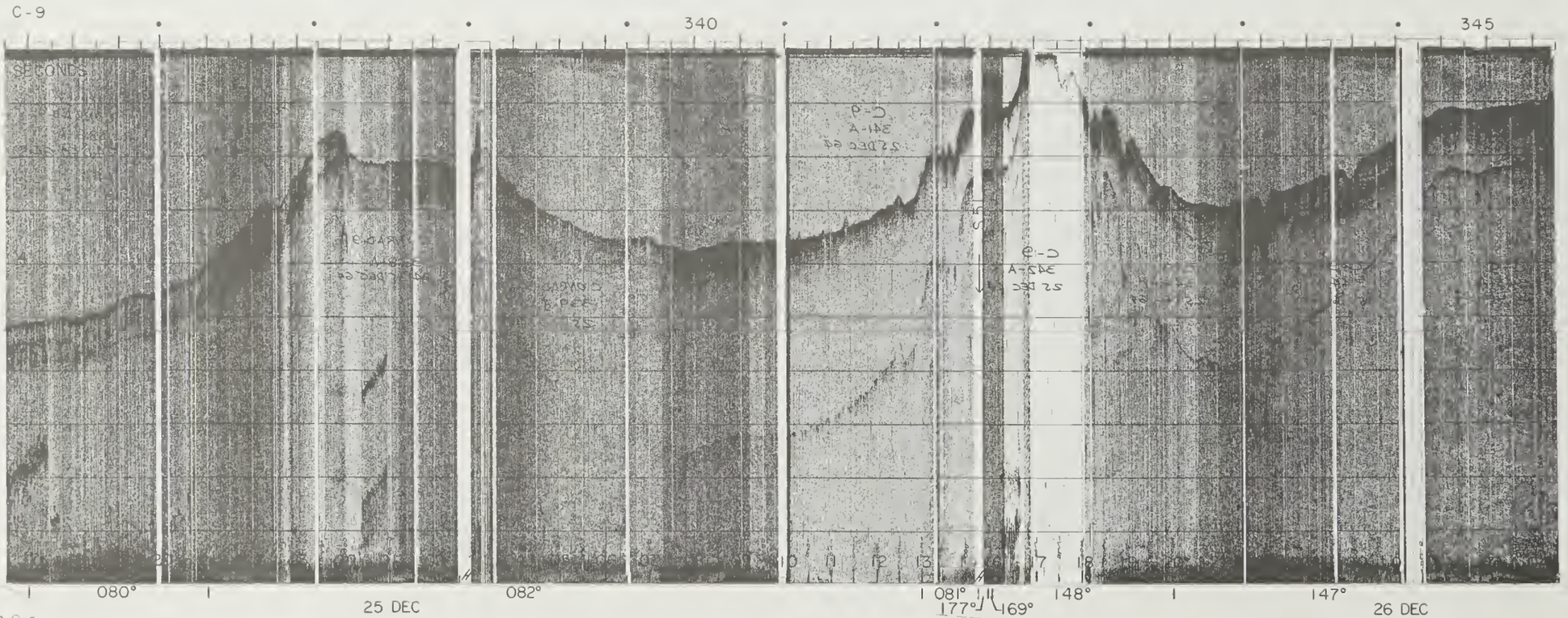

275
280
284-I
KINGSTON
114° 116° 245° 264° 116°
10 DEC
123°
11 DEC
104°
359°
002°
353°
043° 144° 122
12 DEC

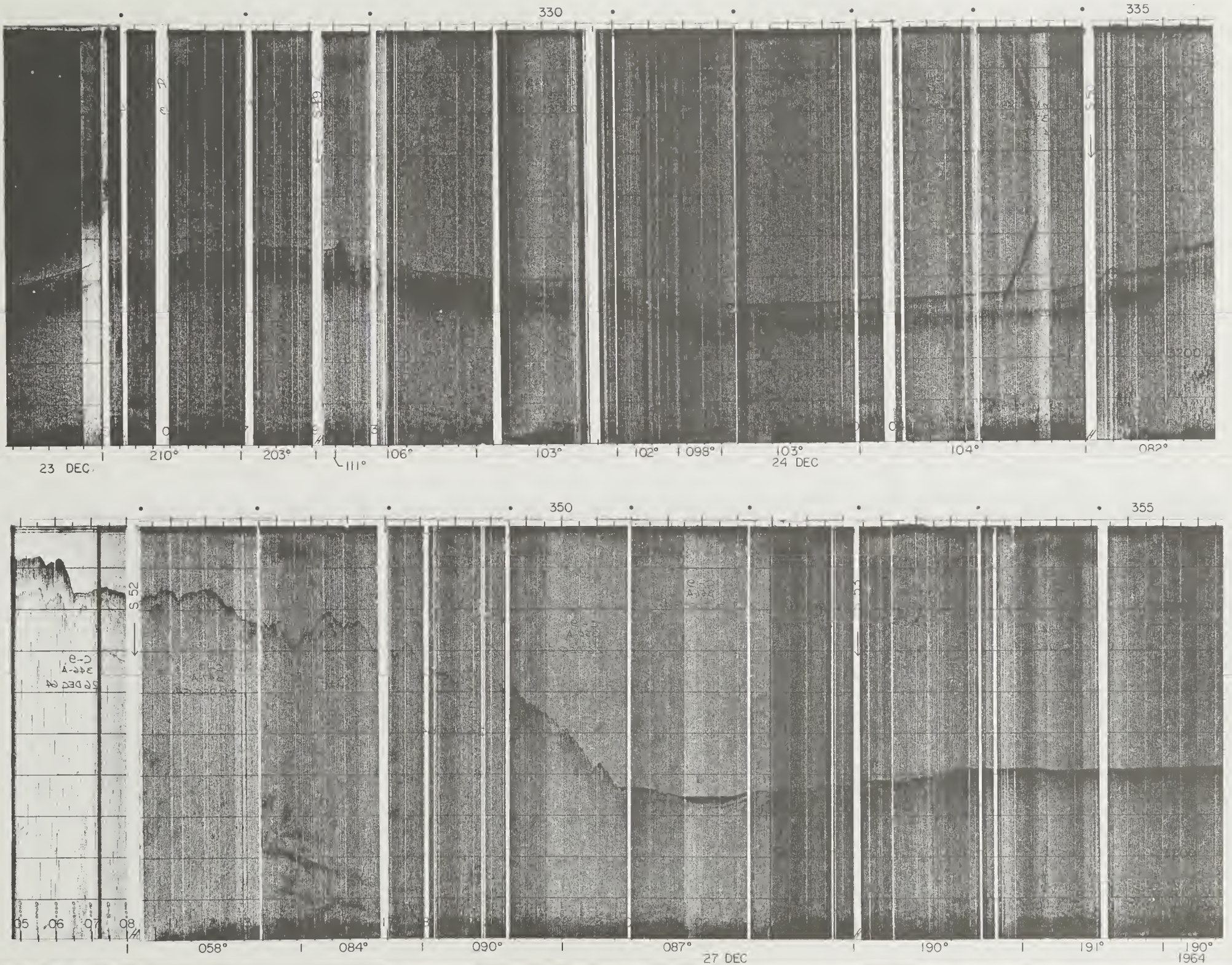

295
300
SECONDS
144°
145°
040°
042°
041°
14 DEC
130°
161°
083°
141°
073°
15 DEC

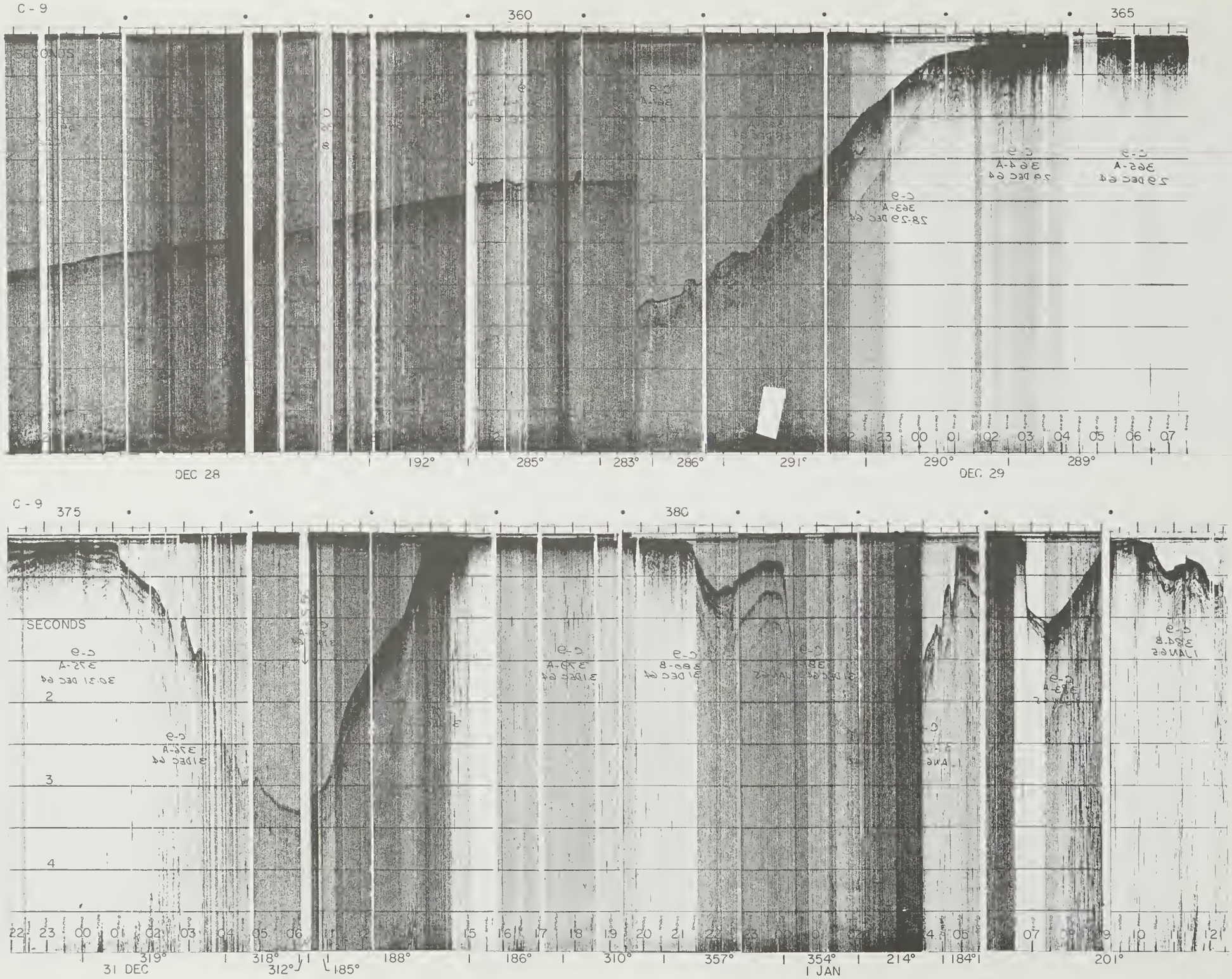

284 - II
285
290
FATHOMS
800
2400
315° 045° 024°
269° 098°
142°
130°
131°
135° 004°
003° 13 DEC
351° 003° 002°
113°
114°
027°
024°

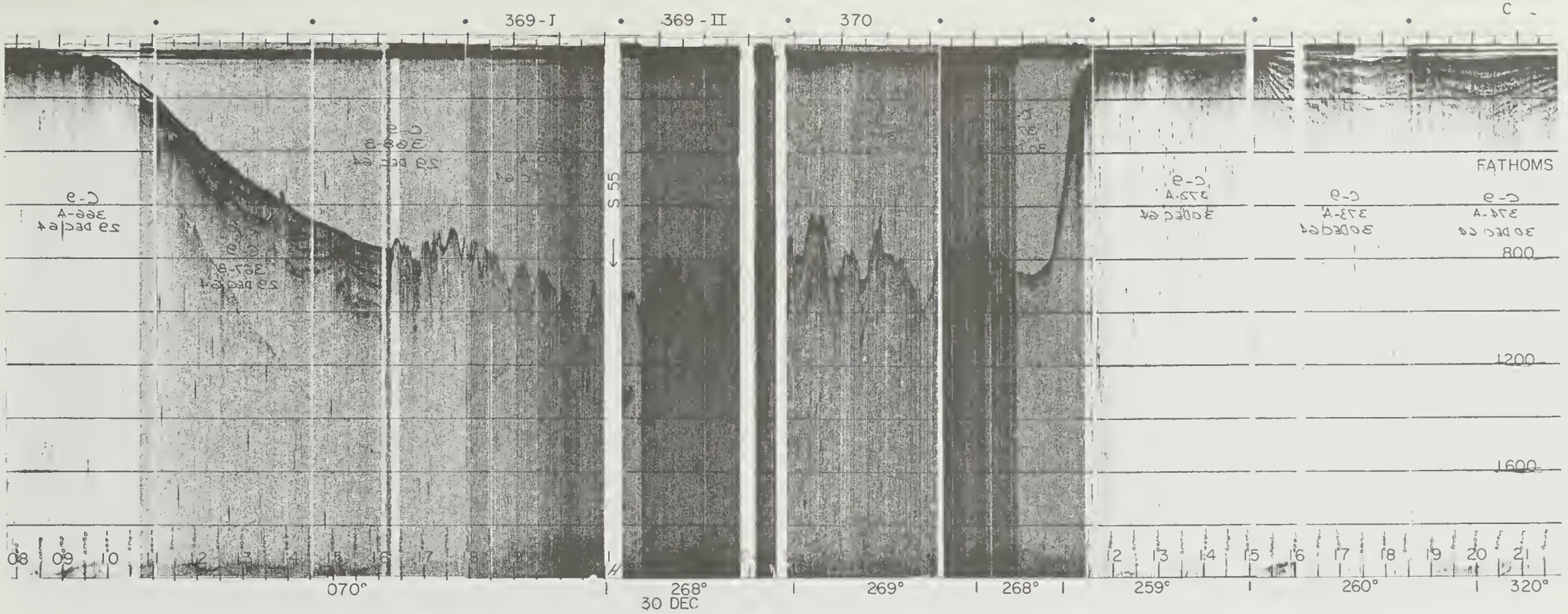

305
310
800
1600
2400
3200
4800
117° 115° 248° 067°
072° 072° 081° 043° 16 DEC
154°
155°
153°
147°
004°
357° 189° 021° 17 DEC
279° 285° 287° 200° 199° 1964

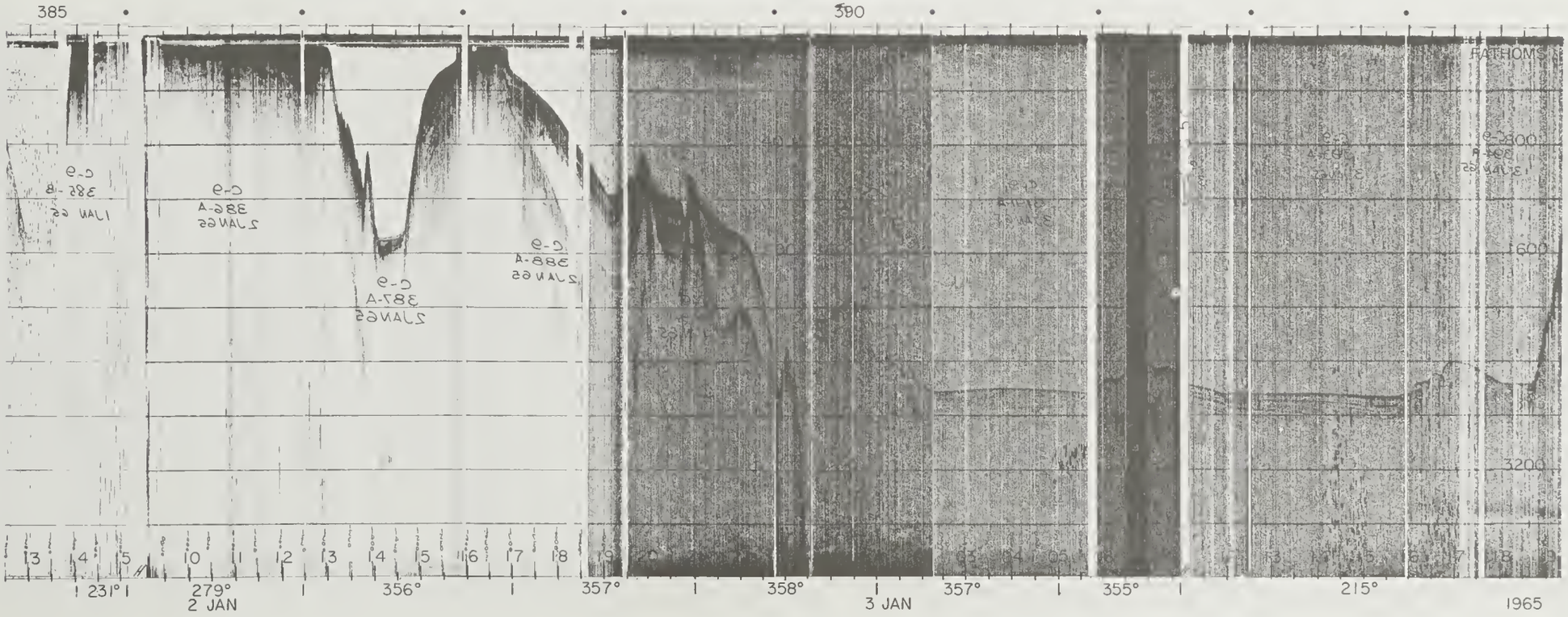

C-9
315
320
SAN JUAN
317°
183°
136°
137°
331°
330°
21 DEC
22 DEC
209°
210°
209°
208°

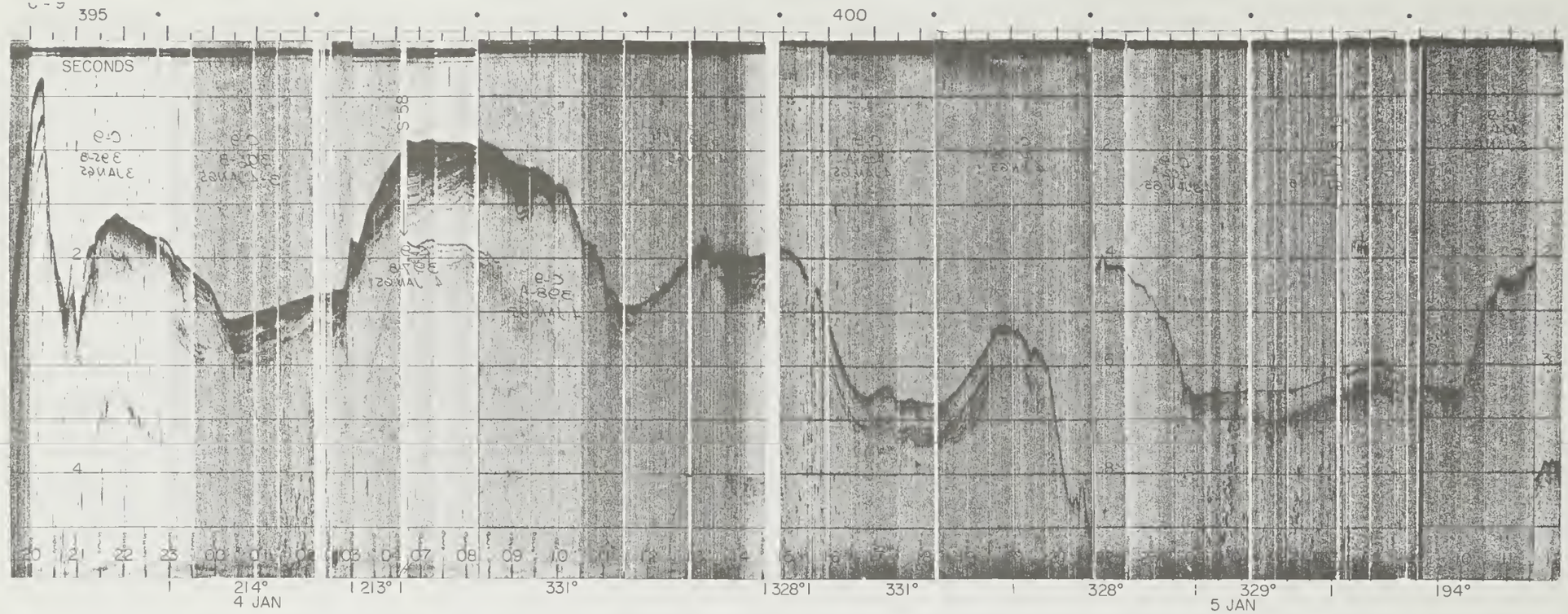

C-9
340
345
SECONDS
080°
25 DEC
082°
081°
177°
169°
148°
147°
26 DEC

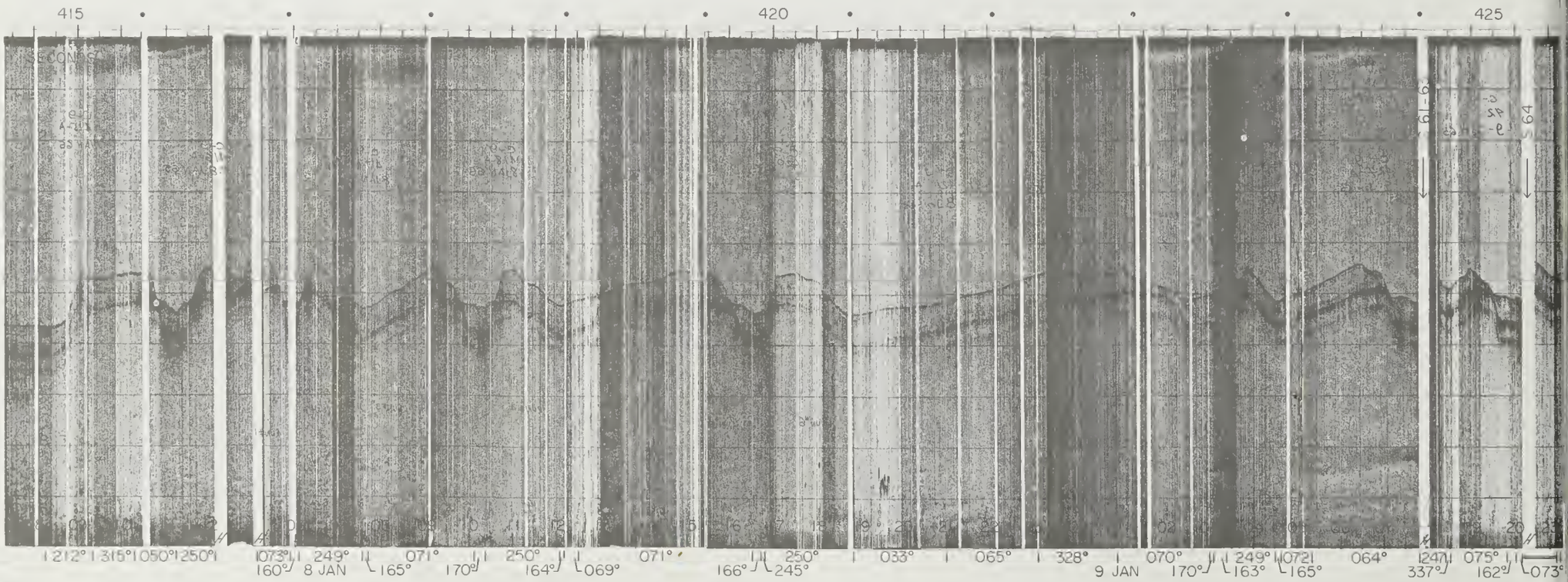

330
335
S 49
S 50
S 51
200
210°
203°
111°
106°
103°
102°
098°
103°
24 DEC
104°
082°
23 DEC
350
355
S 52
S 53
058°
084°
090°
087°
27 DEC
190°
191°
190°
1964

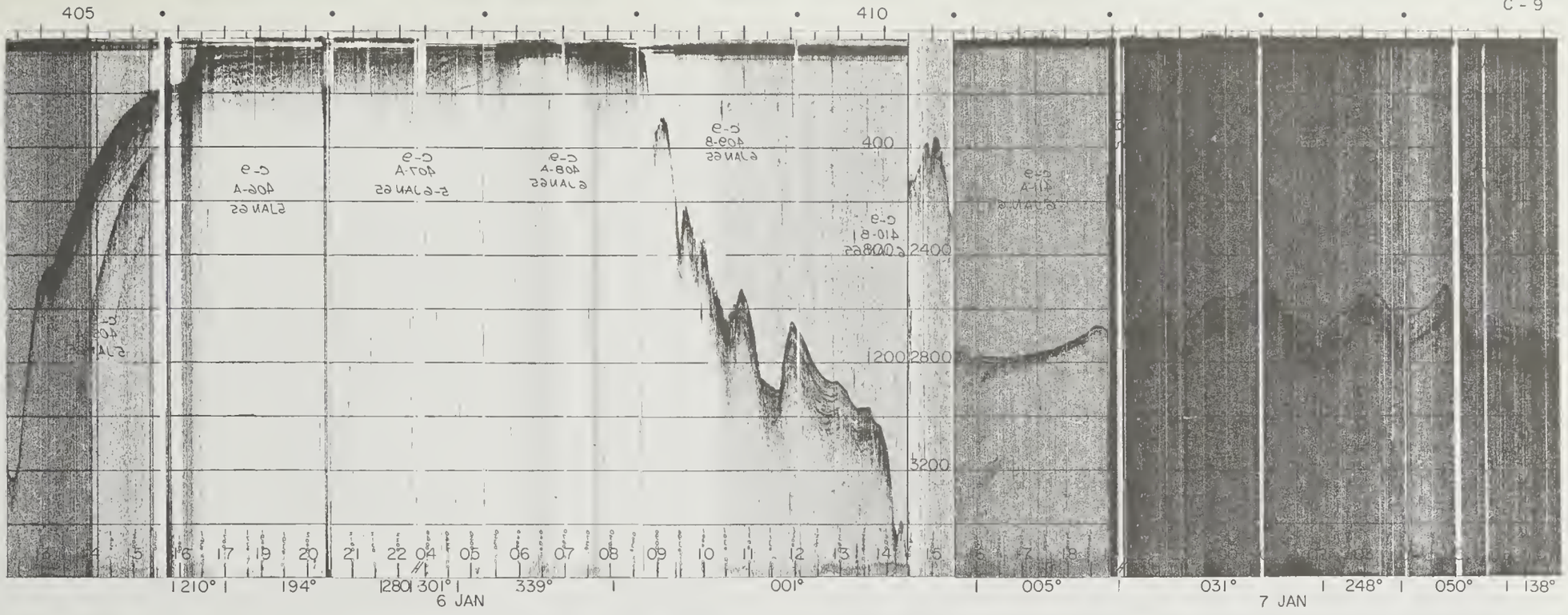

C - 9
360
365
SECONDS
DEC 28
DEC. 29
192°
285°
283°
286°
291°
290°
289°
C - 9
375
380
SECONDS
2
3
4
22 23 00 01 02 03 04 05 06
319°
31 DEC
318°
312°
185°
188°
186°
310°
357°
354°
1 JAN
214°
184°
201°

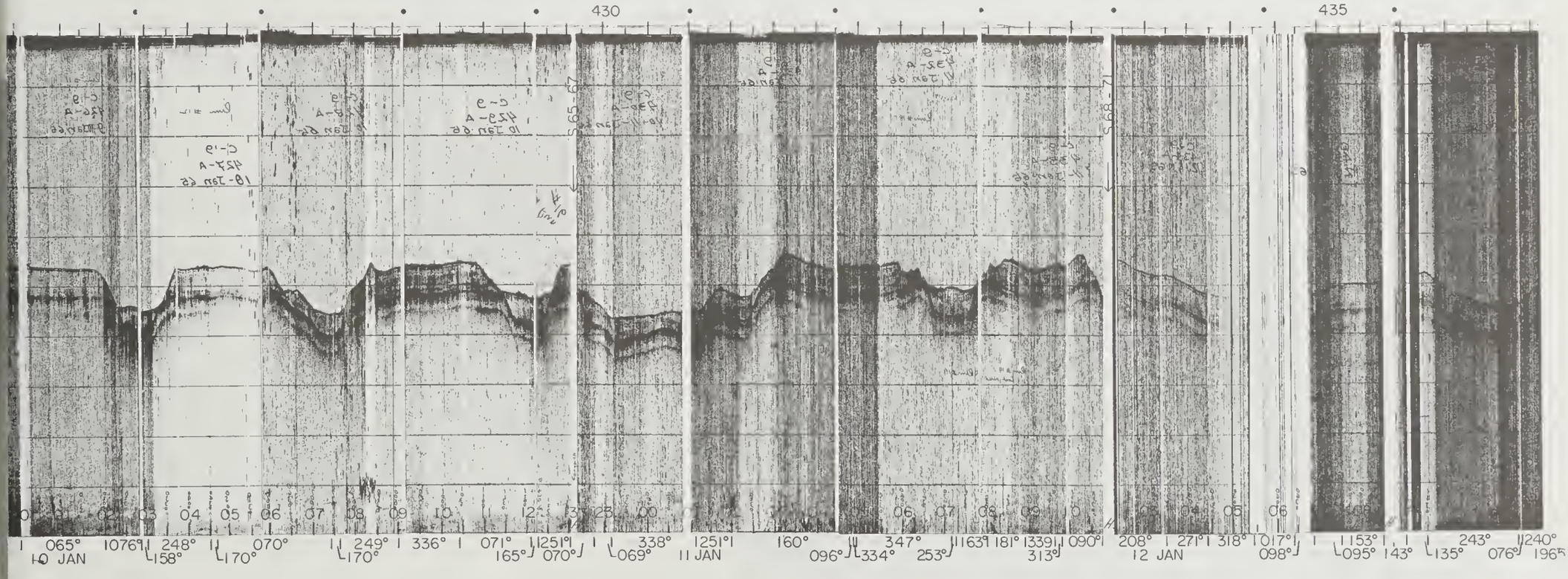

369 - I
369 - II
370
FATHOMS
800
1200
1600
070°
268°
30 DEC
269°
268°
259°
260°
320°

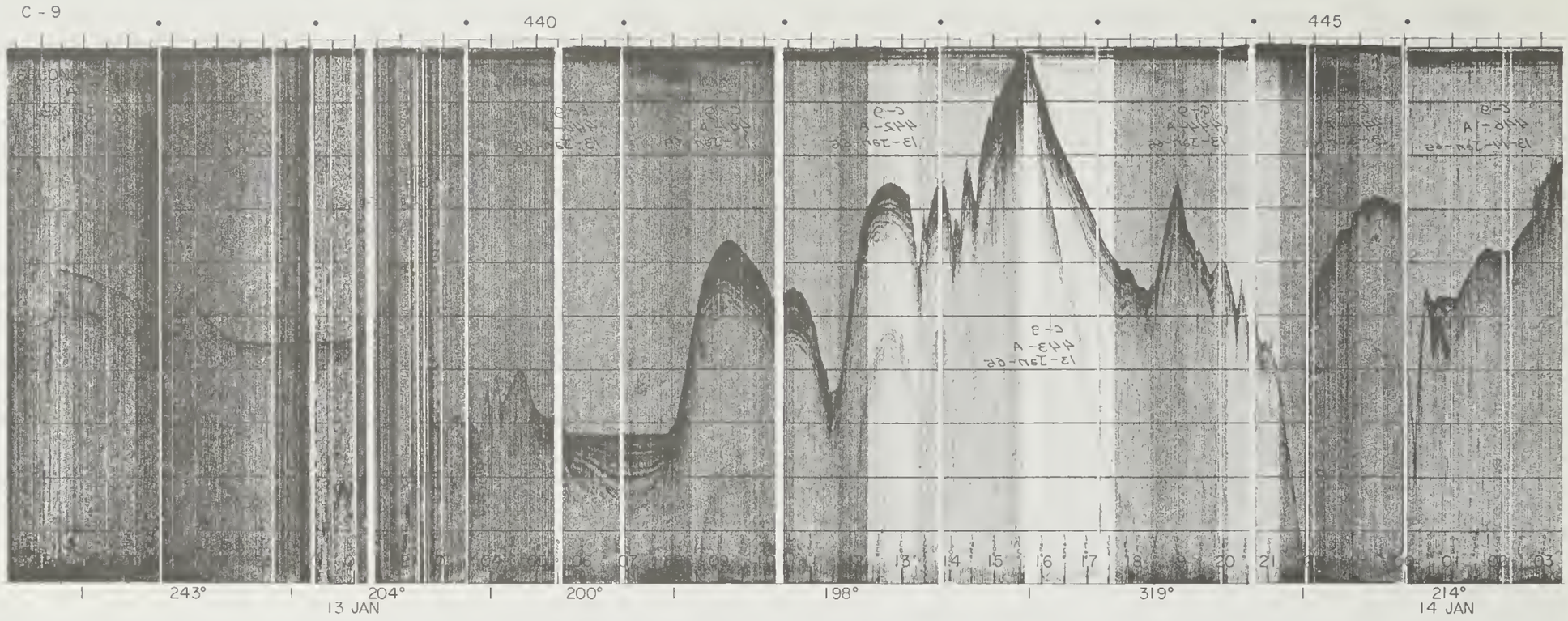

385
390
FATHOMS
1600
3200
231°
279°
2 JAN
356°
357°
358°
3 JAN
357°
355°
215°
1965

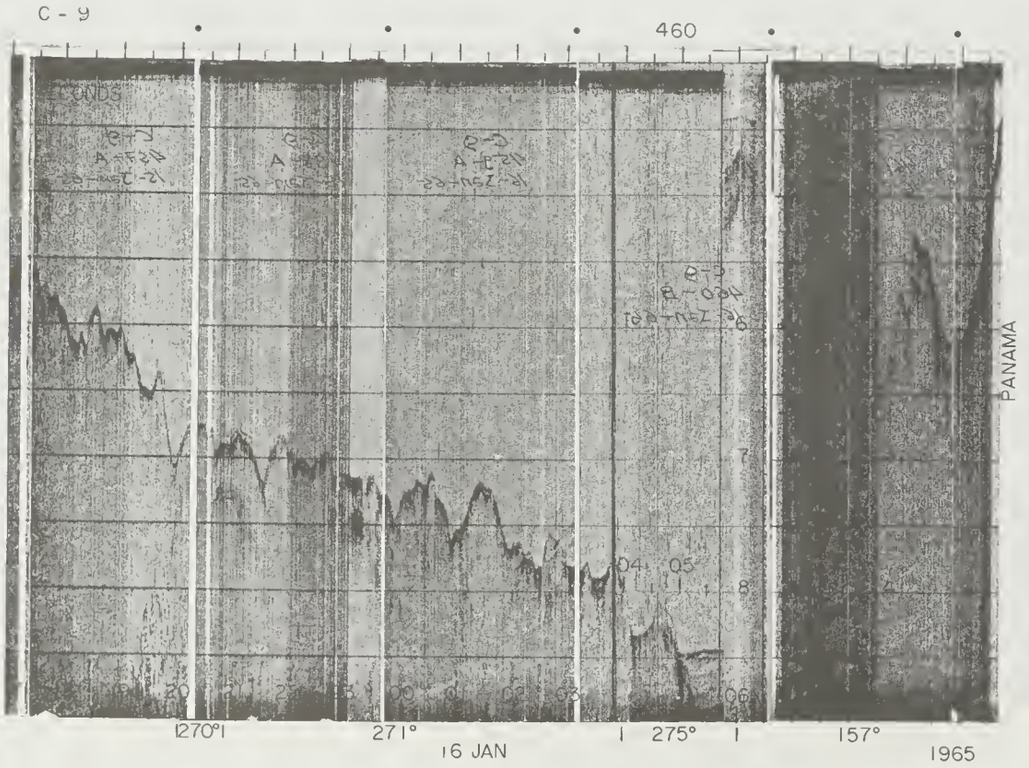

395
400
SECONDS
214°
4 JAN
213°
331°
328°
329°
194°
5 JAN

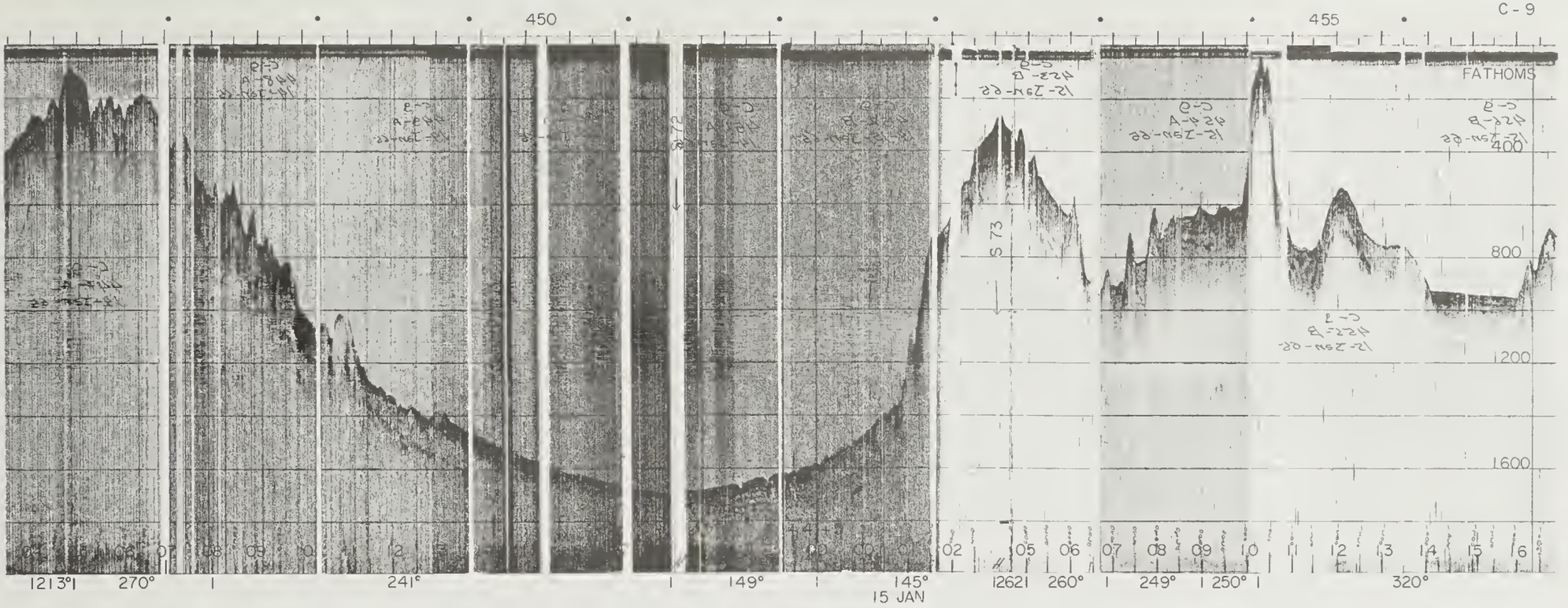

415
420
425
SECONDS
212°
315°
050°
250°
073°
160°
249°
8 JAN
165°
071°
170°
250°
164°
069°
071°
166°
250°
245°
033°
065°
328°
070°
170°
249°
163°
072°
165°
064°
247°
337°
075°
162°
073°
9 JAN


405
410
400
2400
2800
3200
6 JAN
7 JAN

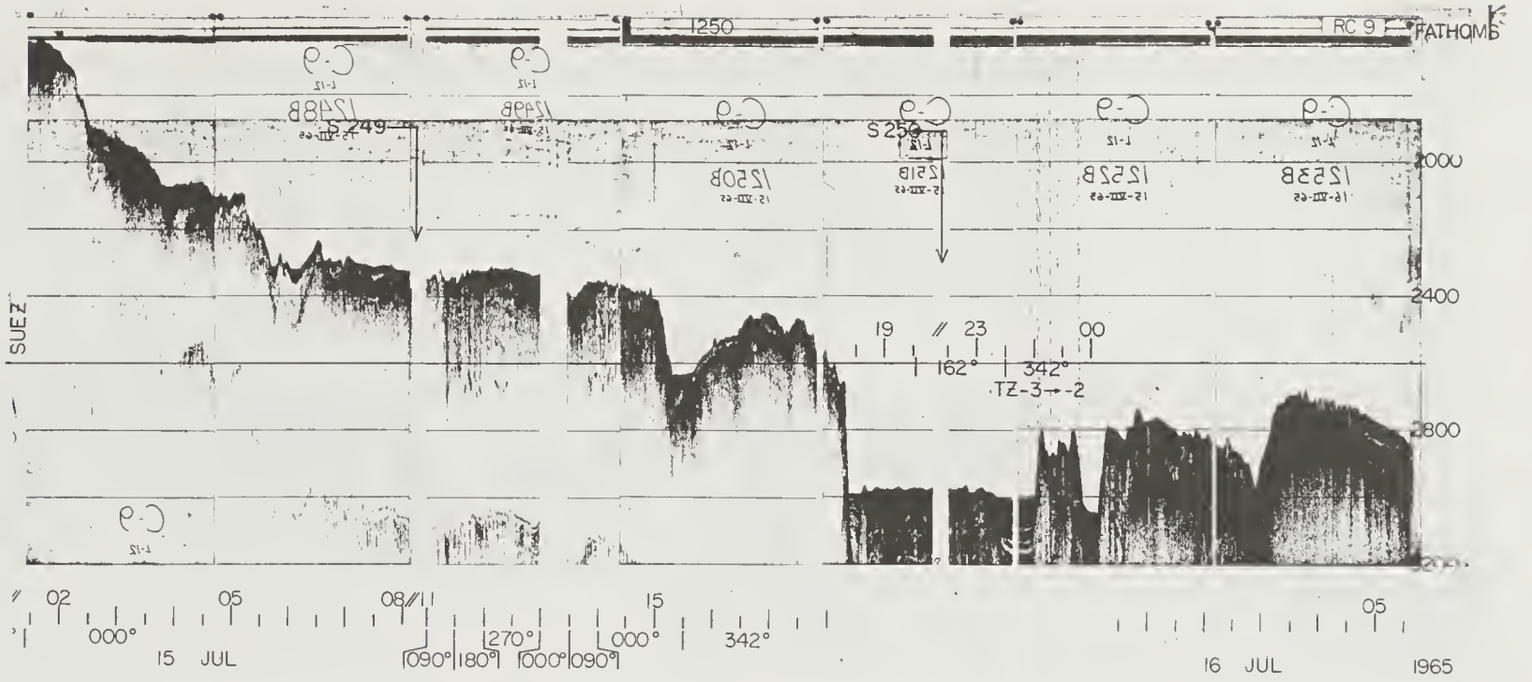

430
435
10 JAN
11 JAN
12 JAN

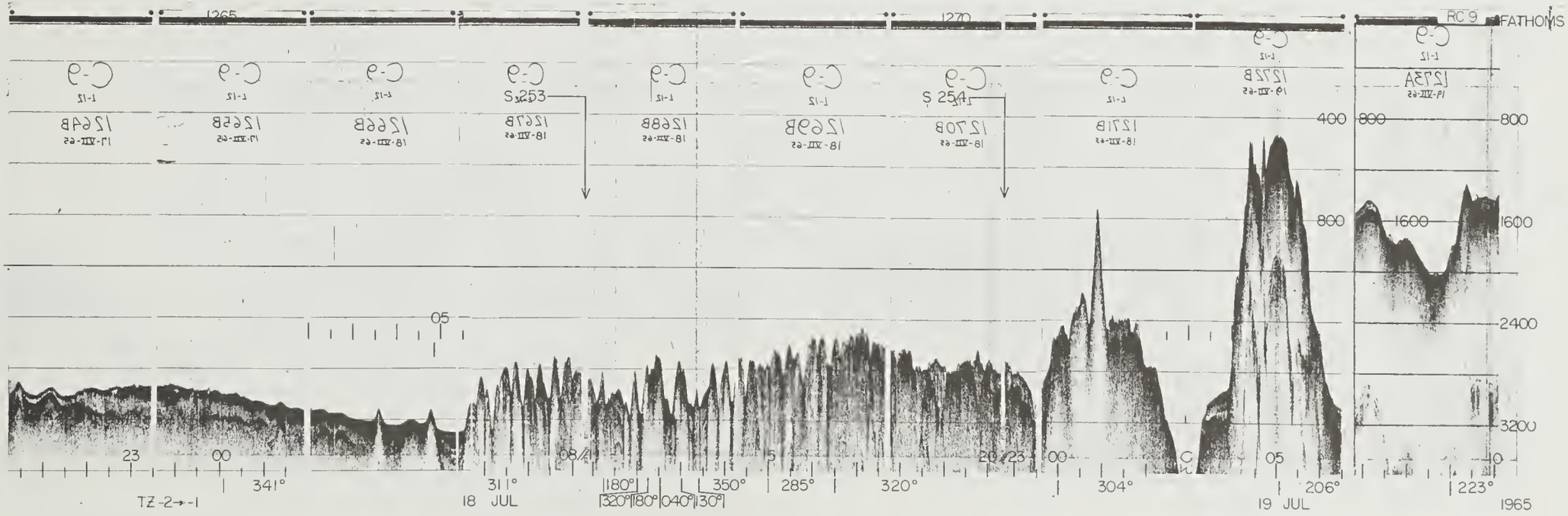

C - 9
440
445
243°
204°
200°
198°
319°
214°
13 JAN
14 JAN

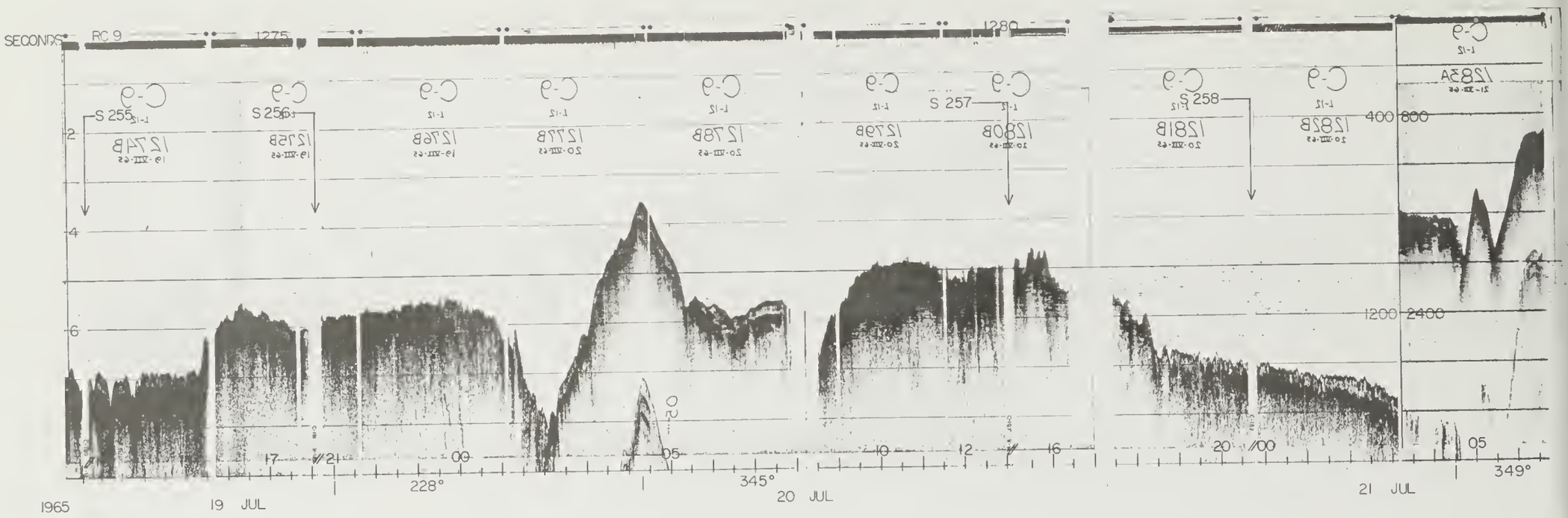

C - 9
460
PANAMA
1270°
271°
275°
157°
16 JAN
1965

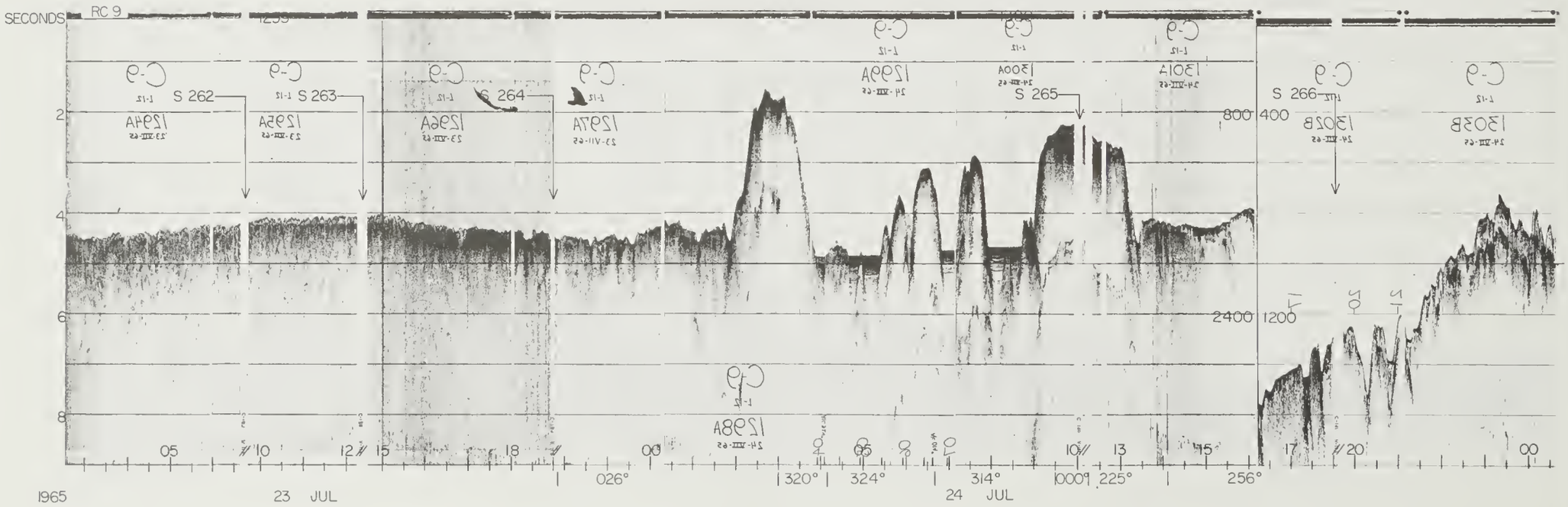

450
455
FATHOMS
400
800
1200
1600
S 72
S 73
1213°1
270°
241°
149°
145°
15 JAN
12621
260°
249°
250°
320°

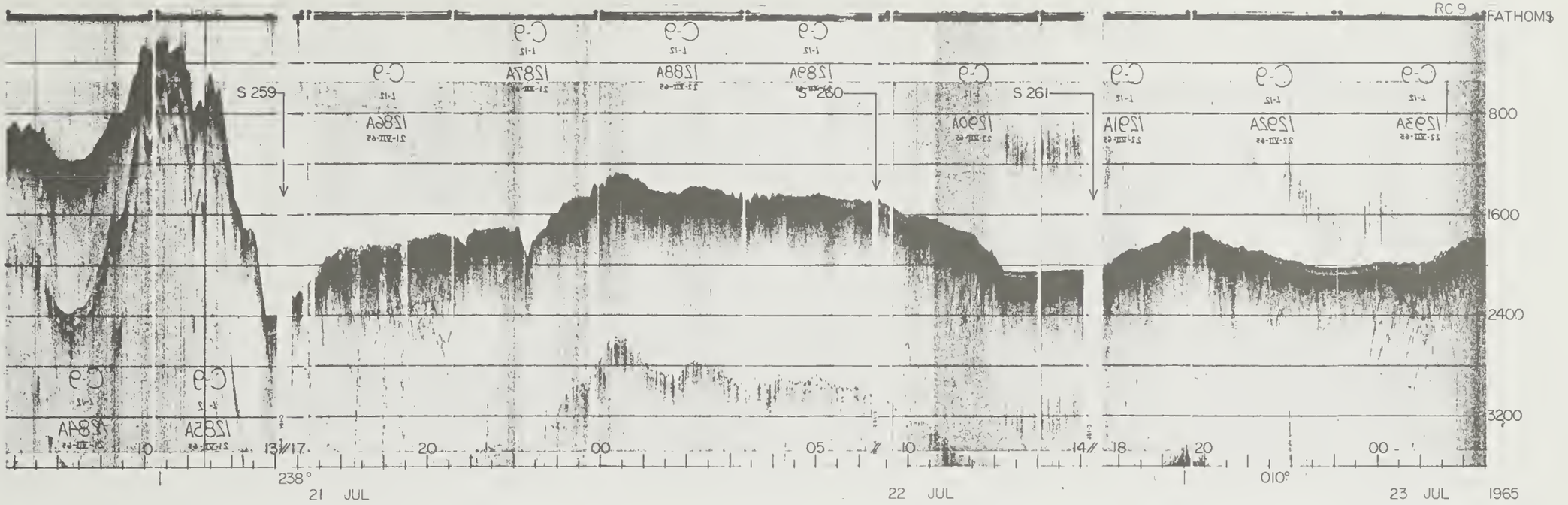
SECONDS
RC 9
1255
1260
S 251
S 252
5
6
7
8
10
14
15
20
235°
195°
330°
225°
250°
195°
250°
1965
16 JUL
17 JUL

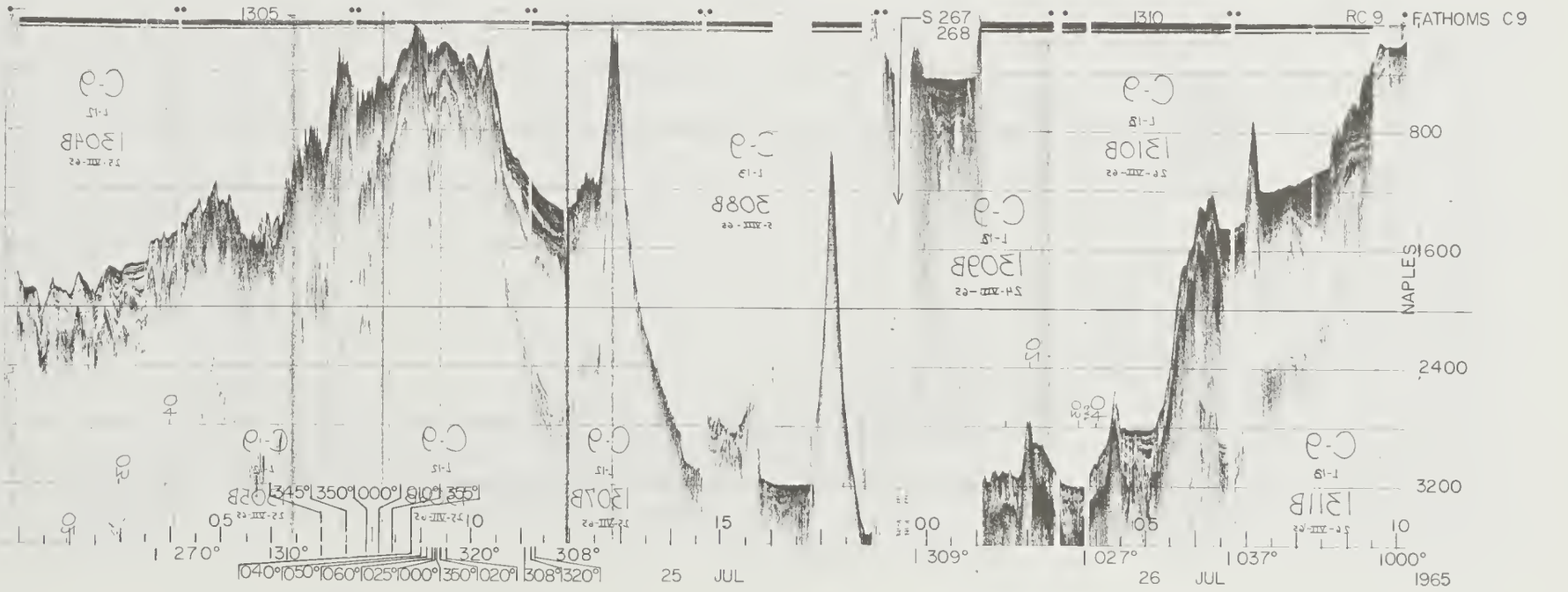

1250
RC 9
FATHOMS
S 249
S 250
2000
2400
2800
SUEZ
19
23
00
162°
342°
TZ-3→-2
02
05
08
15
05
000°
090°
180°
270°
000°
090°
000°
342°
15 JUL
16 JUL
1965

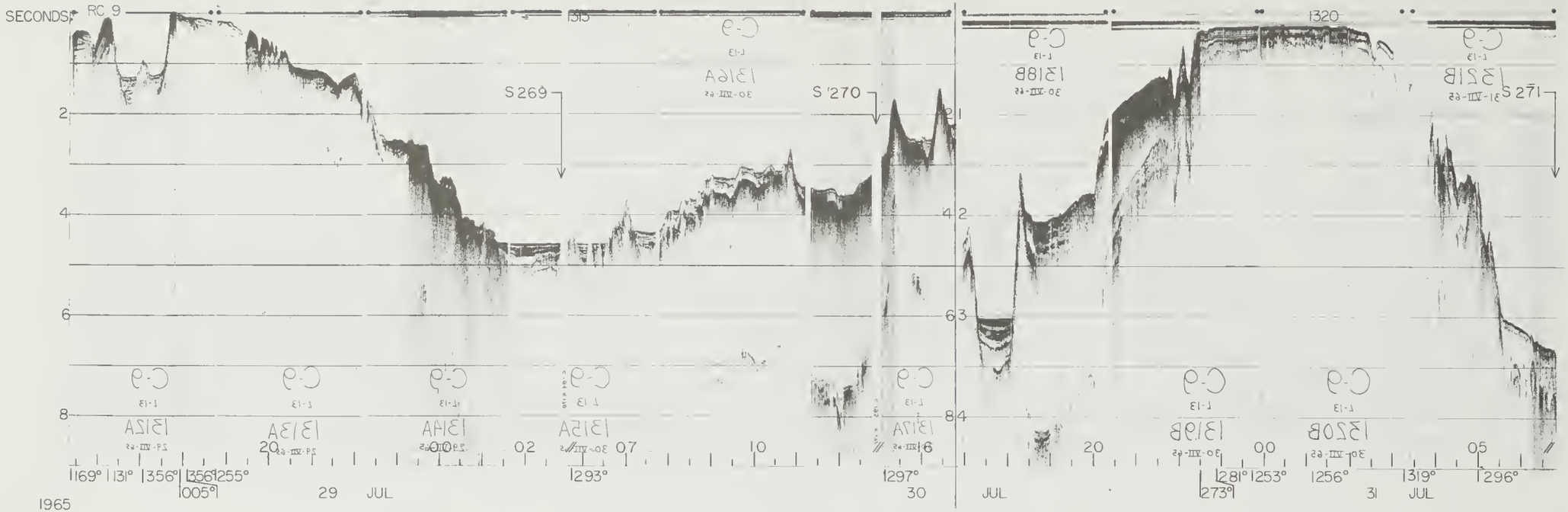

1265
1270
RC 9
FATHOMS
S 253
S 254
400
800
1600
2400
3200
05
23
00
341°
TZ-2→-1
18 JUL
311°
180°
320°
180°
040°
030°
350°
285°
320°
20
23
00
304°
05
206°
19 JUL
223°
1965

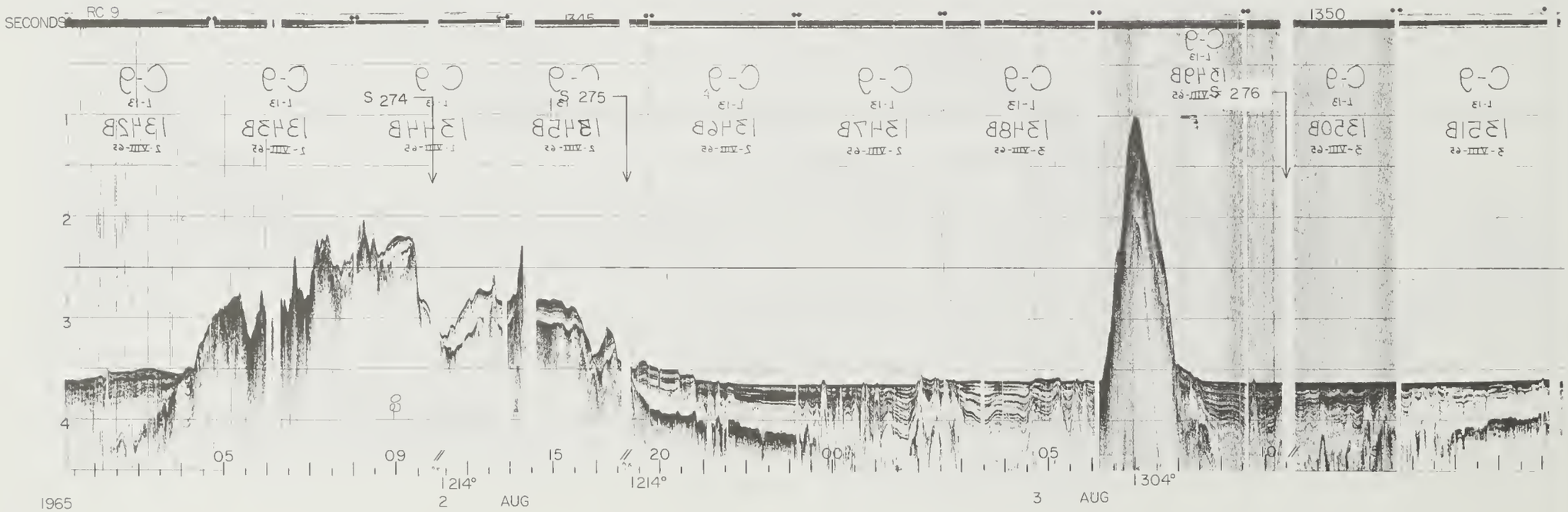

SECONDS
RC 9
1275
1280
S 255
S 256
S 257
S 258
1965
19 JUL
20 JUL
21 JUL
228°
345°
349°

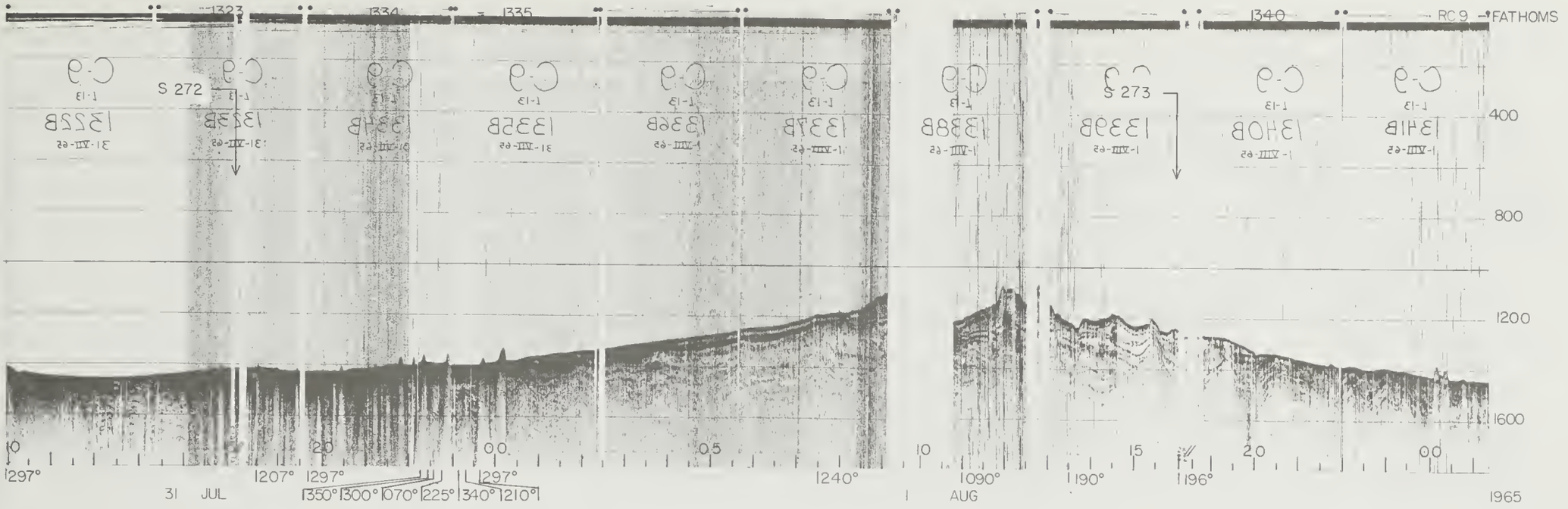

SECONDS
RC 9
S 262
S 263
S 264
S 265
S 266
1965
23 JUL
24 JUL
026°
320°
324°
314°
225°
256°

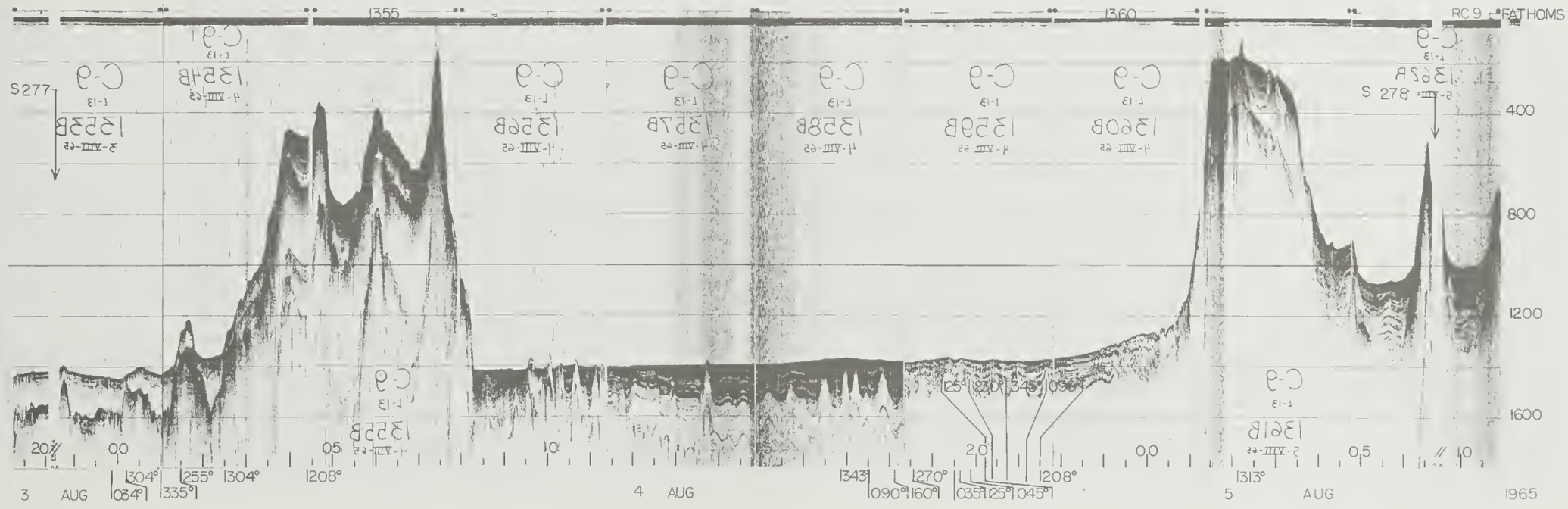

RC 9
FATHOMS
S 259
S 260
S 261
800
1600
2400
3200
238°
010°
21 JUL
22 JUL
23 JUL
1965

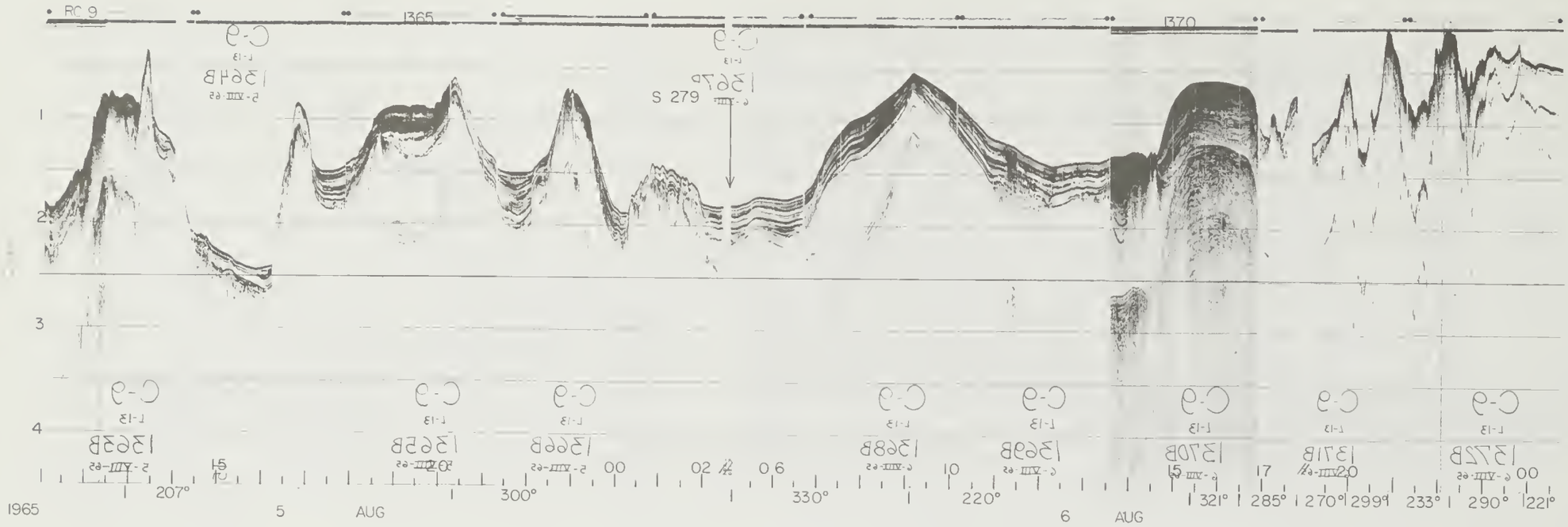

1305
1310
RC 9
FATHOMS C9
S 267
268
800
1600
2400
3200
NAPLES
270°
1310°
320°
308°
309°
027°
037°
1000°
25 JUL
26 JUL
1965

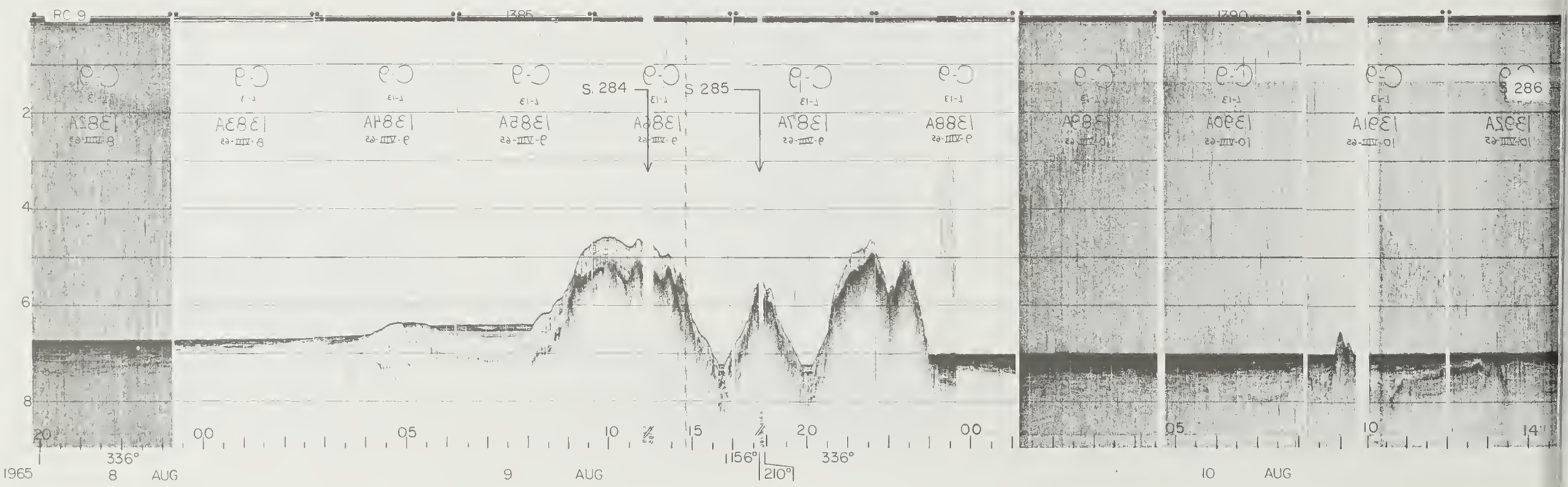

SECONDS
RC 9
1315
1320
S 269
S 270
S 271
1965
29 JUL
30 JUL
31 JUL

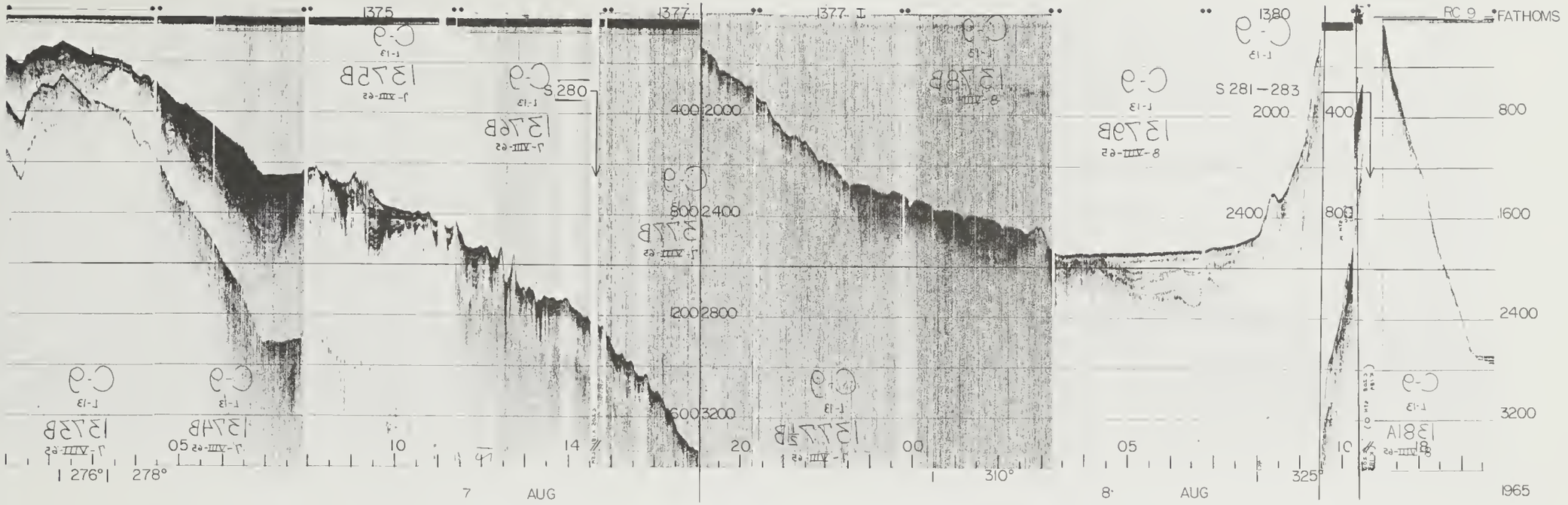

SECONDS
RC 9
1345
1350
S 274
S 275
S 276
1965
2 AUG
3 AUG

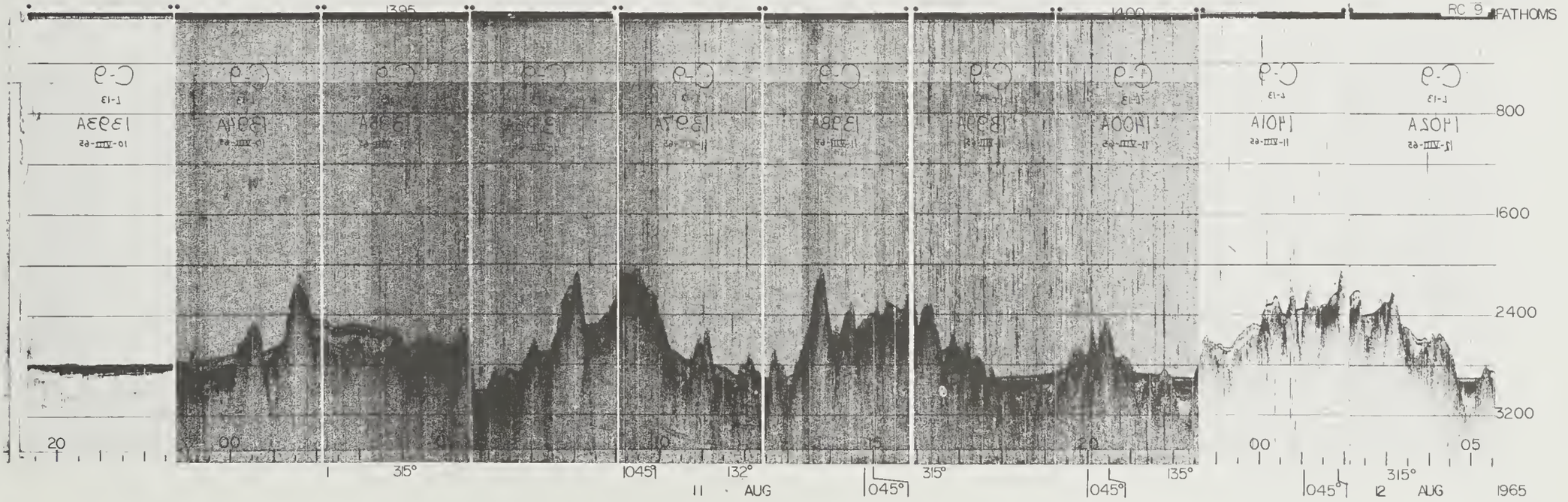

1323
1334
1335
1340
RC 9 FATHOMS
S 272
S 273
400
800
1200
1600
1207°
1297°
1350°
1300°
1070°
1225°
1340°
1210°
1240°
1090°
1190°
1196°
31 JUL
1 AUG
1965

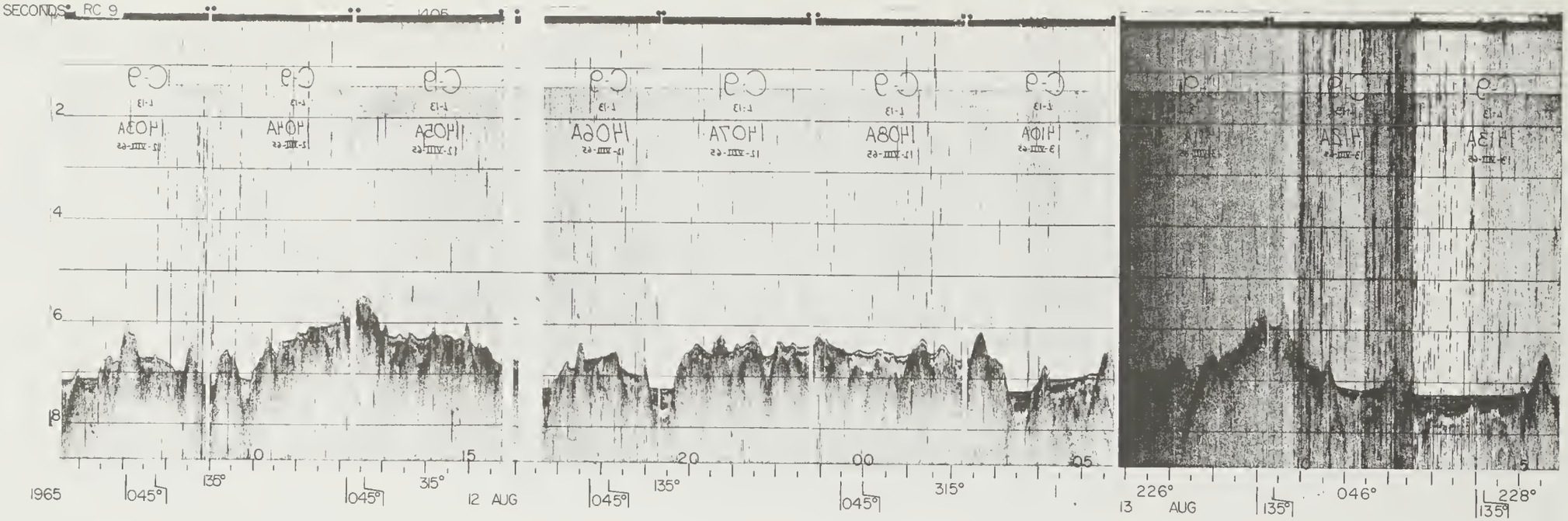

1355
1360
RC 9 FATHOMS
S277
S 278
400
800
1200
1600
1304°
1255°
1304°
1208°
1343°
1270°
1208°
1313°
3 AUG
034°
335°
4 AUG
090°
160°
035°
125°
045°
5 AUG
1965

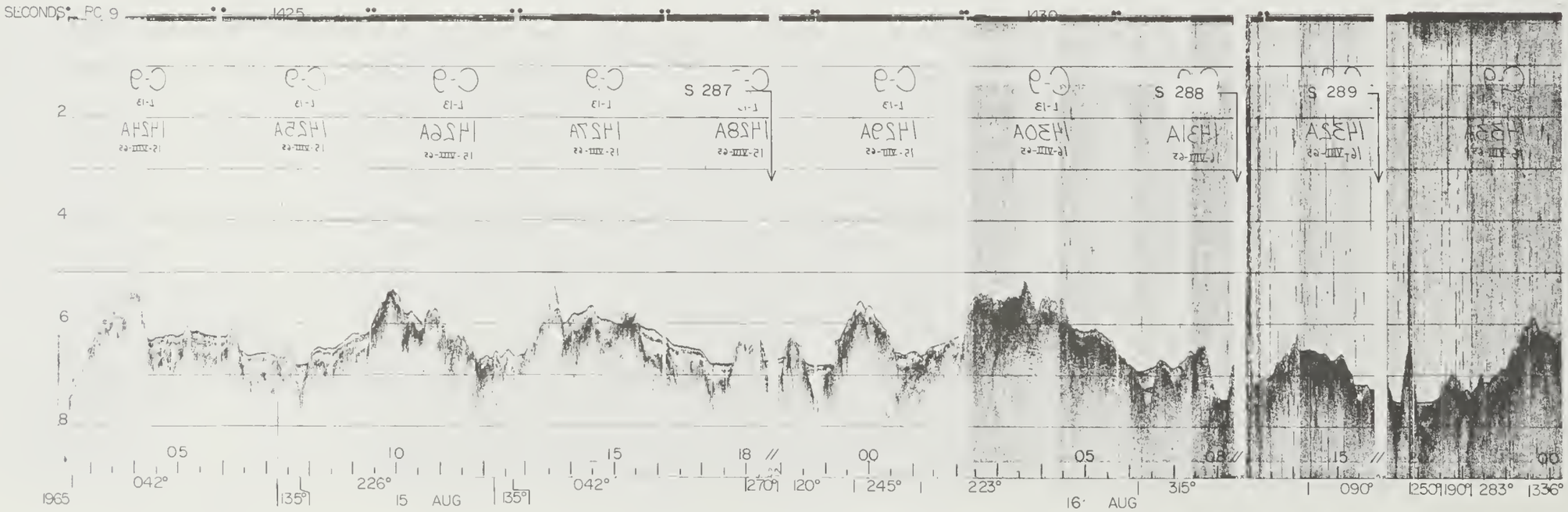

RC 9
1365
1370
S 279
1965
5 AUG
6 AUG

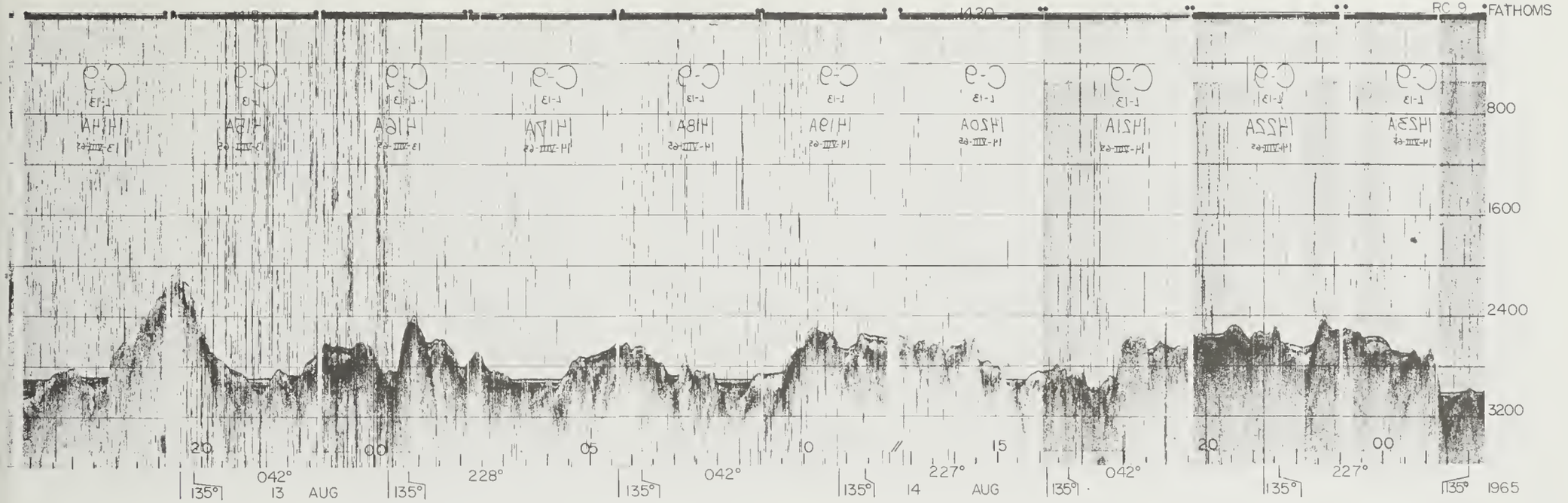

RC 9
1385
1390
S. 284
S 285
S 286
1965
8 AUG
9 AUG
10 AUG

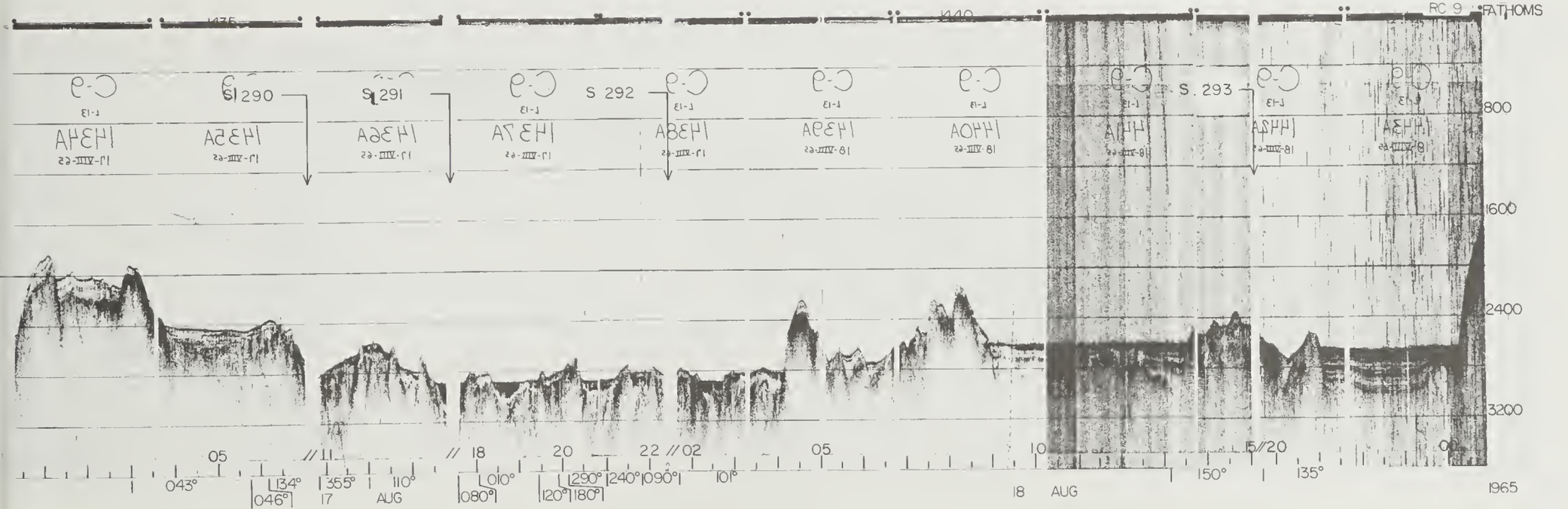

RC 9
FATHOMS
S 280
S 281–283
800
1600
2400
3200
1965
276°
278°
7 AUG
310°
325°
8 AUG

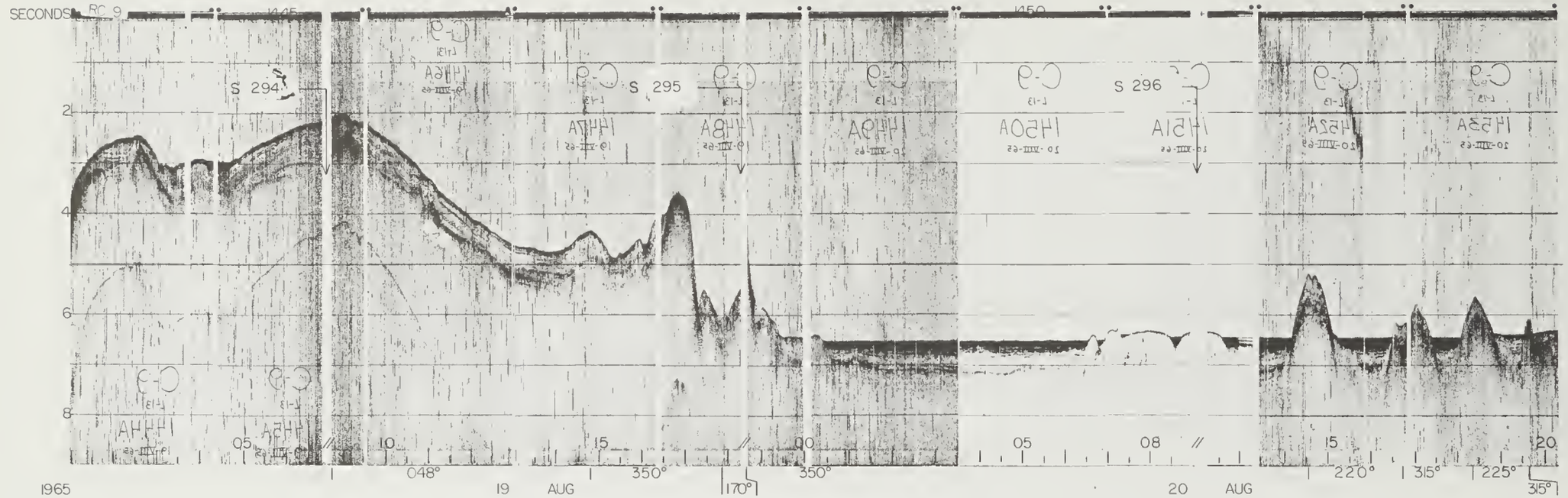

RC 9
FATHOMS
800
1600
2400
3200
315°
045°
132°
135°
11 AUG
12 AUG
1965

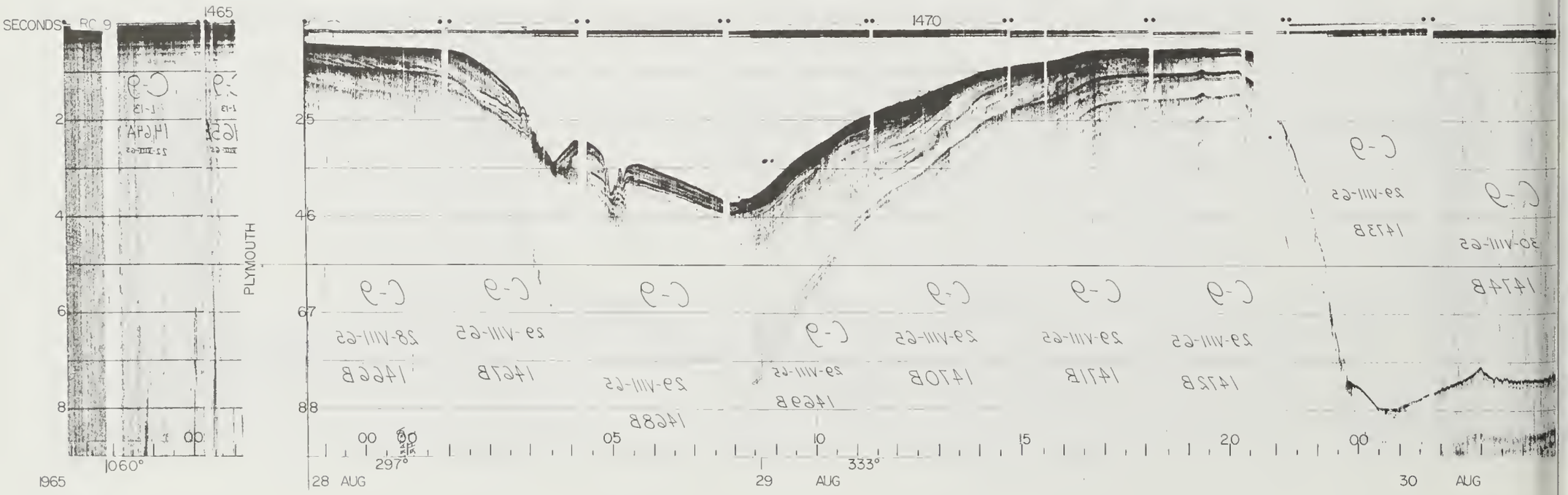

SECONDS
RC 9
1405
1410
2
4
6
8
10
15
20
00
05
1965
045°
135°
315°
12 AUG
13 AUG
226°
046°
228°

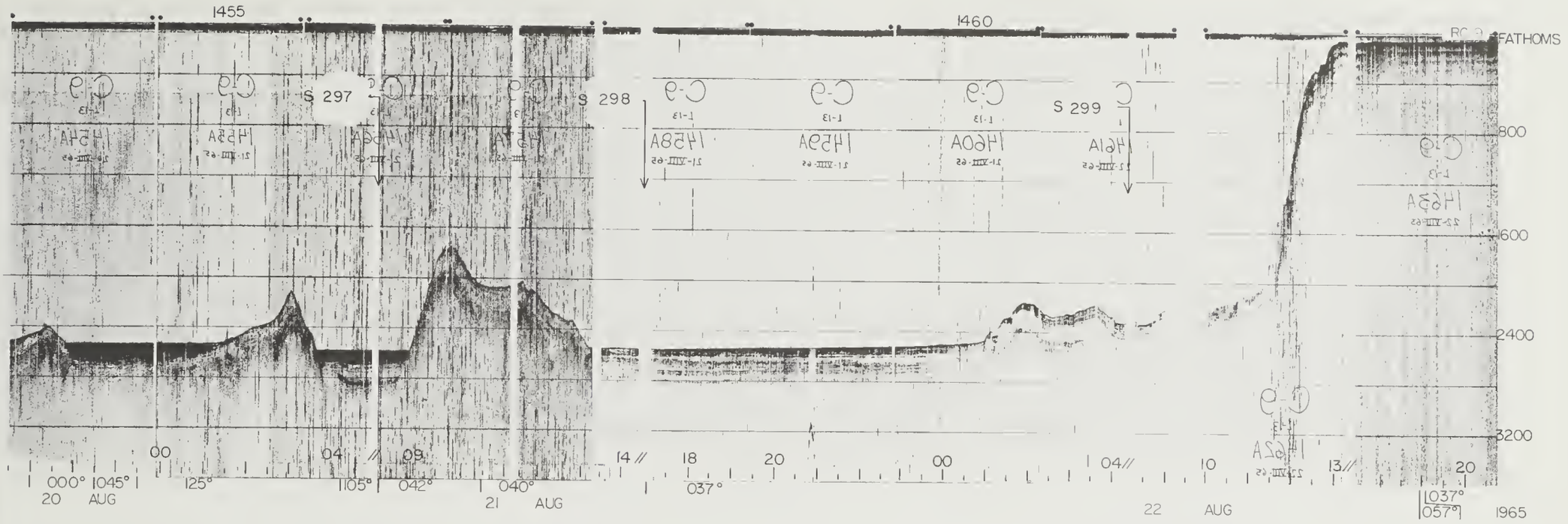

SECONDS
RC 9
1425
1430
S 287
S 288
S 289
2
4
6
8
05
10
15
18
00
05
08
15
20
00
1965
042°
135°
226°
15 AUG
042°
270°
120°
245°
223°
315°
16 AUG
090°
250°
190°
283°
336°

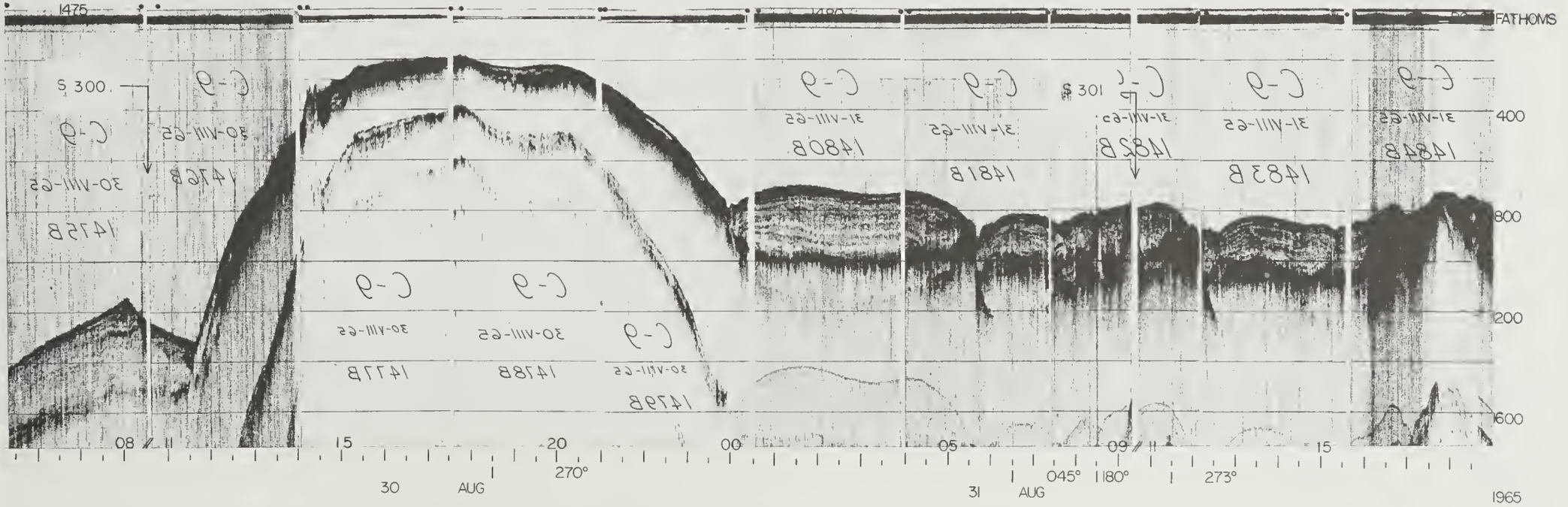

RC 9
FATHOMS
800
1600
2400
3200
1965
1430
20
00
05
10
15
20
00
042°
135°
13 AUG
228°
042°
227°
14 AUG
227°

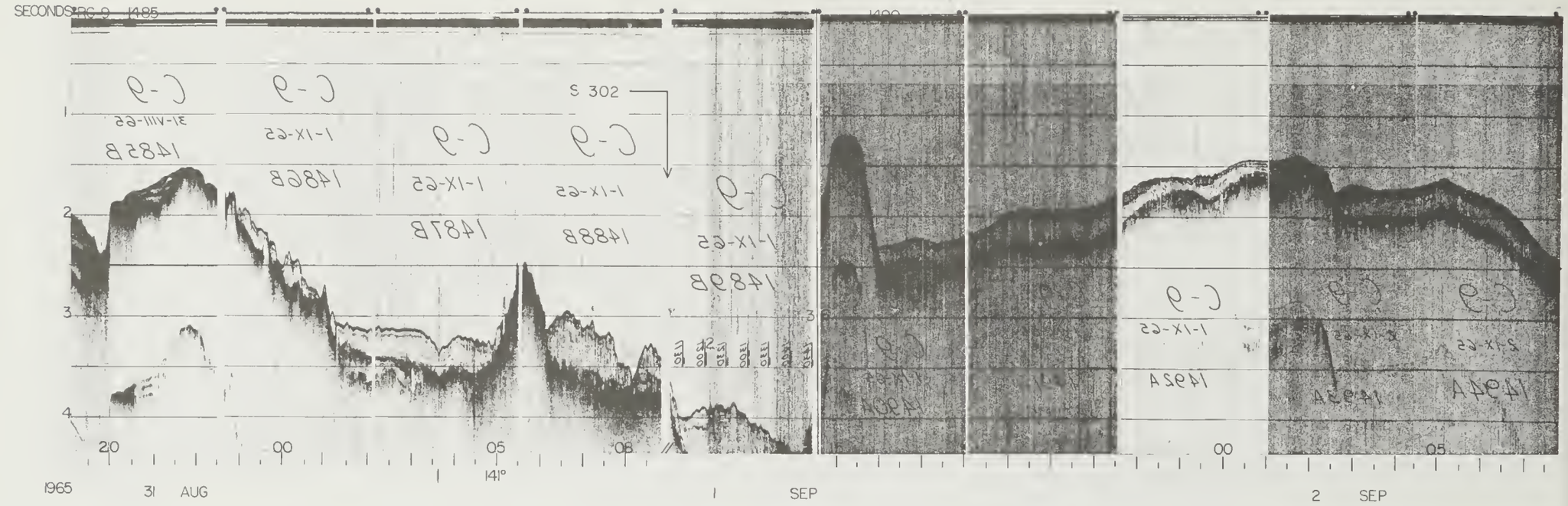

RC 9
FATHOMS
800
1600
2400
3200
1965
1440
S 292
S. 293
05
11
18
20
22
02
05
10
15
20
00
043°
046°
134°
355°
17 AUG
110°
080°
010°
120°
180°
290°
240°
090°
101°
150°
135°
18 AUG

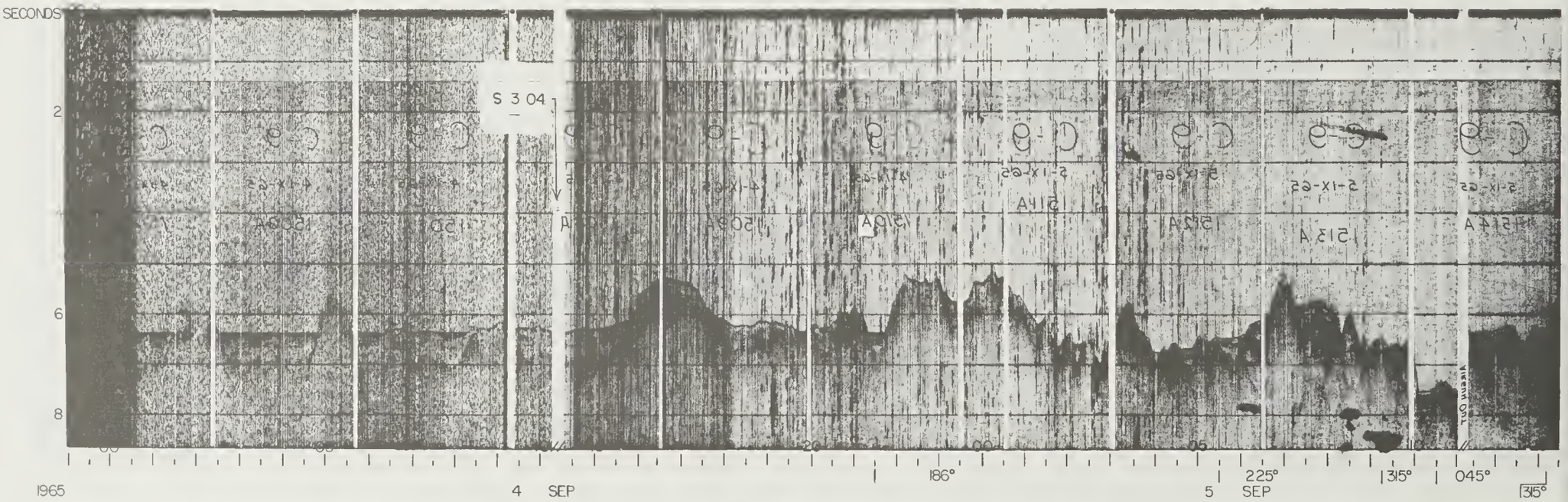

SECONDS
RC 9
1445
1450
S 294
S 295
S 296
2
4
6
8
05
10
15
00
05
08
15
20
1965
048°
19 AUG
350°
170°
350°
20 AUG
220°
315°
225°
315°

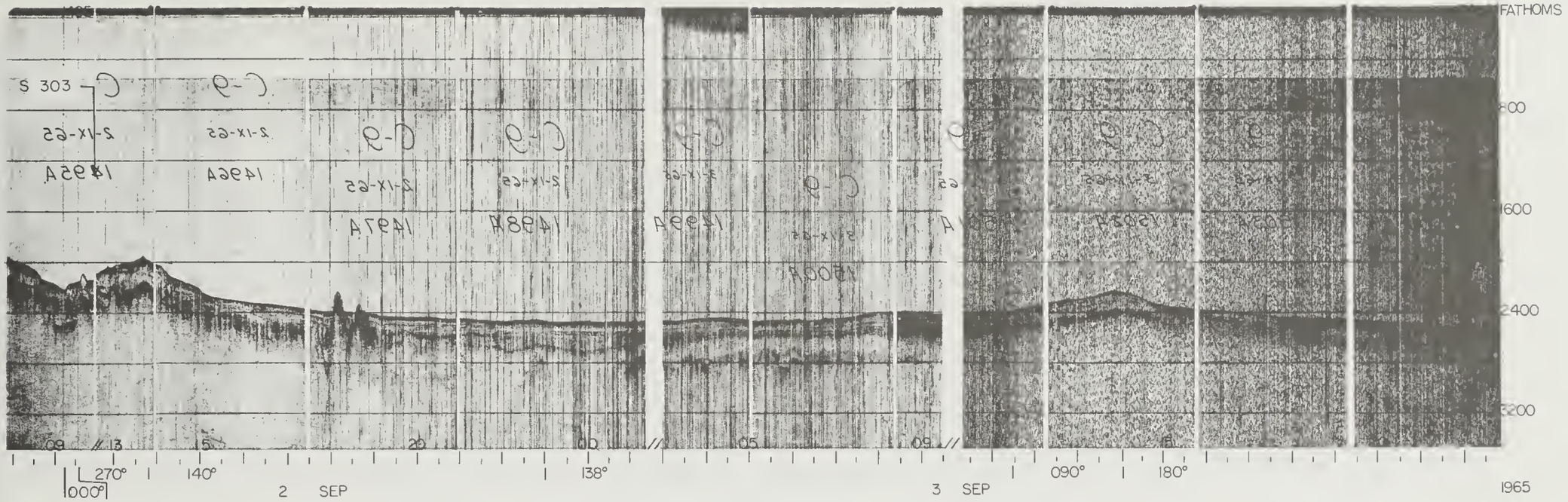

SECONDS
RC 9
1465
1470
PLYMOUTH
2
4
6
8
2.5
4.6
6.7
8.8
00
00
05
10
15
20
00
1965
060°
297°
28 AUG
333°
29 AUG
30 AUG

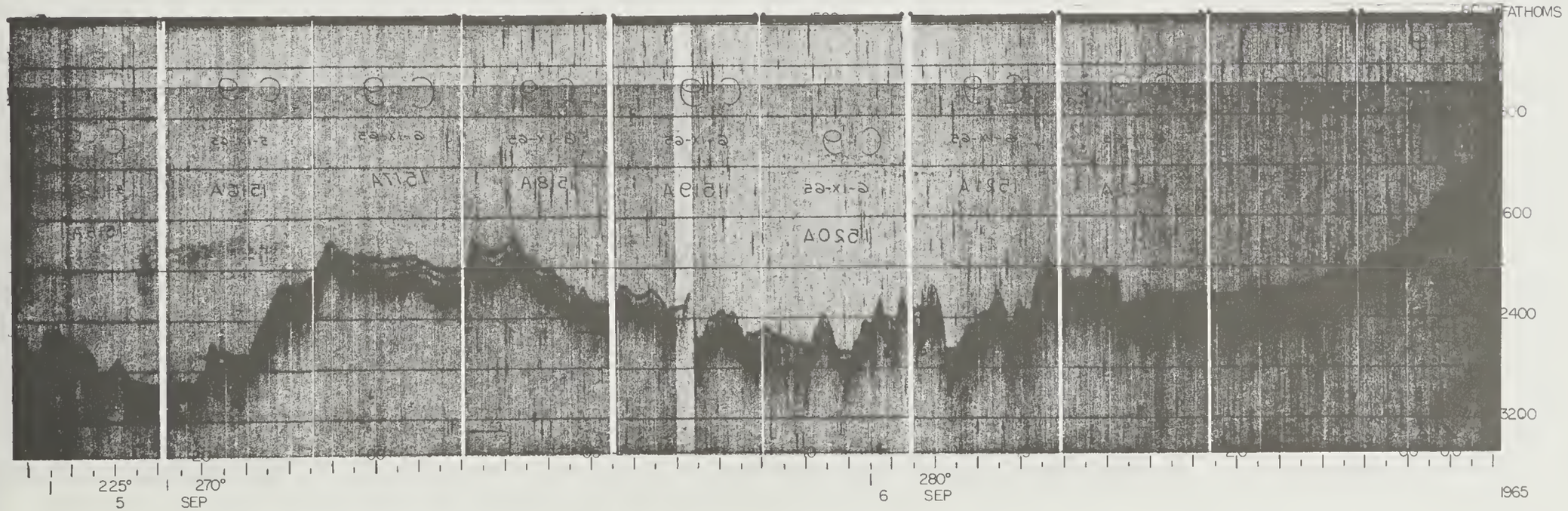

1455
1460
S 297
S 298
S 299
FATHOMS
800
1600
2400
3200
000°
045°
125°
105°
042°
040°
037°
20 AUG
21 AUG
22 AUG
1037°
057°
1965

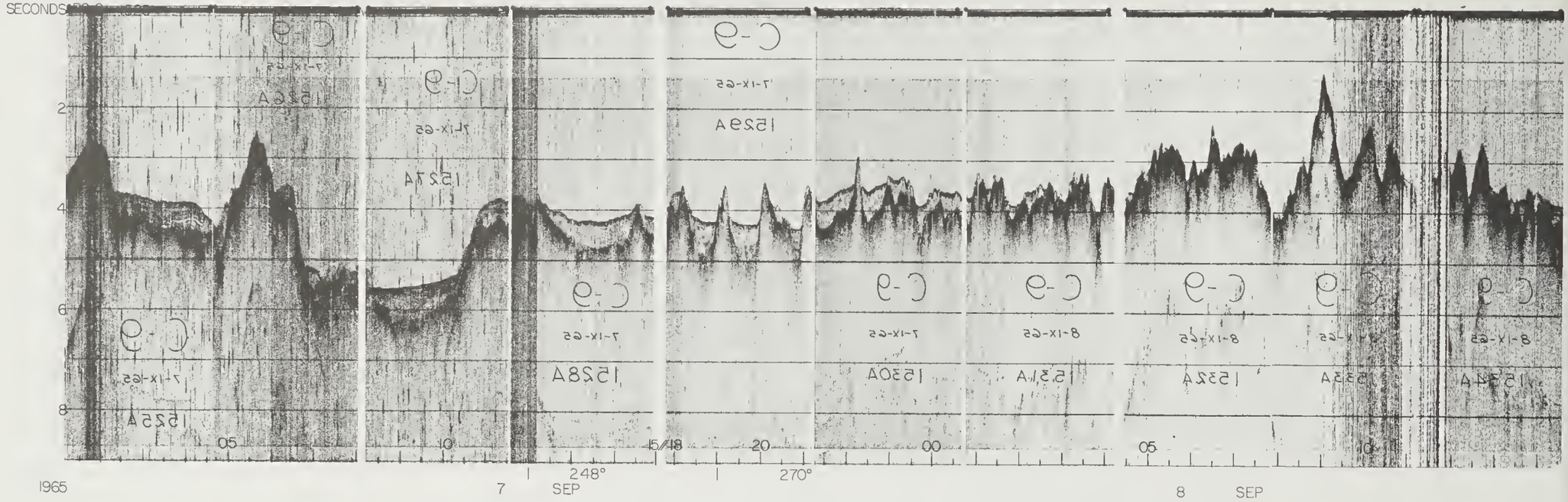

1475
S 300
S 301
FATHOMS
400
800
1200
1600
270°
045°
180°
273°
30 AUG
31 AUG
1965

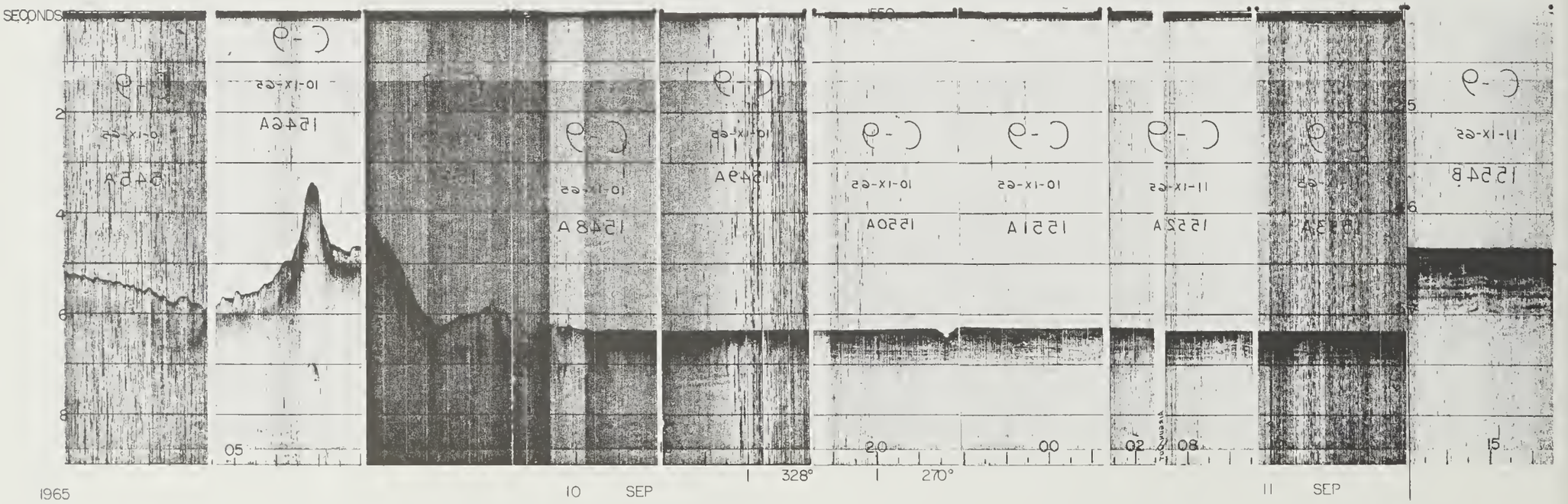

SECONDS
S 302
1965
31 AUG
1
SEP
2
SEP


SECONDS
S 304
1965
4 SEP
5 SEP


FATHOMS
1600
2400
3200
270°
000°
140°
2 SEP
138°
090°
180°
3 SEP
1965

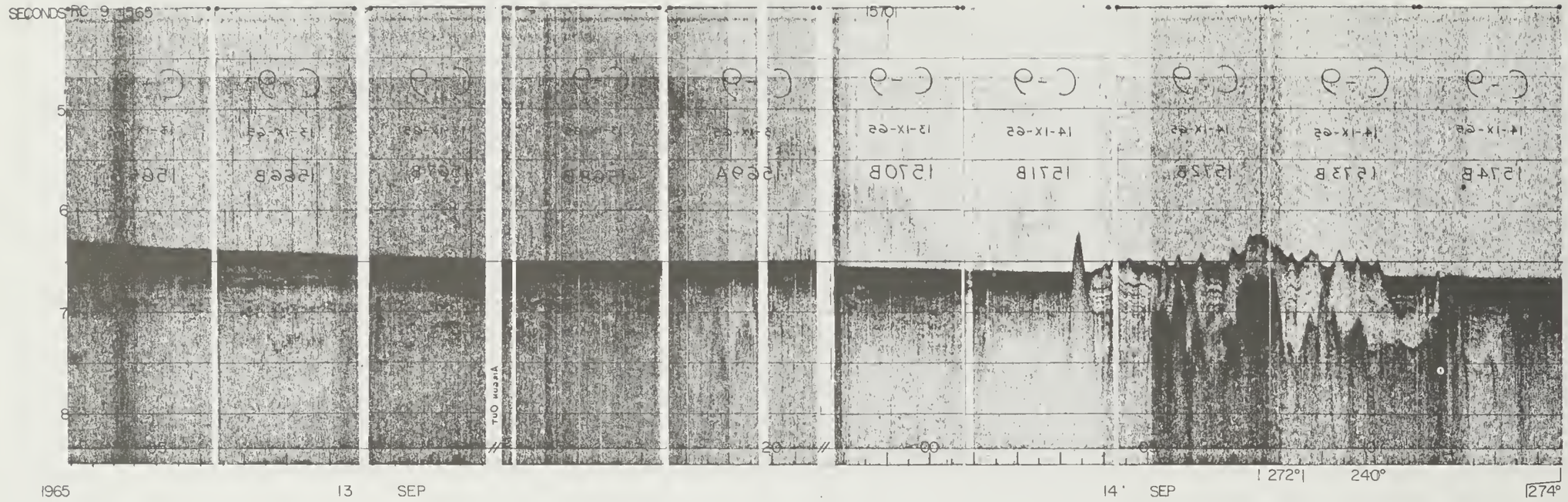

FATHOMS
600
2400
3200
225°
5 SEP
270°
280°
6 SEP
1965

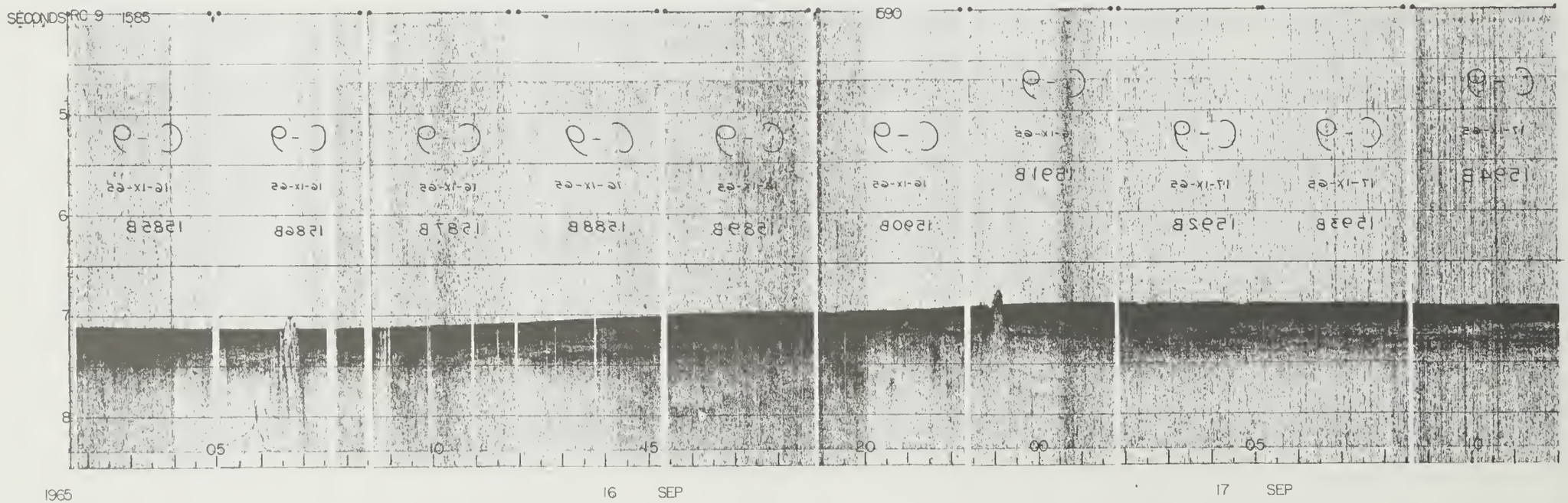

SECONDS
2
4
6
8
05
10
15/18
20
00
05
10
1965
7 SEP
248°
270°
8 SEP

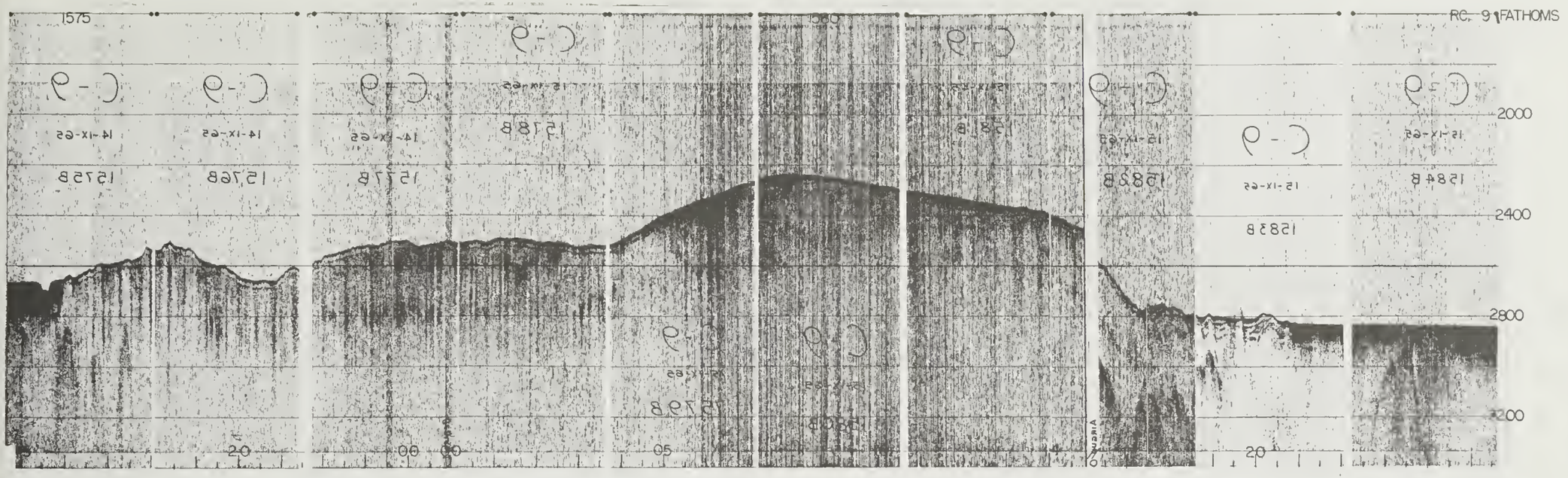

SECONDS
2
4
6
8
05
20
00
02
08
15
1965
10 SEP
328°
270°
11 SEP

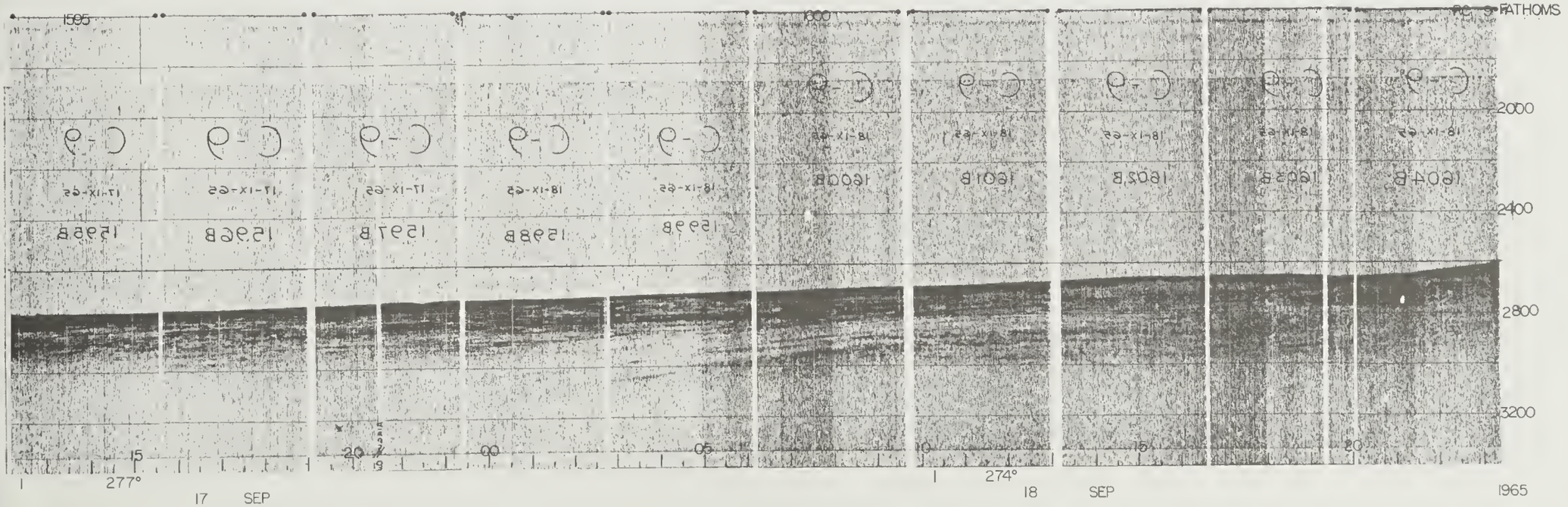
1535
1540
FATHOMS
800
1600
2400
3200
8 SEP
9 SEP
1965

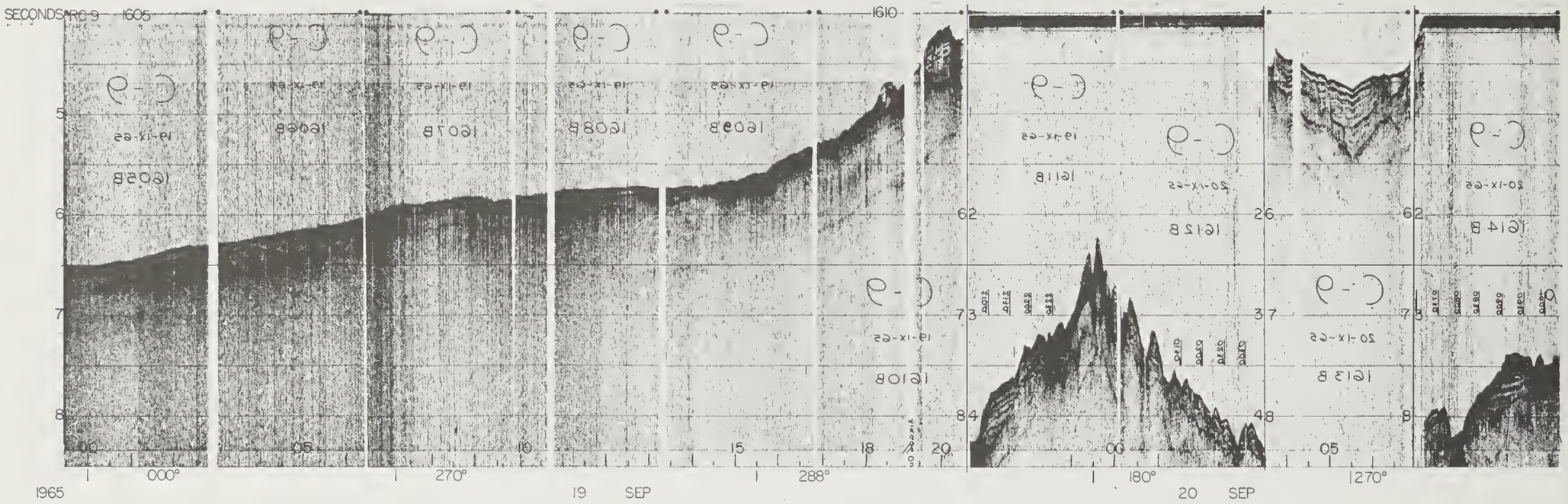
1555
1560
FATHOMS
2000
2400
2800
3200
11 SEP
12 SEP
13 SEP
1965


SECONDS RC 9 1565
1570
1965
13 SEP
14 SEP
272°
240°
274°

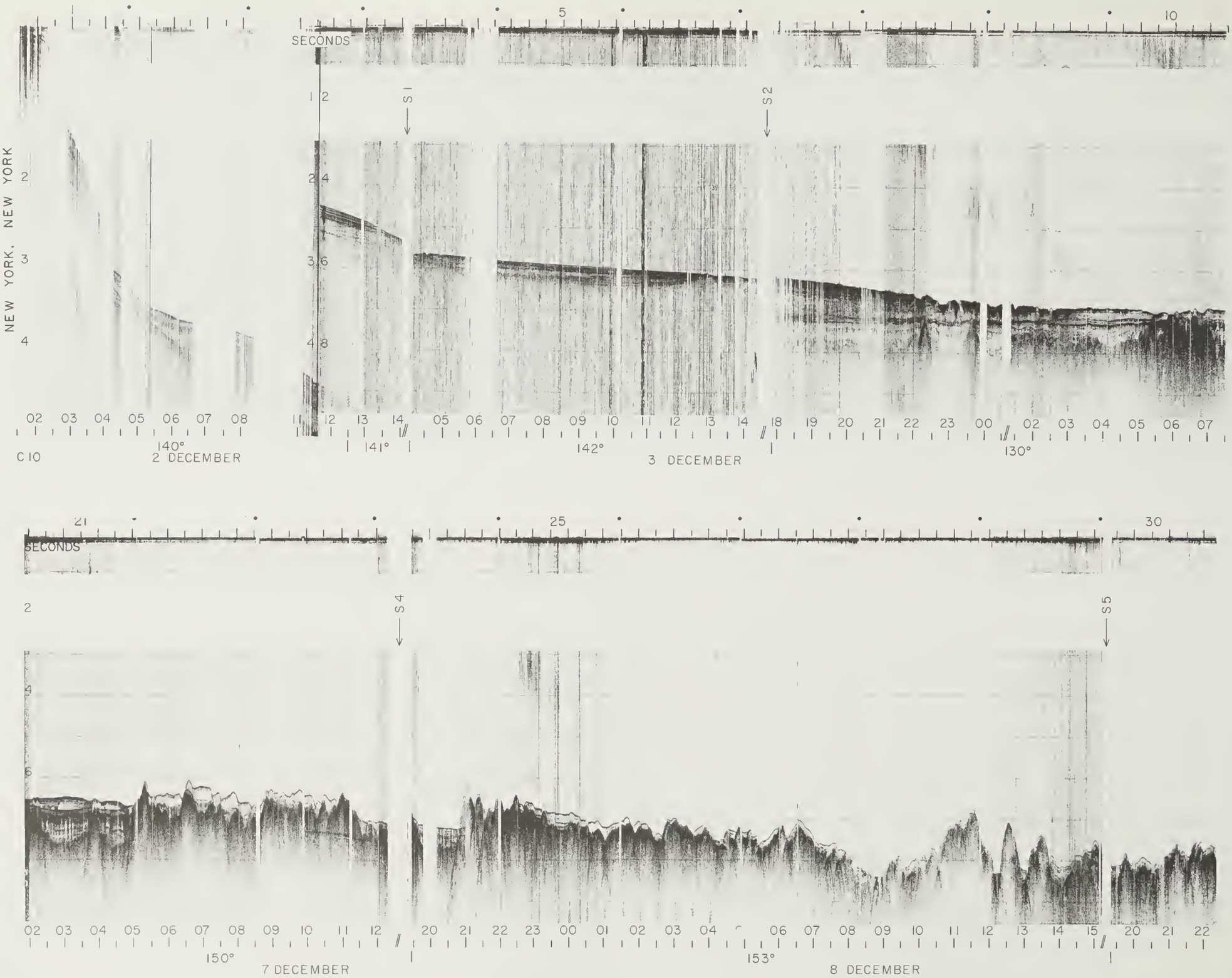

SECONDS RC 9 1585
1590
1965
16 SEP
17 SEP

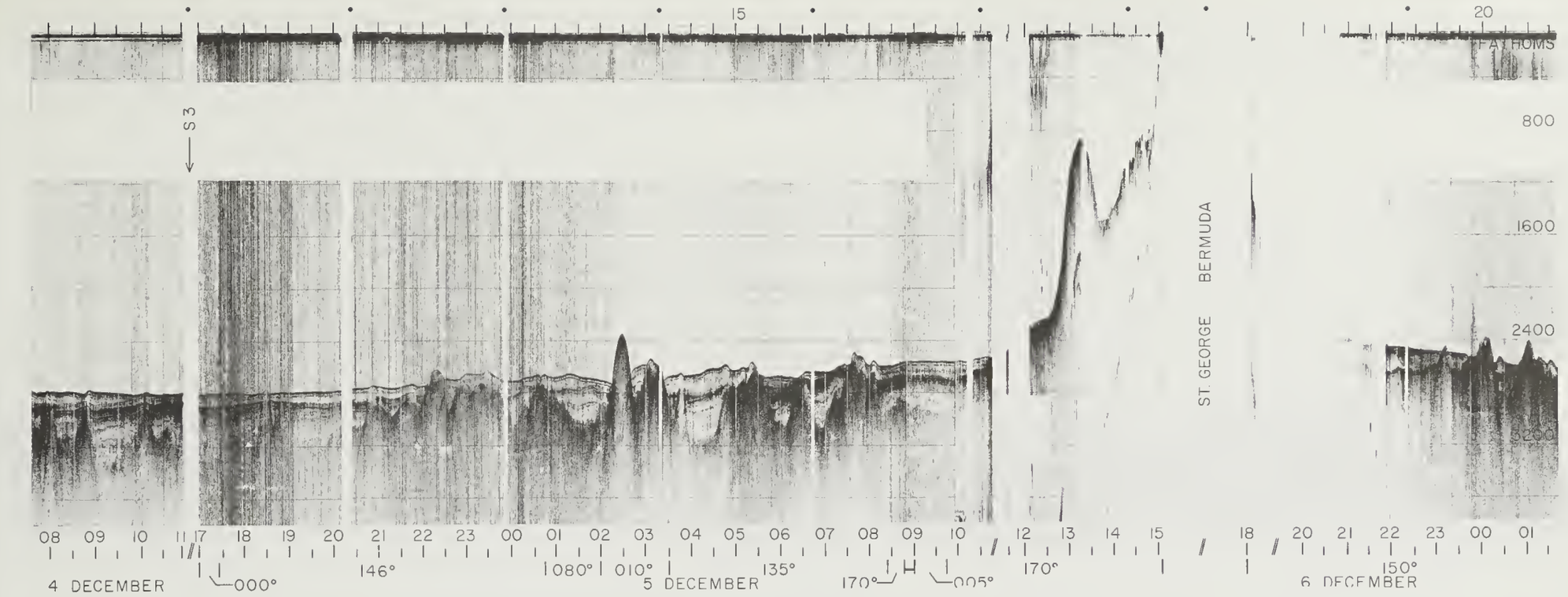

RC. 9
FATHOMS
2000
2400
2800
3200
14 SEP
15 SEP
1965

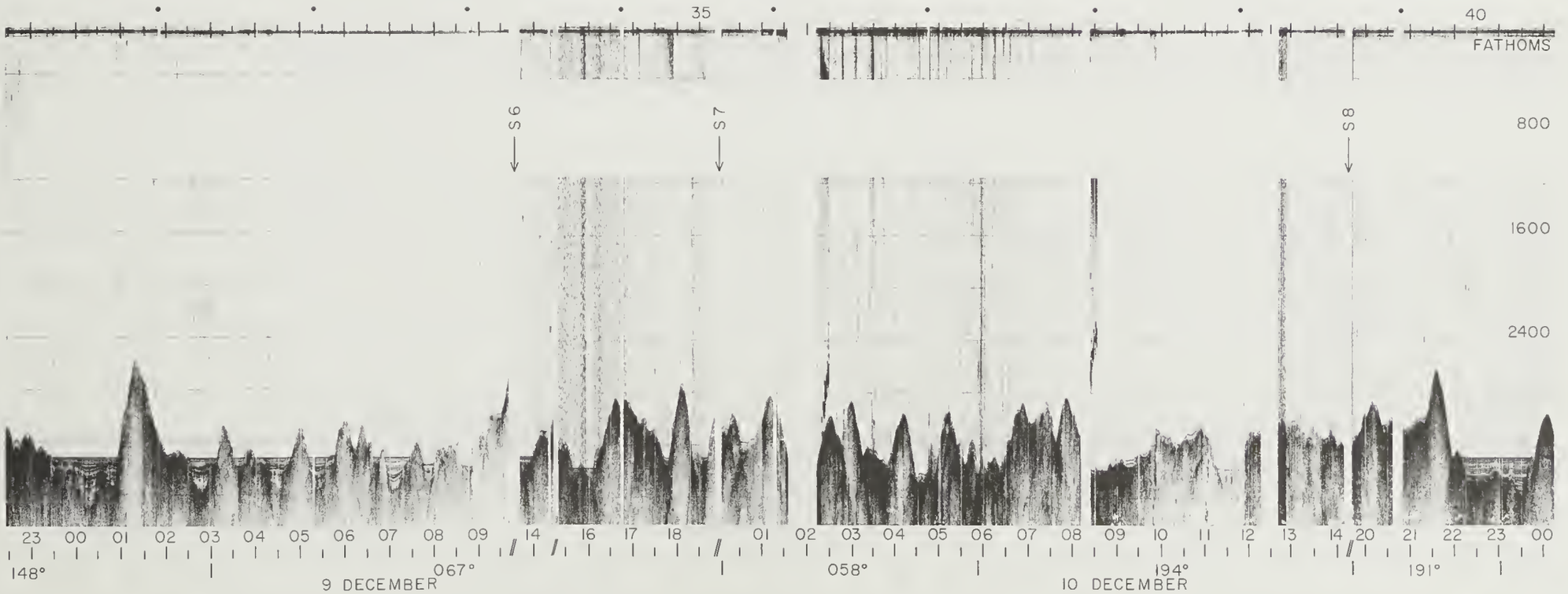

RC. 9
FATHOMS
2000
2400
2800
3200
277°
274°
17 SEP
18 SEP
1965

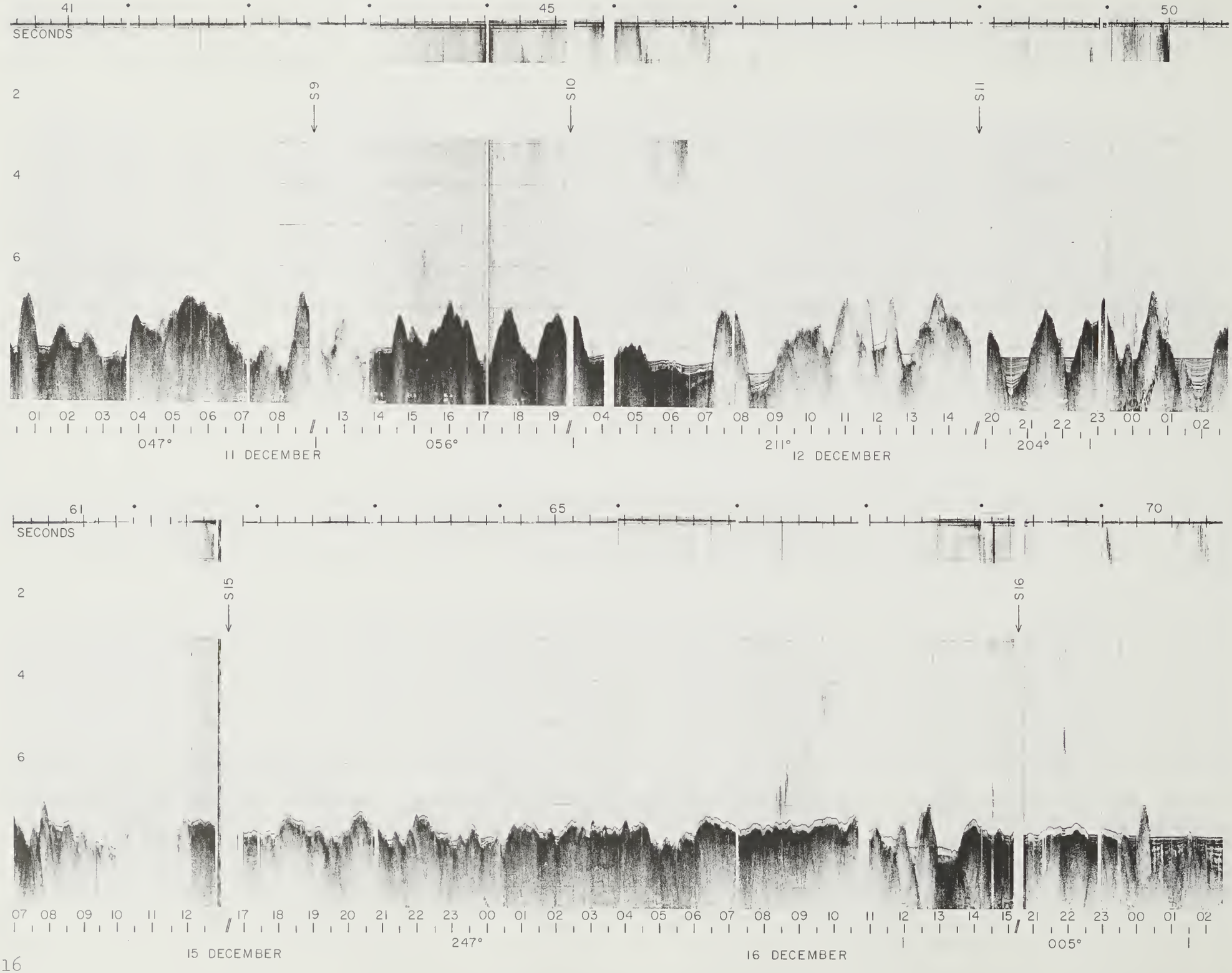

SECONDS
1605
1610
000°
270°
288°
180°
270°
1965
19 SEP
20 SEP

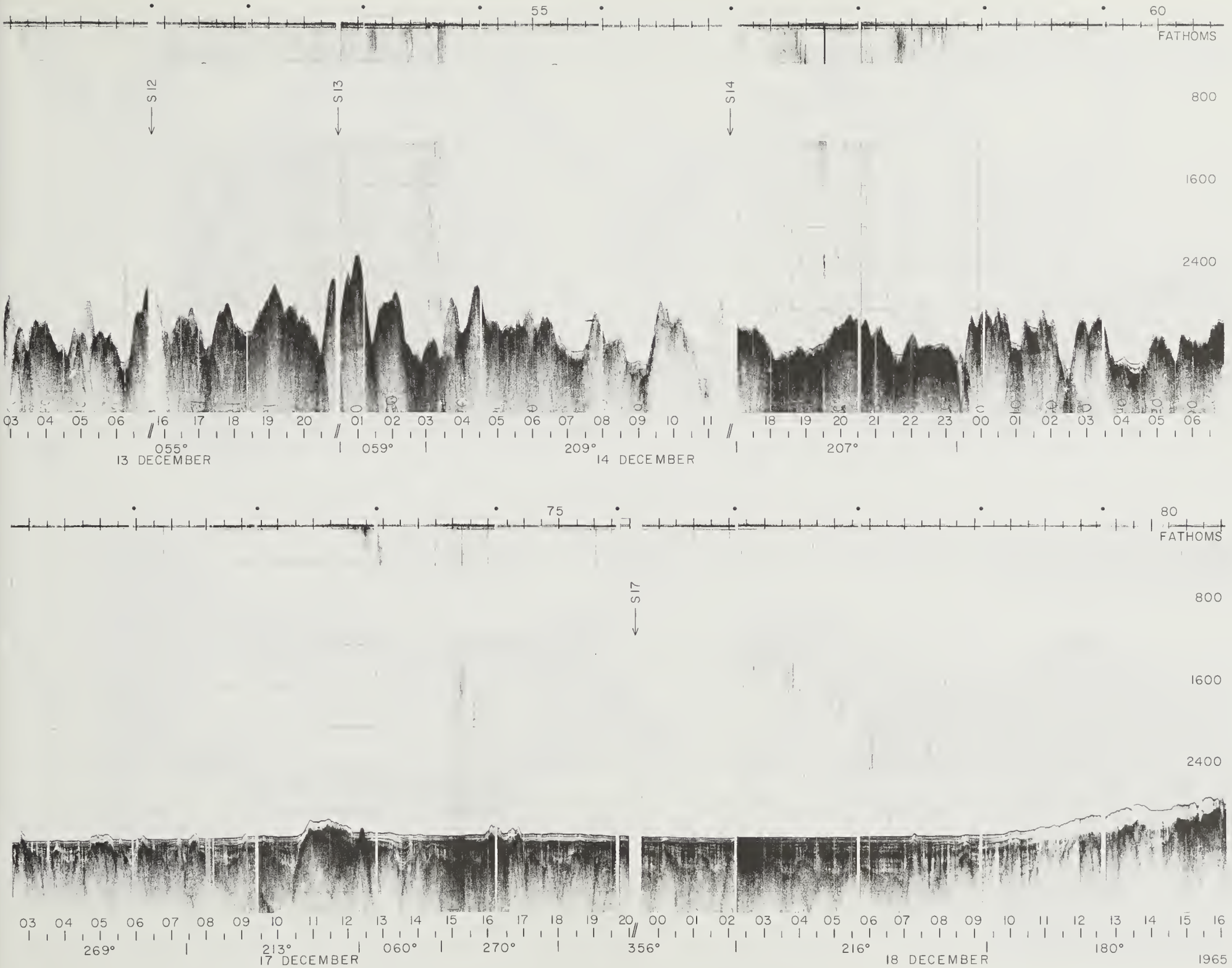
FATHOMS
400
800
1200
1600
NEW YORK, NEW YORK
C-9
21-IX-65
1624B
1623B
1622B
1621B
1620B
1619B
20-IX-65
1618B
1617B
1616B
1615B
270°
217°
270°
000°
180°
20 SEP
21 SEP
1965

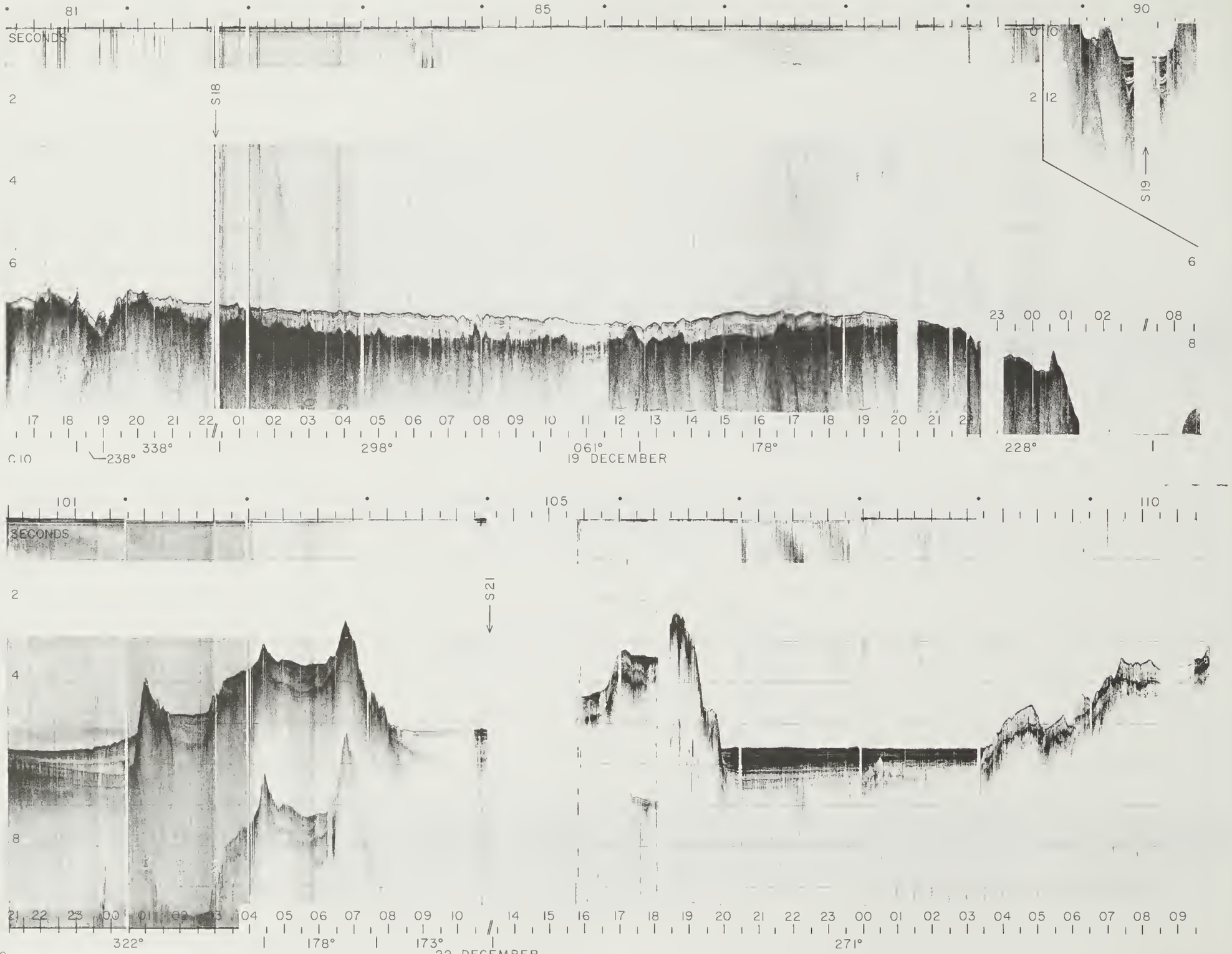

SECONDS
NEW YORK, NEW YORK
S1
S2
S4
S5
C10
2 DECEMBER
3 DECEMBER
7 DECEMBER
8 DECEMBER
140°
141°
142°
130°
150°
153°

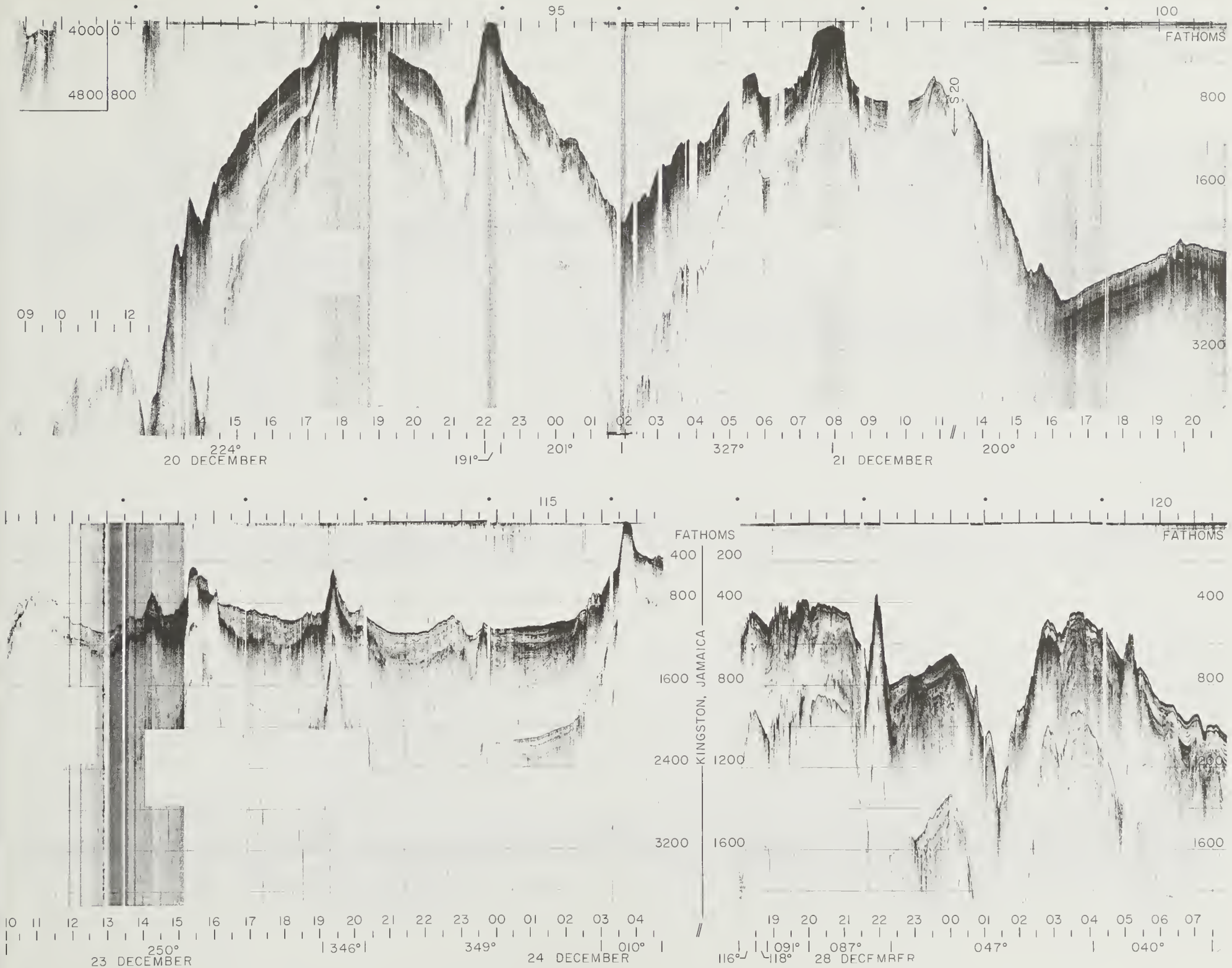

15
20
FATHOMS
800
1600
2400
3200
S3
ST. GEORGE
BERMUDA
08 09 10 11 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 12 13 14 15 18 20 21 22 23 00 01
146°
080° 010°
135°
170°
005°
170°
150°
4 DECEMBER
000°
5 DECEMBER
6 DECEMBER

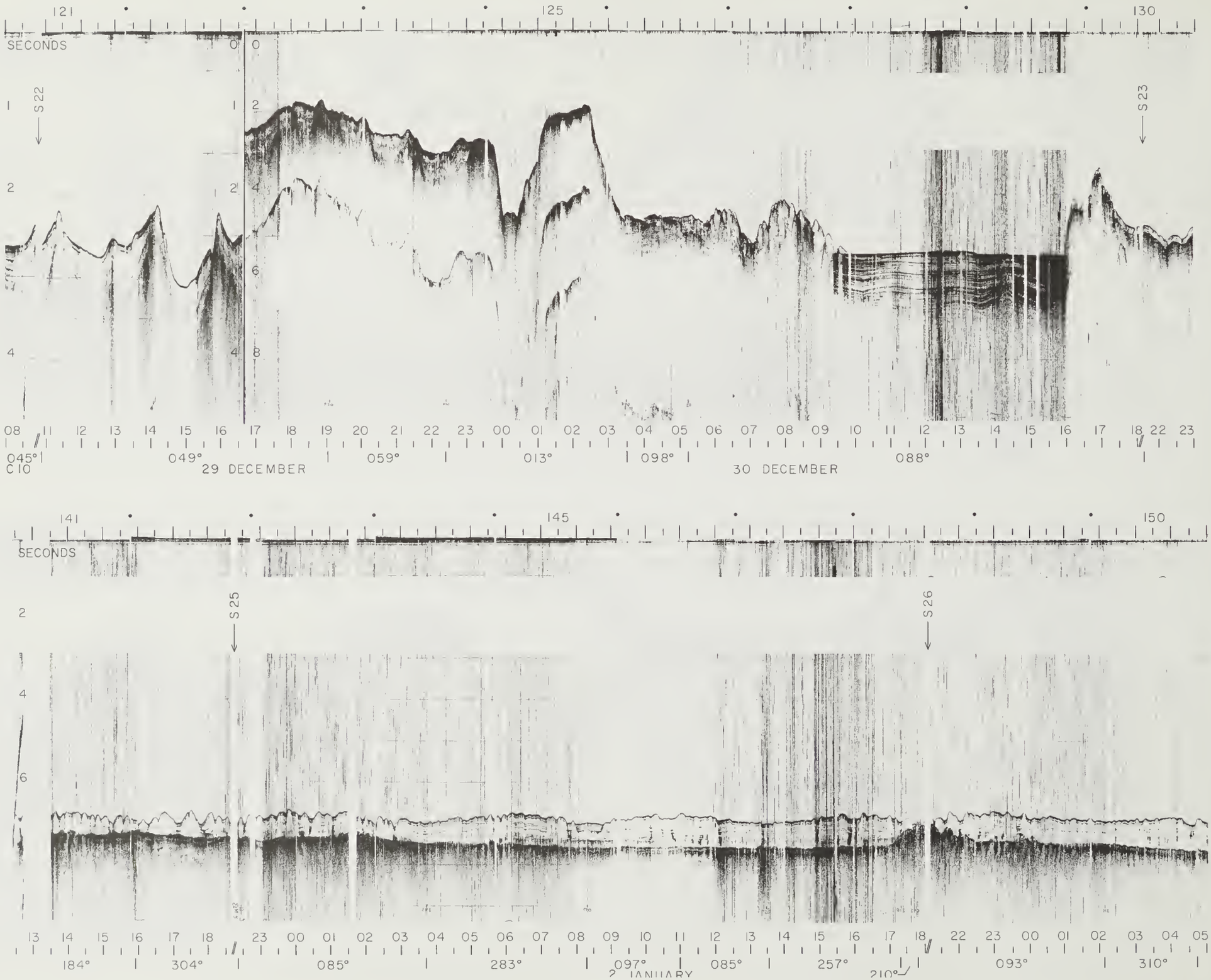

35
40
FATHOMS
800
1600
2400
S6
S7
S8
23 00 01 02 03 04 05 06 07 08 09 14 16 17 18 01 02 03 04 05 06 07 08 09 10 11 12 13 14 20 21 22 23 00
148°
067°
058°
194°
191°
9 DECEMBER
10 DECEMBER

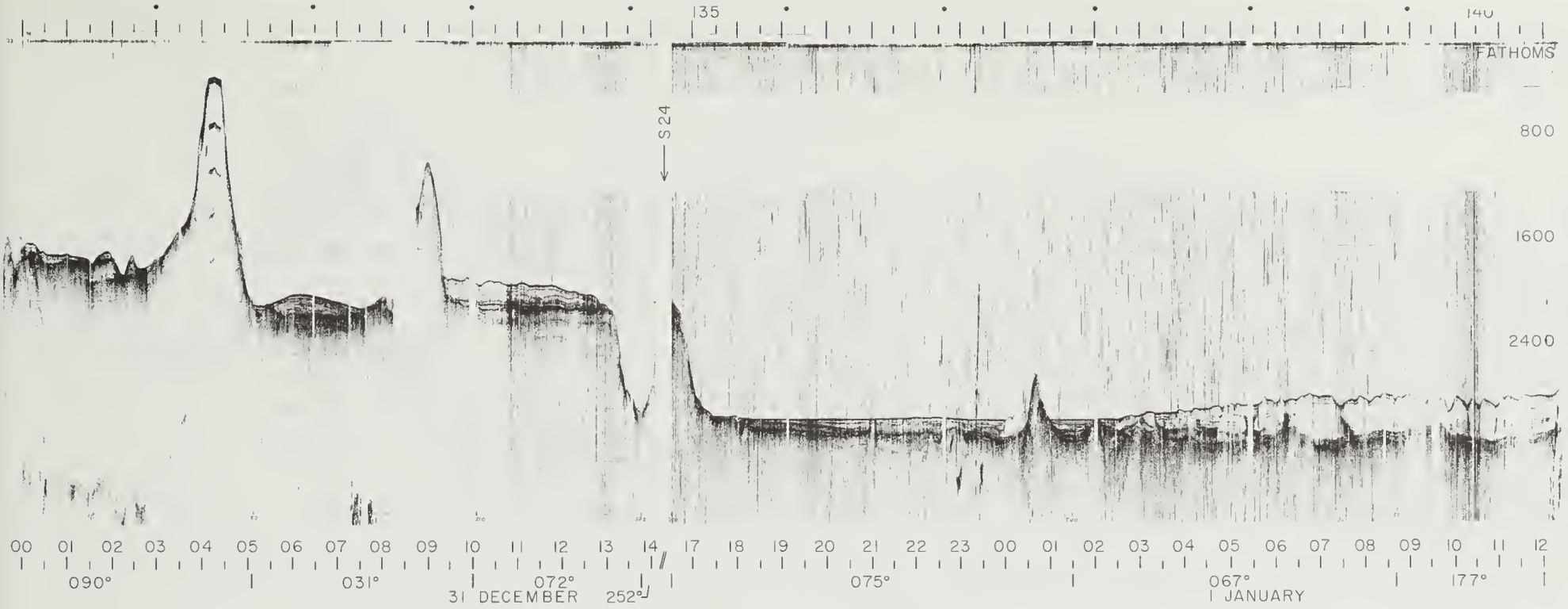

SECONDS
41
45
50
2
4
6
S9
S10
S11
01 02 03 04 05 06 07 08 13 14 15 16 17 18 19 04 05 06 07 08 09 10 11 12 13 14 20 21 22 23 00 01 02
047°
11 DECEMBER
056°
211°
12 DECEMBER
204°
SECONDS
61
65
70
2
4
6
S15
S16
07 08 09 10 11 12 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 21 22 23 00 01 02
15 DECEMBER
247°
16 DECEMBER
005°

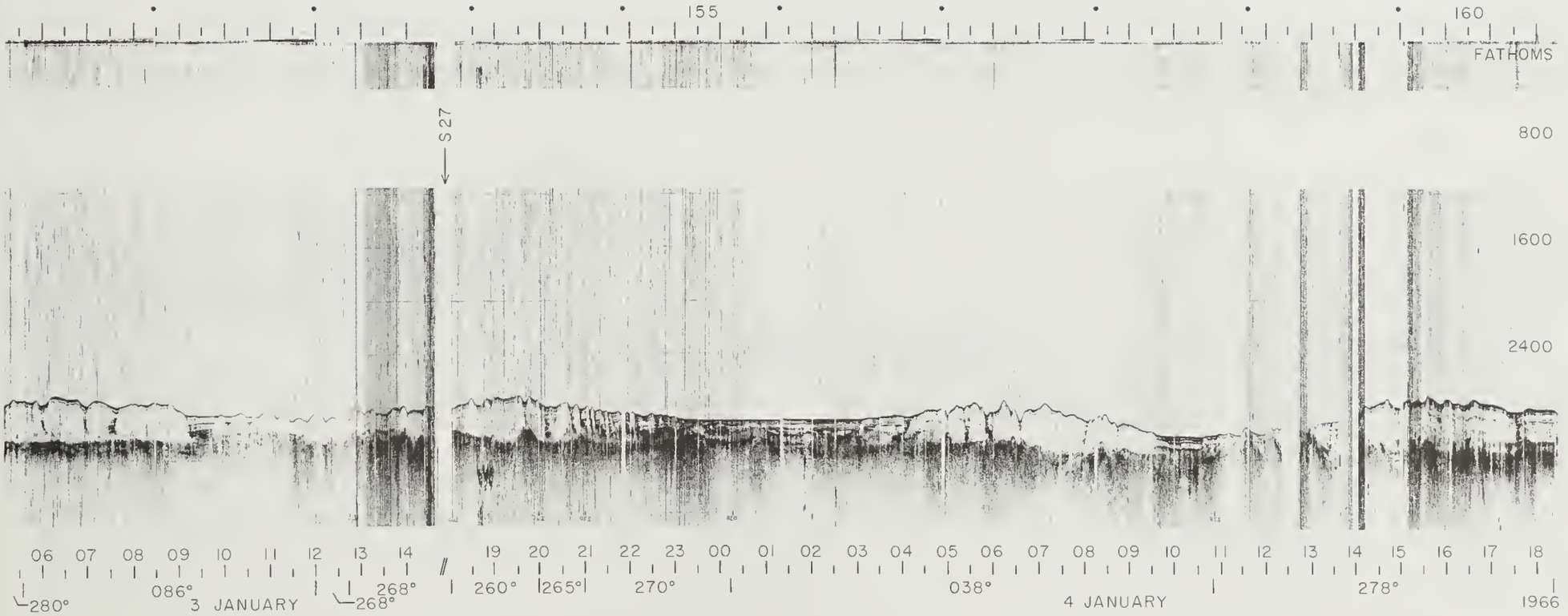

55
60
FATHOMS
S12
S13
S14
800
1600
2400
03 04 05 06 16 17 18 19 20 01 02 03 04 05 06 07 08 09 10 11 18 19 20 21 22 23 00 01 02 03 04 05 06
055°
059°
209°
207°
13 DECEMBER
14 DECEMBER
75
80
FATHOMS
S17
800
1600
2400
03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16
269°
213°
060°
270°
356°
216°
180°
17 DECEMBER
18 DECEMBER
1965

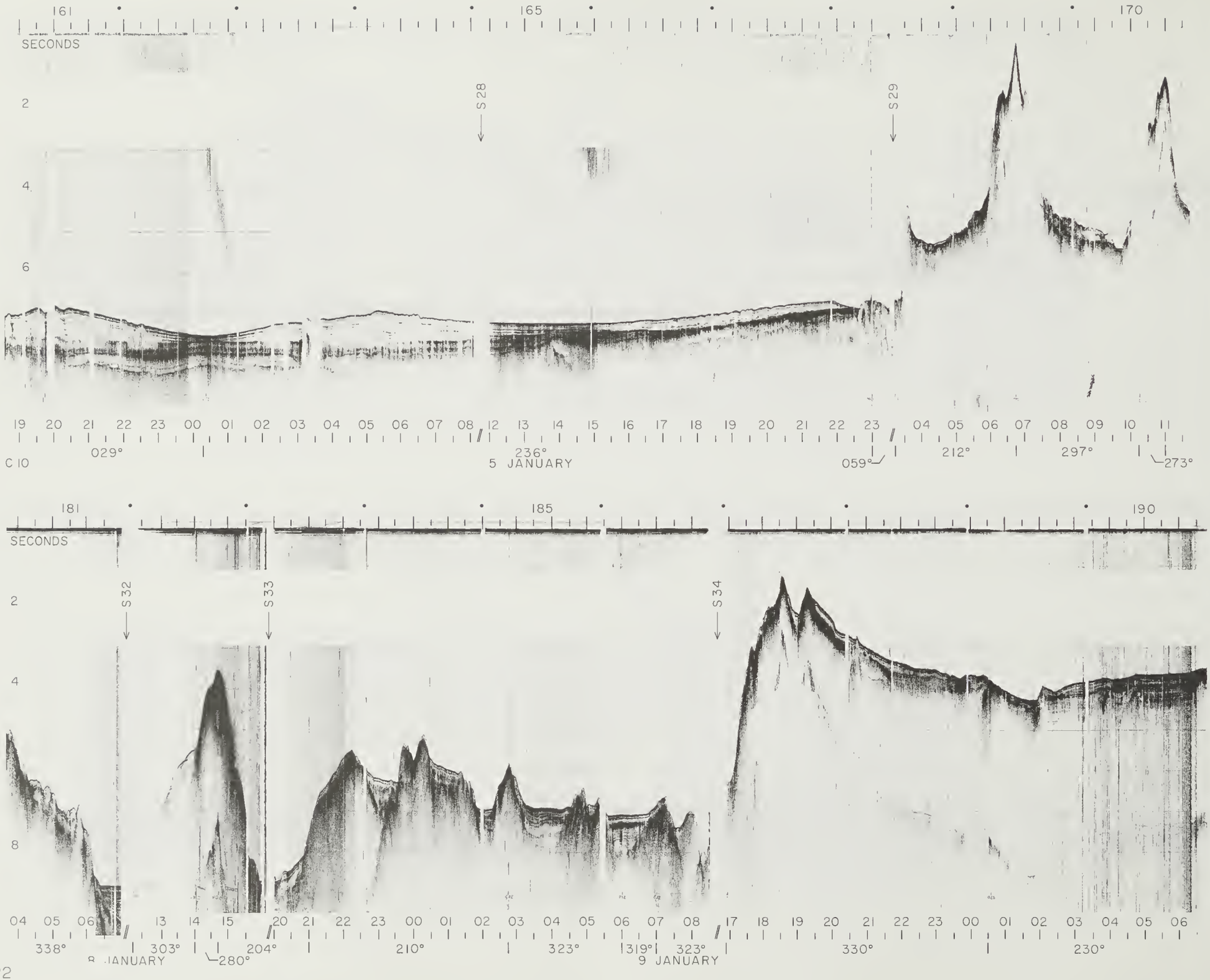

81
85
90
SECONDS
2
4
6
S18
S19
2
12
6
8
23 00 01 02 08
17 18 19 20 21 22 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22
338°
238°
298°
061°
178°
228°
19 DECEMBER
101
105
110
SECONDS
2
4
8
S21
21 22 23 00 01 02 03 04 05 06 07 08 09 10 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
322°
178°
173°
271°
22 DECEMBER

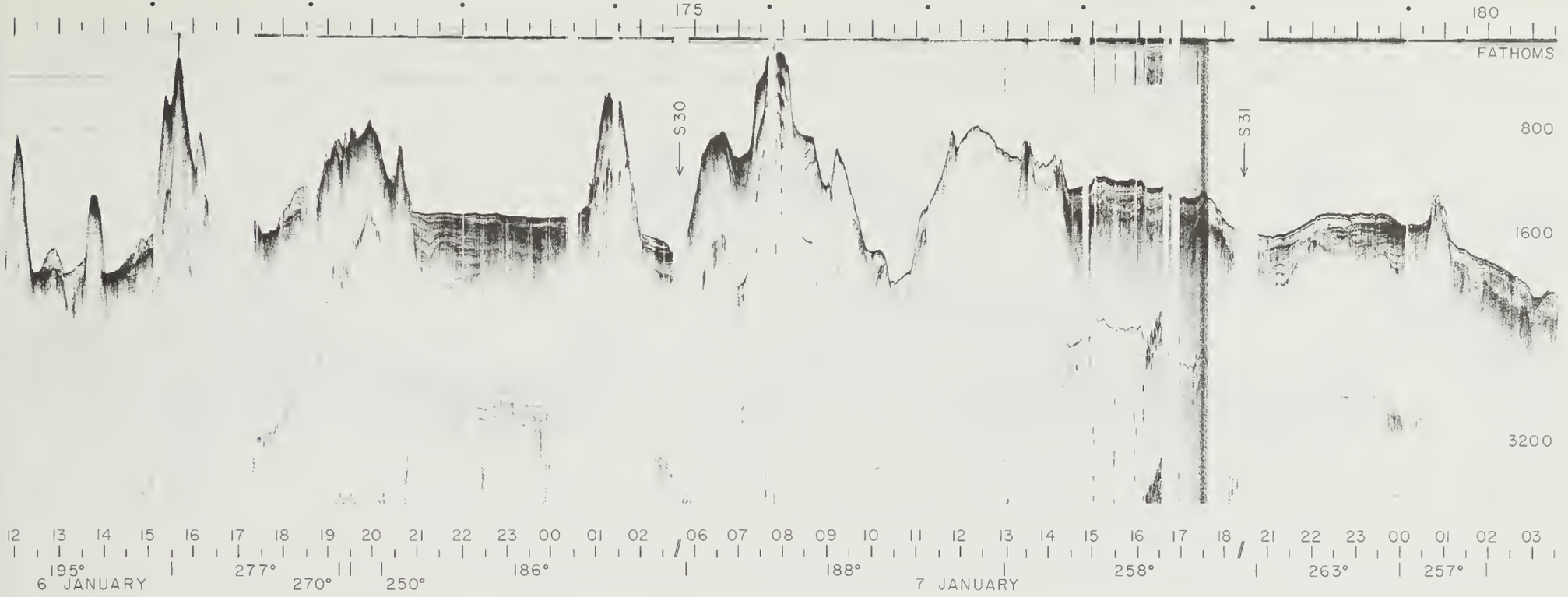

95
100
FATHOMS
4000 0
4800 800
800
1600
3200
S20
09 10 11 12
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 14 15 16 17 18 19 20
224°
20 DECEMBER
191°
201°
327°
200°
21 DECEMBER
115
120
FATHOMS
FATHOMS
400 200
800 400
1600 800
2400 1200
3200 1600
KINGSTON, JAMAICA
400
800
1200
1600
10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
19 20 21 22 23 00 01 02 03 04 05 06 07
250°
23 DECEMBER
346°
349°
010°
24 DECEMBER
116°
091°
118°
087°
047°
040°
28 DECEMBER

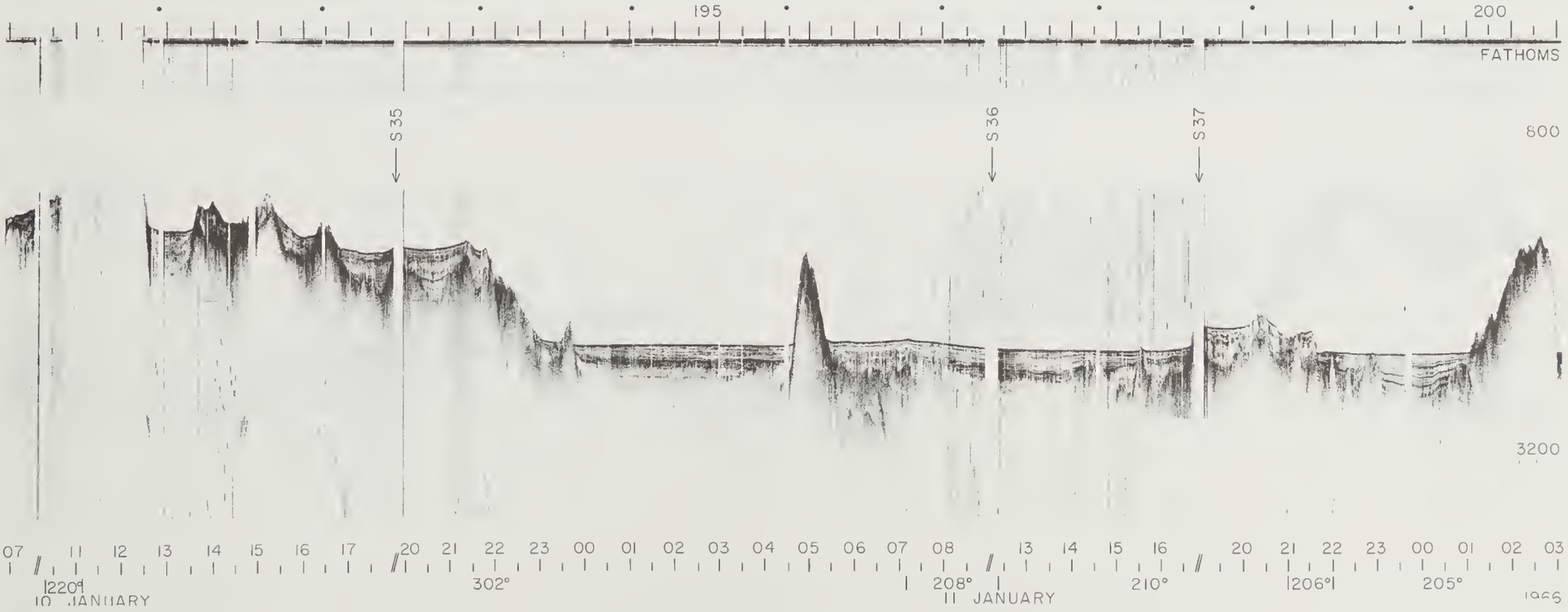

121
125
130
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8
S22
S23
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045°
C10
049°
29 DECEMBER
059°
013°
098°
088°
30 DECEMBER
141
145
150
SECONDS
S25
S26
13 14 15 16 17 18 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 22 23 00 01 02 03 04 05
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085°
283°
097°
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210°
093°
310°

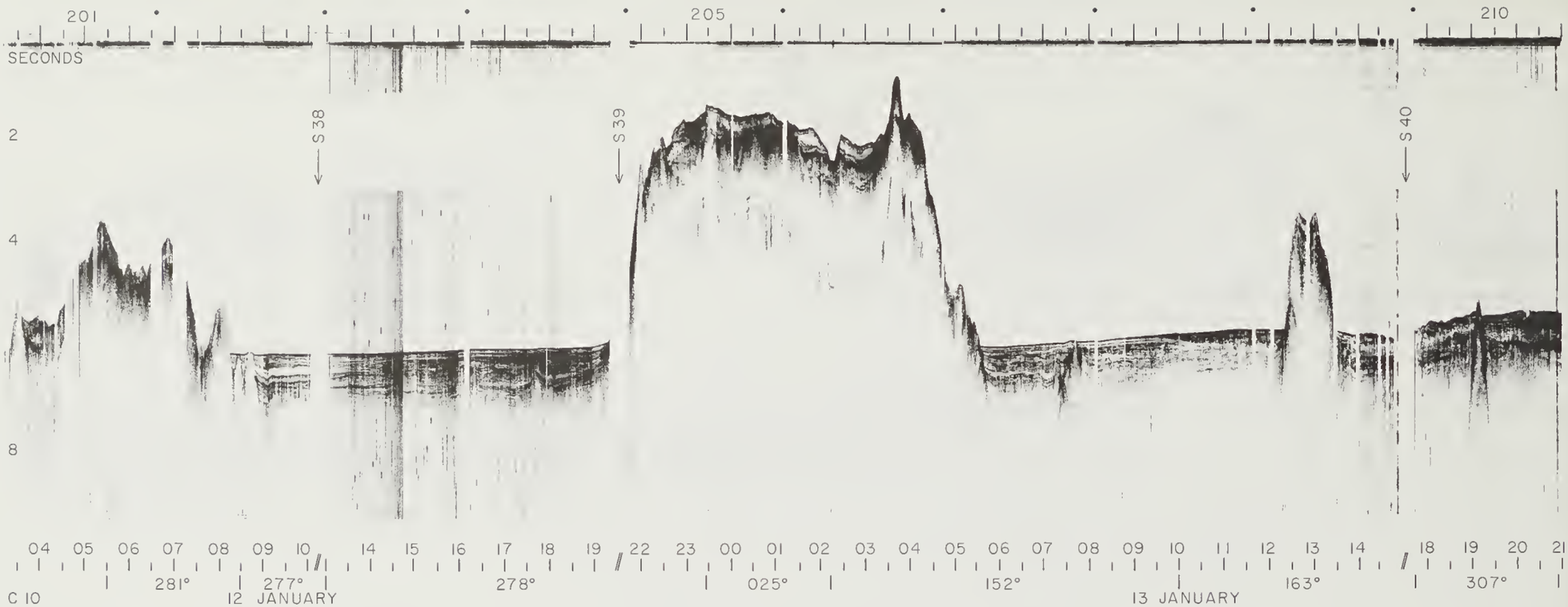

135
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2400
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072°
31 DECEMBER
252°
075°
067°
1 JANUARY
177°

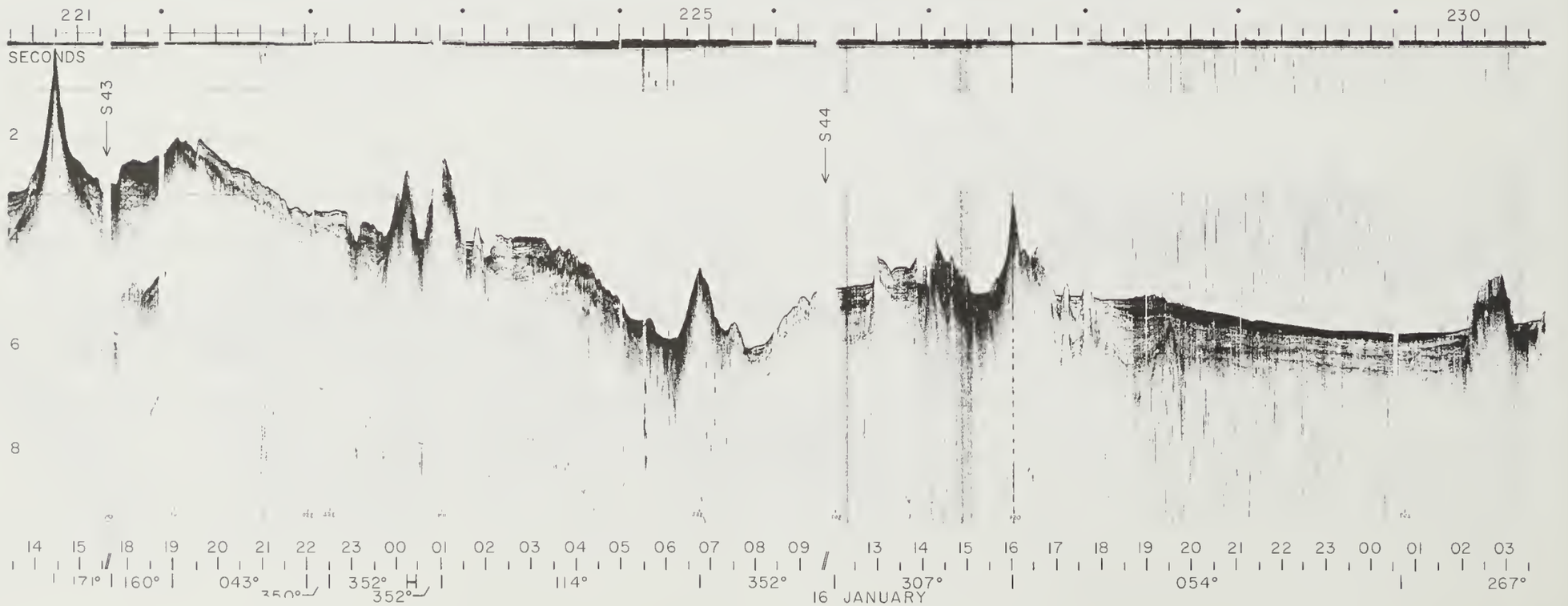

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S27
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1600
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06 07 08 09 10 11 12 13 14 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
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086°
3 JANUARY
268°
268°
260°
265°
270°
038°
4 JANUARY
278°
1966

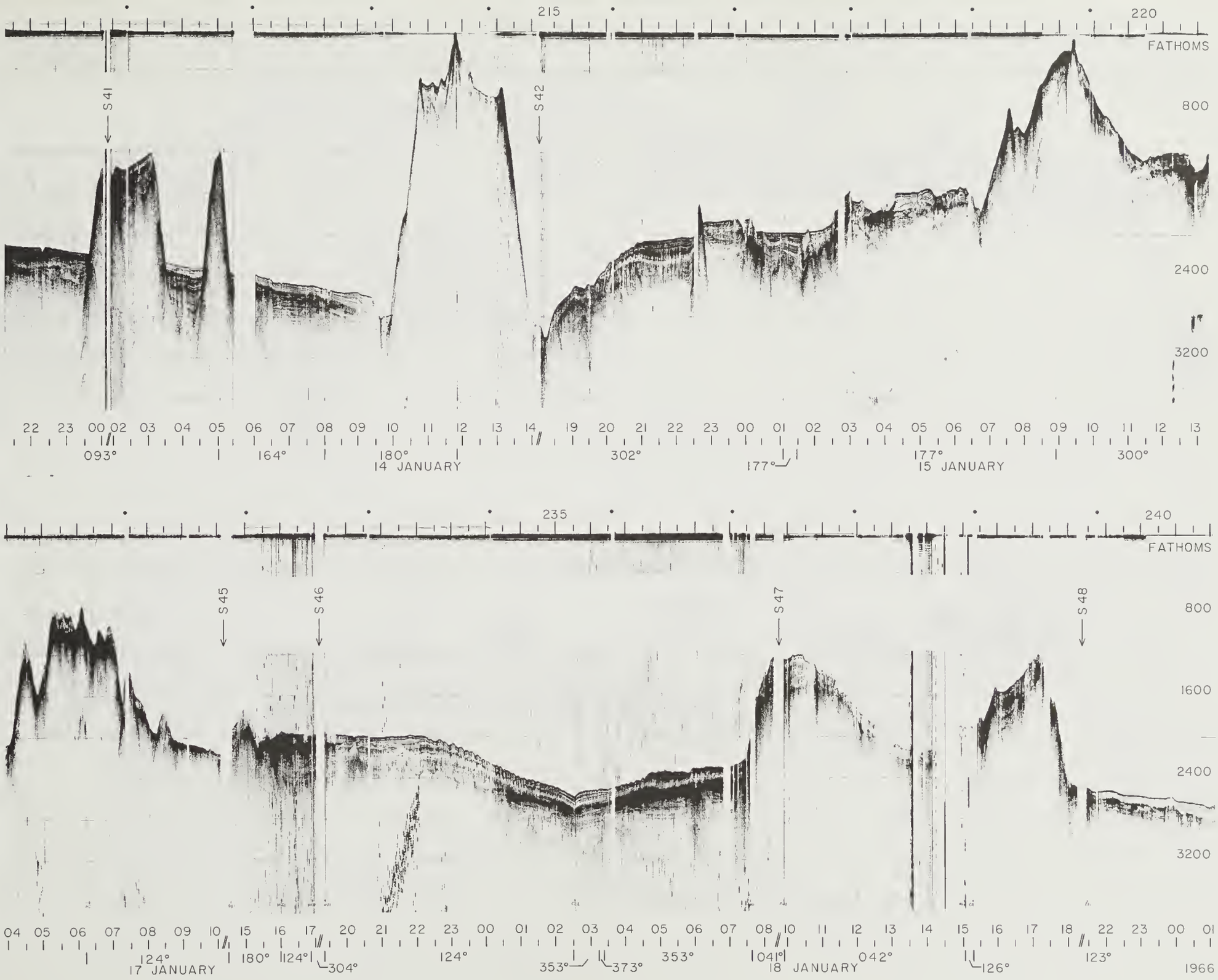

161
165
170
SECONDS
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6
S 28
S 29
19 20 21 22 23 00 01 02 03 04 05 06 07 08 12 13 14 15 16 17 18 19 20 21 22 23 04 05 06 07 08 09 10 11
029°
236°
059°
212°
297°
273°
C 10
5 JANUARY
181
185
190
SECONDS
2
4
8
S 32
S 33
S 34
04 05 06 13 14 15 20 21 22 23 00 01 02 03 04 05 06 07 08 17 18 19 20 21 22 23 00 01 02 03 04 05 06
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204°
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210°
323°
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323°
330°
230°
8 JANUARY
9 JANUARY

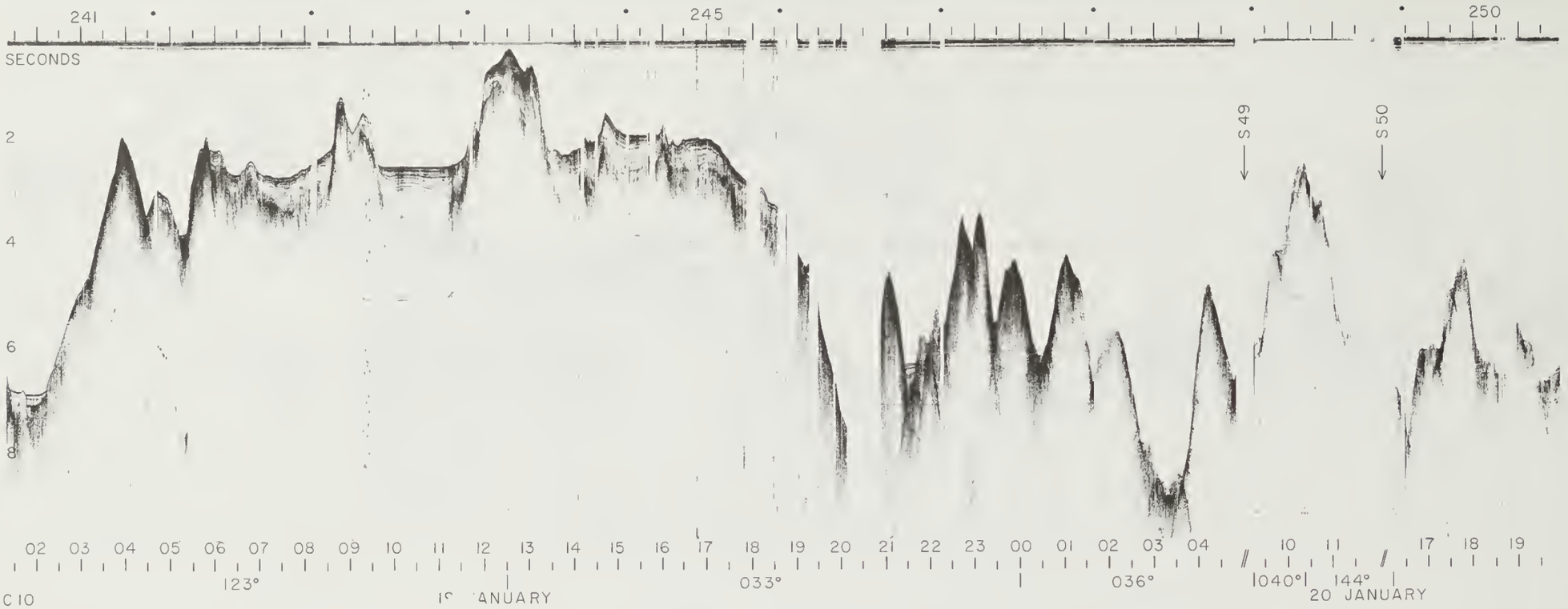

175
180
FATHOMS
800
1600
3200
S30
S31
12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 06 07 08 09 10 11 12 13 14 15 16 17 18 21 22 23 00 01 02 03
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277°
270°
250°
186°
188°
258°
263°
257°
6 JANUARY
7 JANUARY

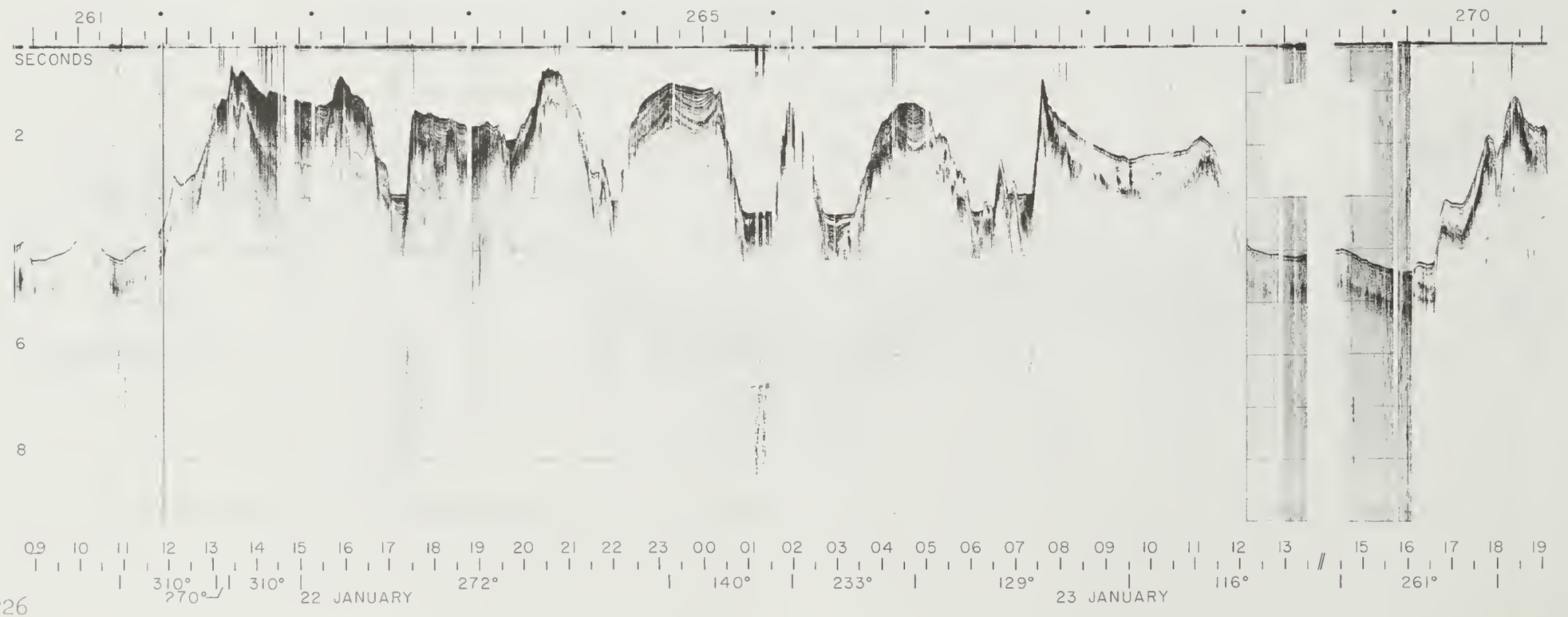

195
200
FATHOMS
800
3200
S35
S36
S37
07 11 12 13 14 15 16 17 20 21 22 23 00 01 02 03 04 05 06 07 08 13 14 15 16 20 21 22 23 00 01 02 03
220°
302°
208°
210°
206°
205°
10 JANUARY
11 JANUARY
1965

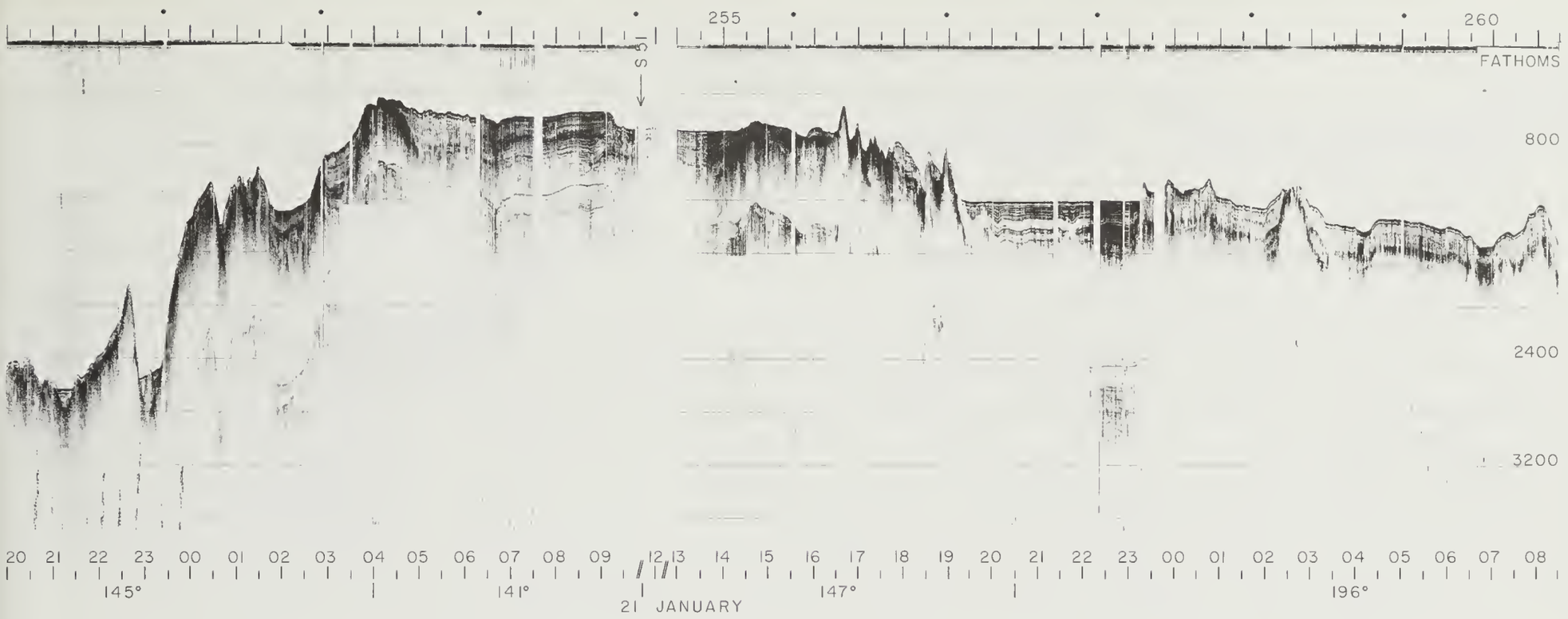

201
205
210
SECONDS
2
4
8
S38
S39
S40
04 05 06 07 08 09 10 14 15 16 17 18 19 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 18 19 20 21
281°
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278°
025°
152°
163°
307°
C 10
12 JANUARY
13 JANUARY

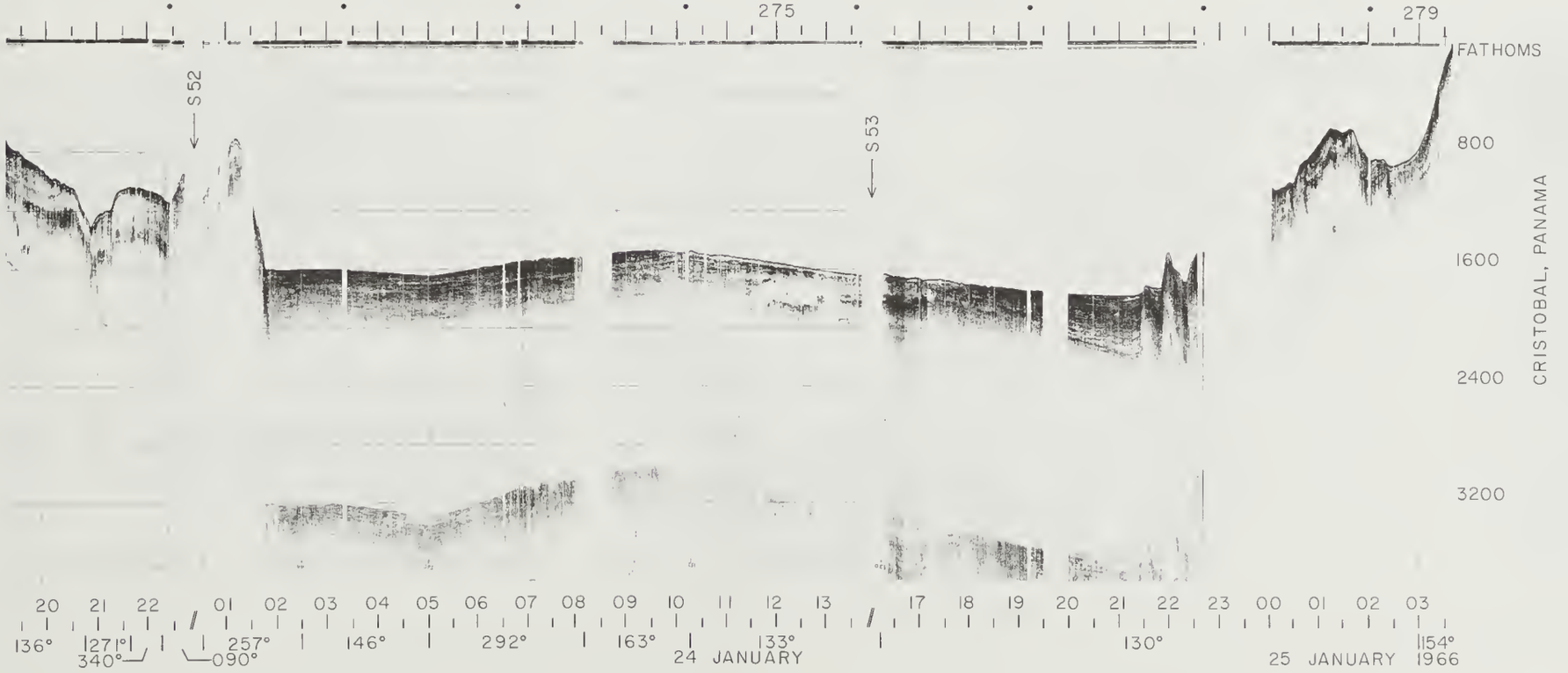

221
225
230
SECONDS
2
4
6
8
S43
S44
14 15 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03
171°
160°
043°
350°
352°
352°
114°
352°
307°
054°
267°
16 JANUARY

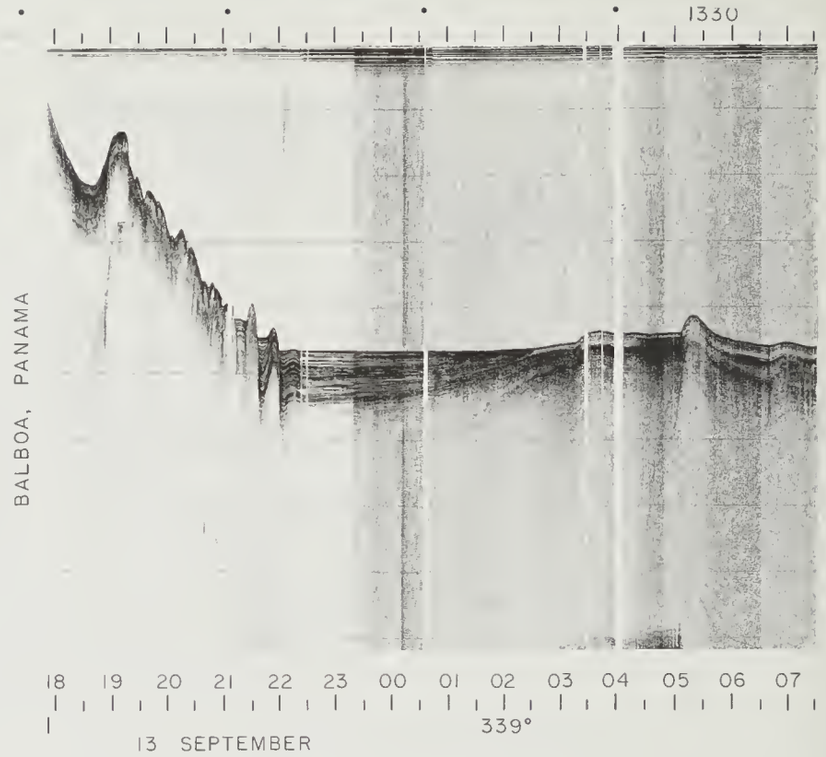

215
220
FATHOMS
S41
S42
800
2400
3200
22 23 00 02 03 04 05 06 07 08 09 10 11 12 13 14 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13
093°
164°
180°
14 JANUARY
302°
177°
177°
15 JANUARY
300°
235
240
FATHOMS
S45
S46
S47
S48
800
1600
2400
3200
04 05 06 07 08 09 10 15 16 17 20 21 22 23 00 01 02 03 04 05 06 07 08 10 11 12 13 14 15 16 17 18 22 23 00 01
124°
17 JANUARY
180°
124°
304°
124°
353°
373°
353°
041°
042°
18 JANUARY
126°
123°
1966

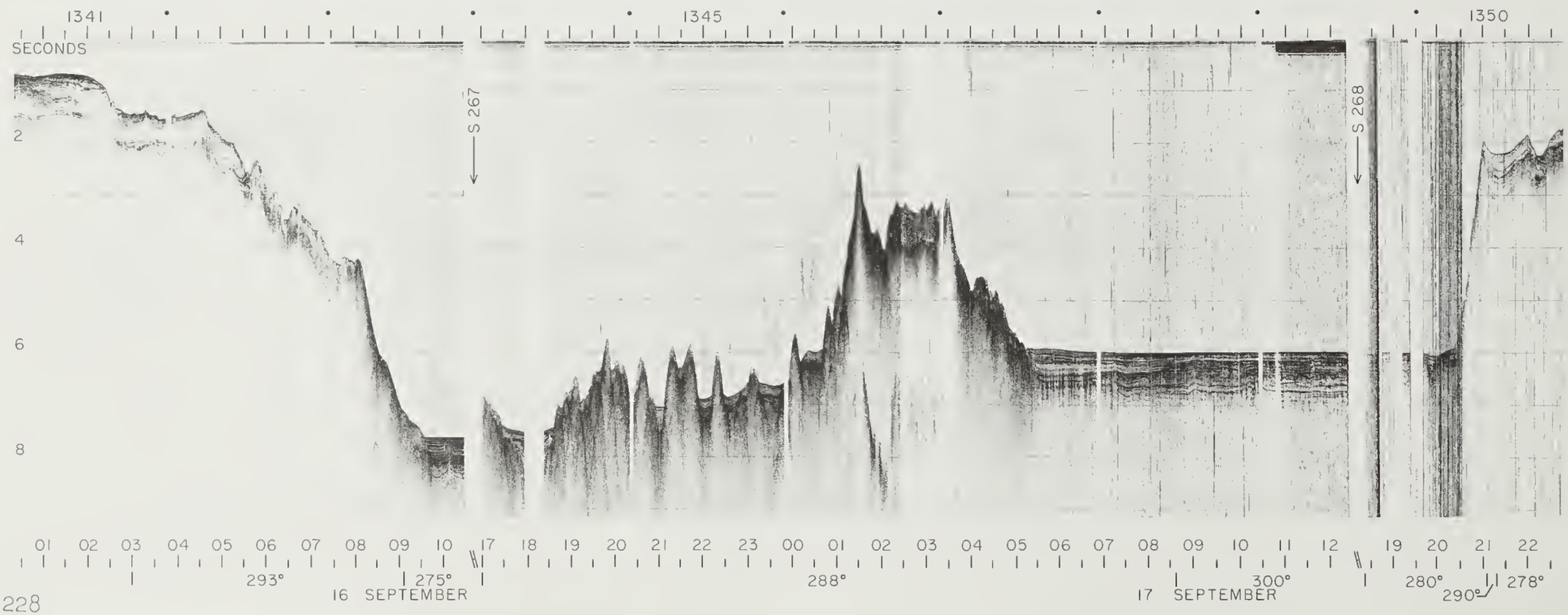

241
245
250
SECONDS
2
4
6
8
S49
S50
02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 10 11 17 18 19
123°
033°
036°
040°
144°
C 10
20 JANUARY

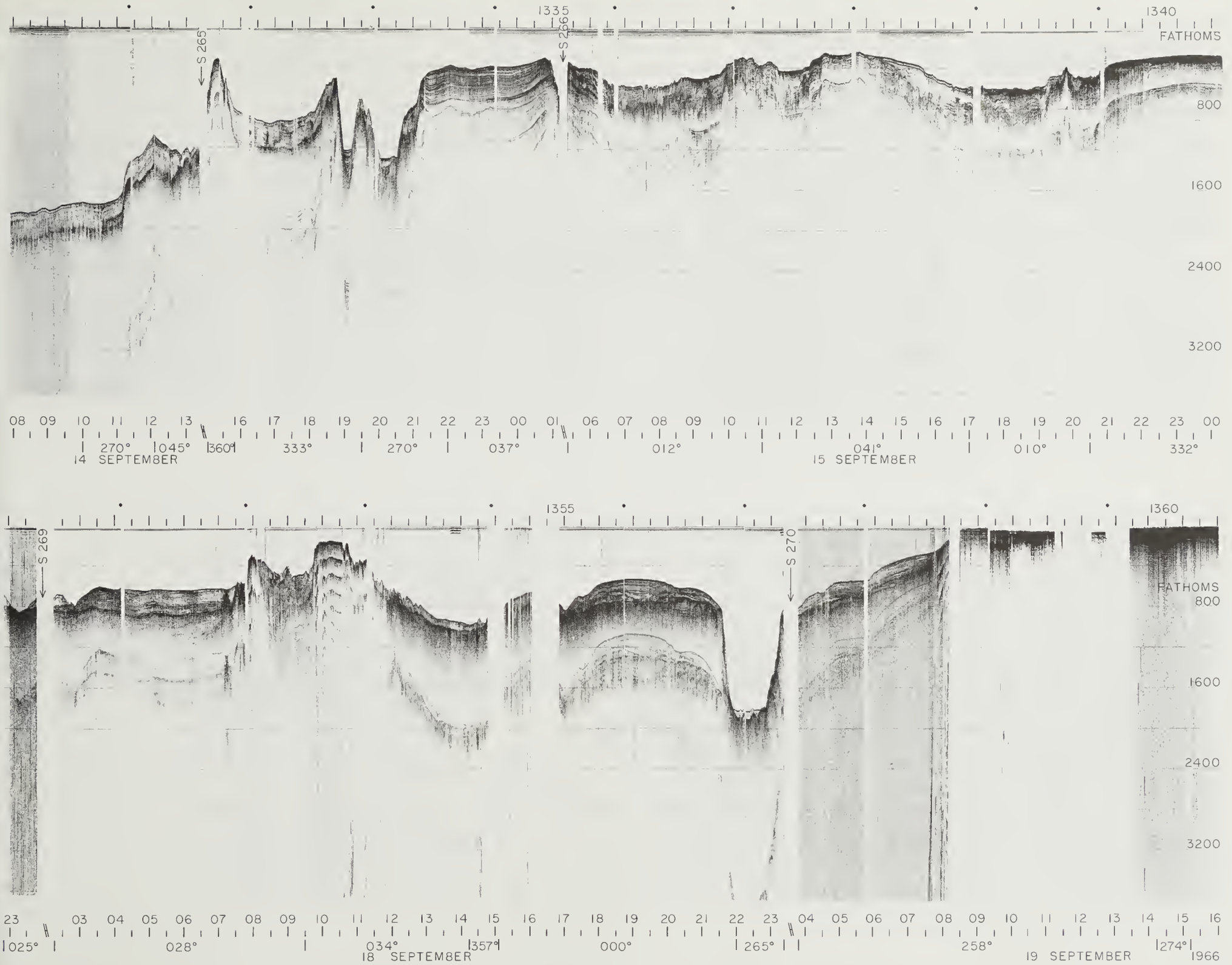

261
265
270
SECONDS
2
6
8
09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 15 16 17 18 19
310°
310°
270°
272°
140°
233°
129°
116°
261°
22 JANUARY
23 JANUARY

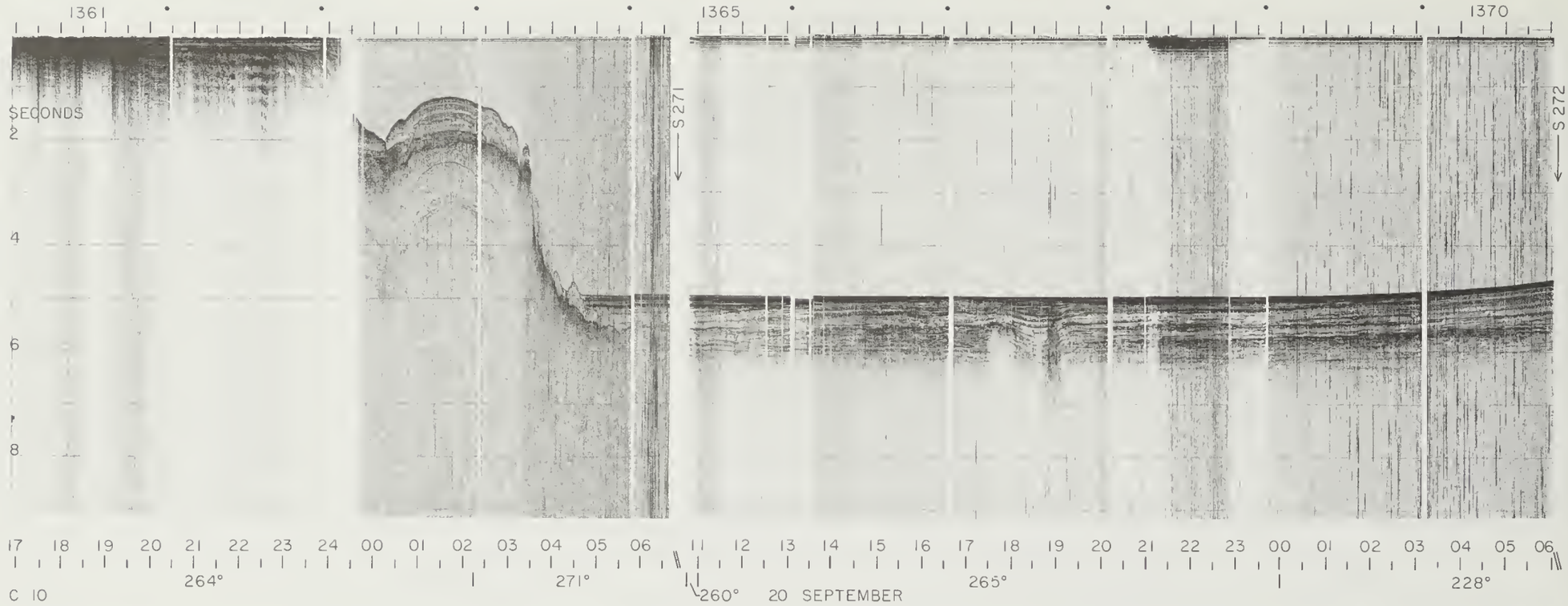

255
260
FATHOMS
S 51
800
2400
3200
20 21 22 23 00 01 02 03 04 05 06 07 08 09 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08
145°
141°
147°
196°
21 JANUARY

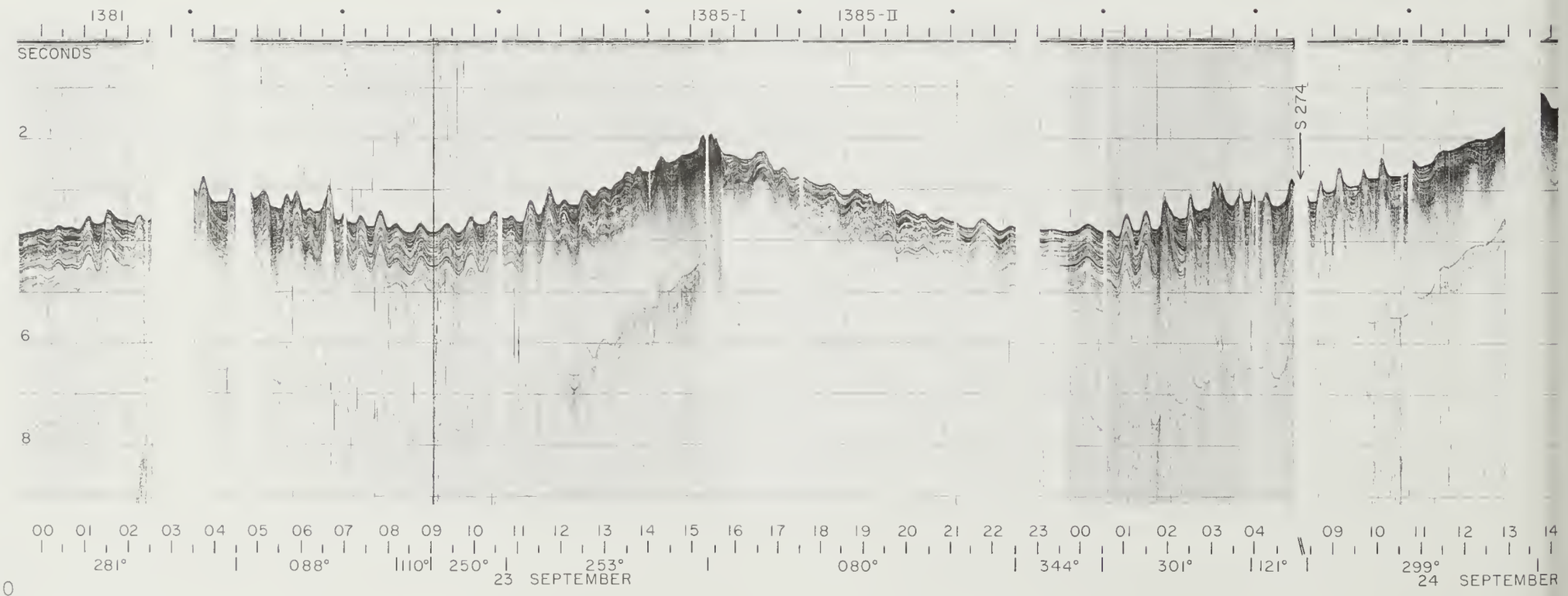

275
279
FATHOMS
S 52
S 53
800
1600
2400
3200
CRISTOBAL, PANAMA
20 21 22 01 02 03 04 05 06 07 08 09 10 11 12 13 17 18 19 20 21 22 23 00 01 02 03
136°
127.1°
340°
090°
257°
146°
292°
163°
133°
130°
1154°
24 JANUARY
25 JANUARY 1966

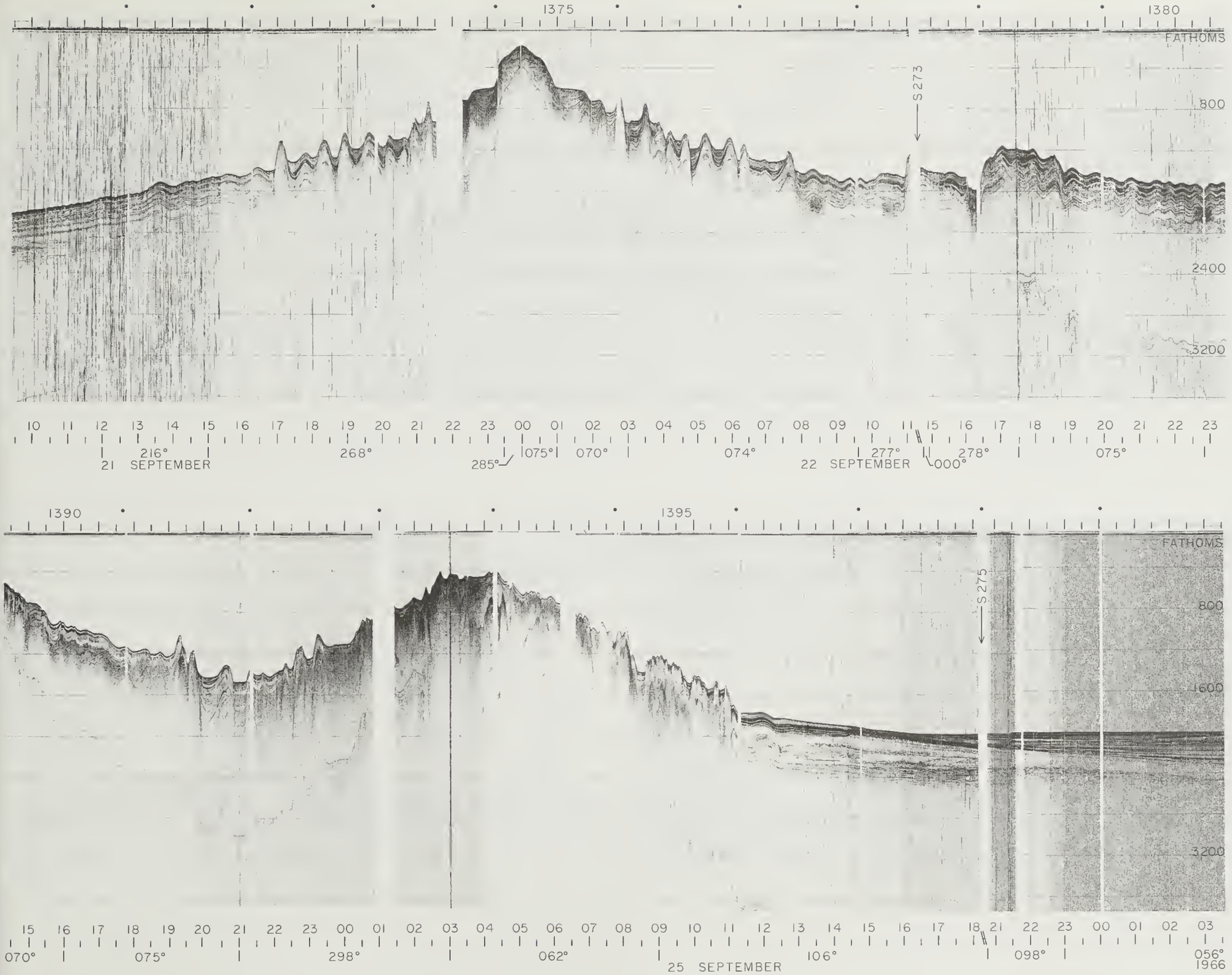

1330
BALBOA, PANAMA
18 19 20 21 22 23 00 01 02 03 04 05 06 07
339°
13 SEPTEMBER

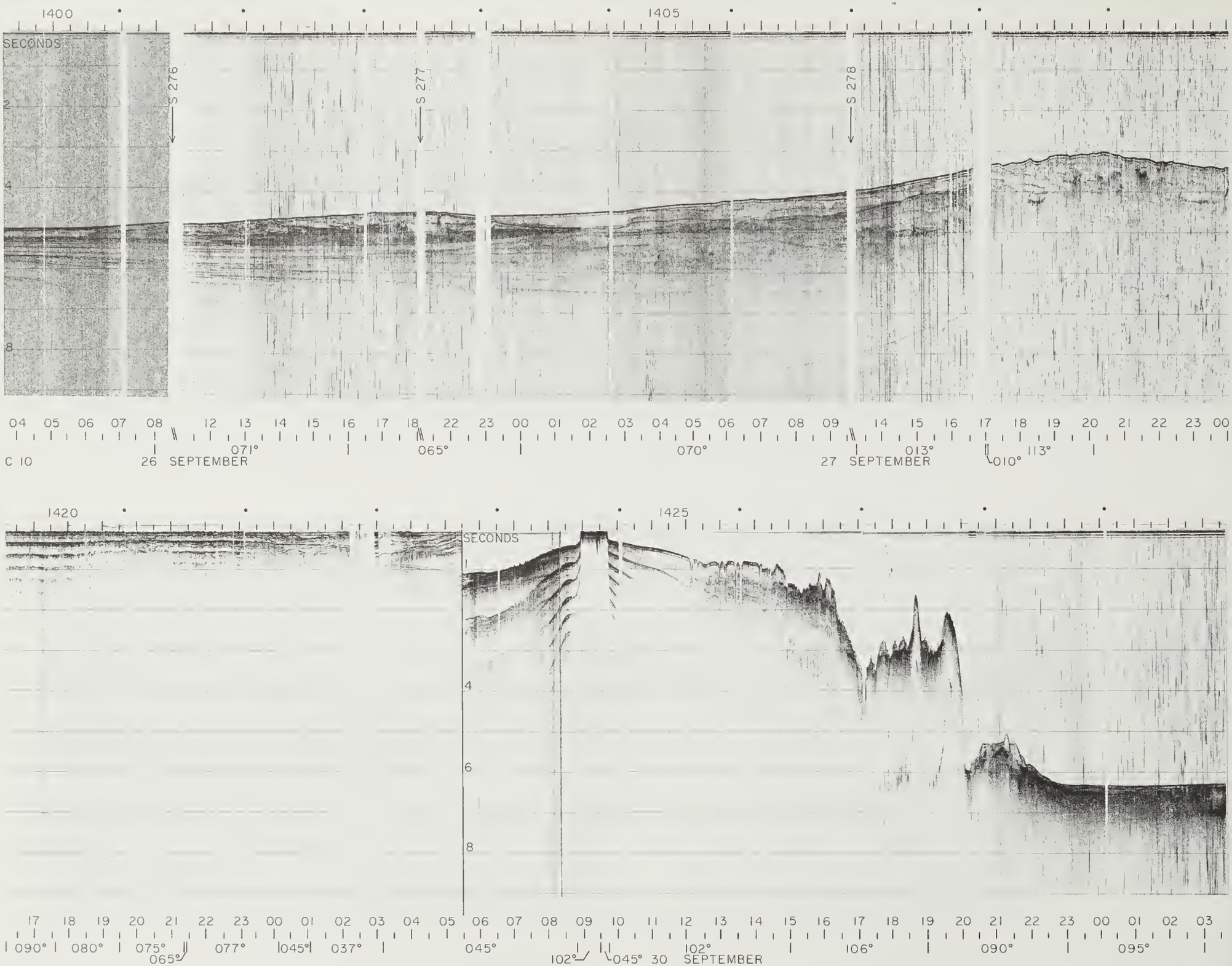

1341
1345
1350
SECONDS
2
4
6
8
S 267
S 268
01 02 03 04 05 06 07 08 09 10 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 19 20 21 22
293°
275°
16 SEPTEMBER
288°
300°
17 SEPTEMBER
280°
278°
290°

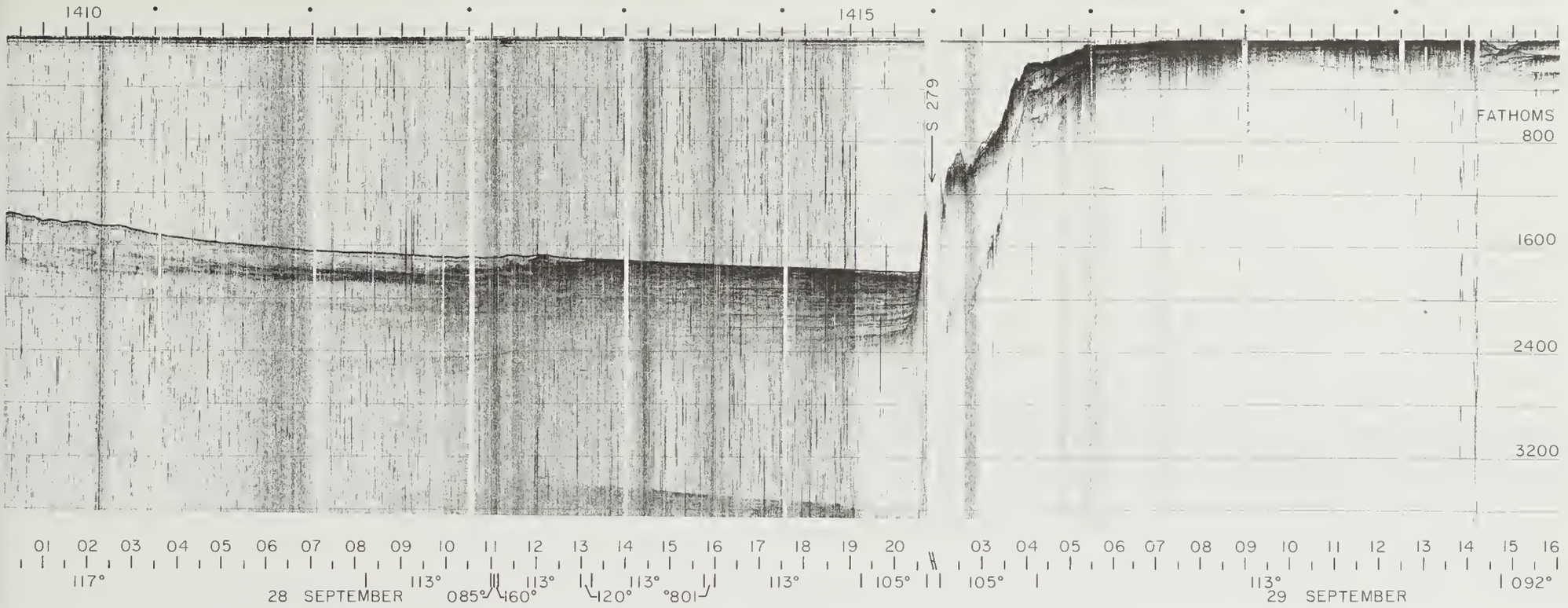

1335
1340
S 265
S 266
FATHOMS
800
1600
2400
3200
08 09 10 11 12 13 16 17 18 19 20 21 22 23 00 01 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00
270° 045° 360° 333° 270° 037° 012° 041° 010° 332°
14 SEPTEMBER
15 SEPTEMBER
1355
1360
S 269
S 270
FATHOMS
800
1600
2400
3200
23 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 04 05 06 07 08 09 10 11 12 13 14 15 16
025° 028° 034° 357° 000° 265° 258° 274°
18 SEPTEMBER
19 SEPTEMBER
1966

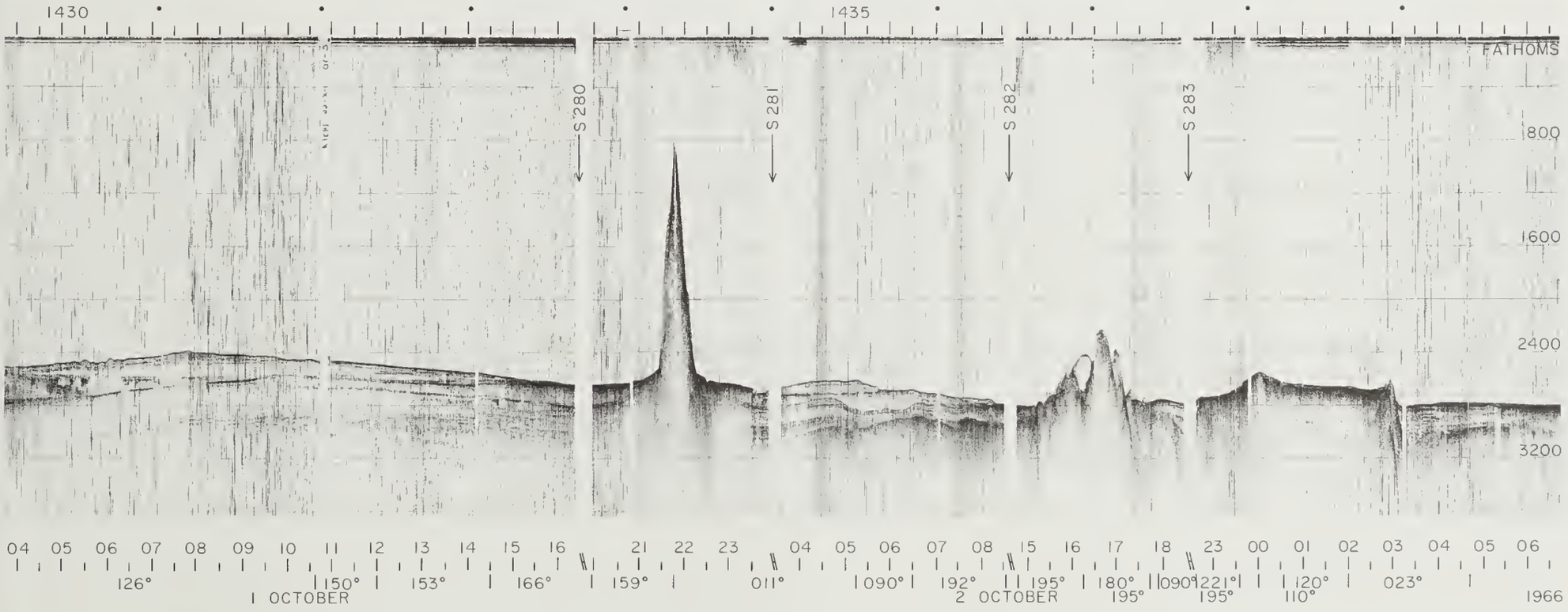

1361
1365
1370
SECONDS
2
4
6
8
S 271
S 272
17 18 19 20 21 22 23 24 00 01 02 03 04 05 06 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06
C 10
264°
271°
260°
20 SEPTEMBER
265°
228°

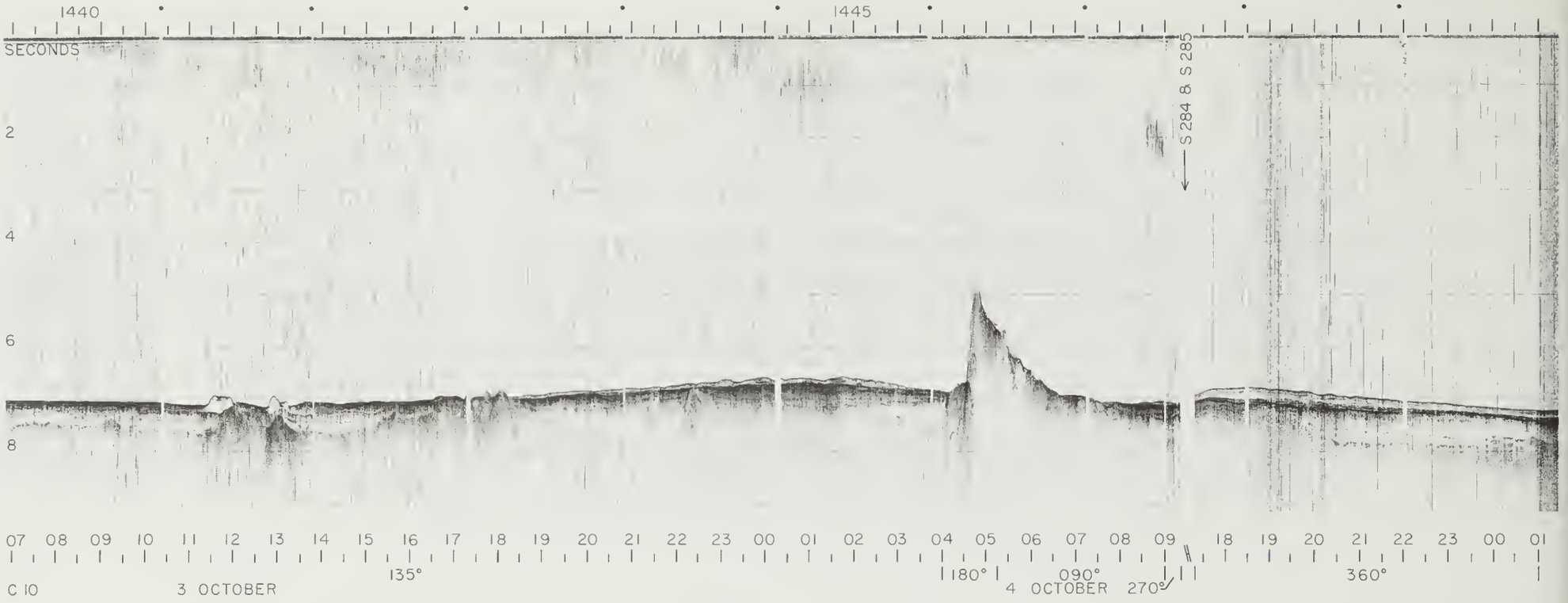

1381
1385-I
1385-II
SECONDS
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6
8
S 274
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 09 10 11 12 13 14
281°
088°
110°
250°
253°
23 SEPTEMBER
080°
344°
301°
121°
299°
24 SEPTEMBER

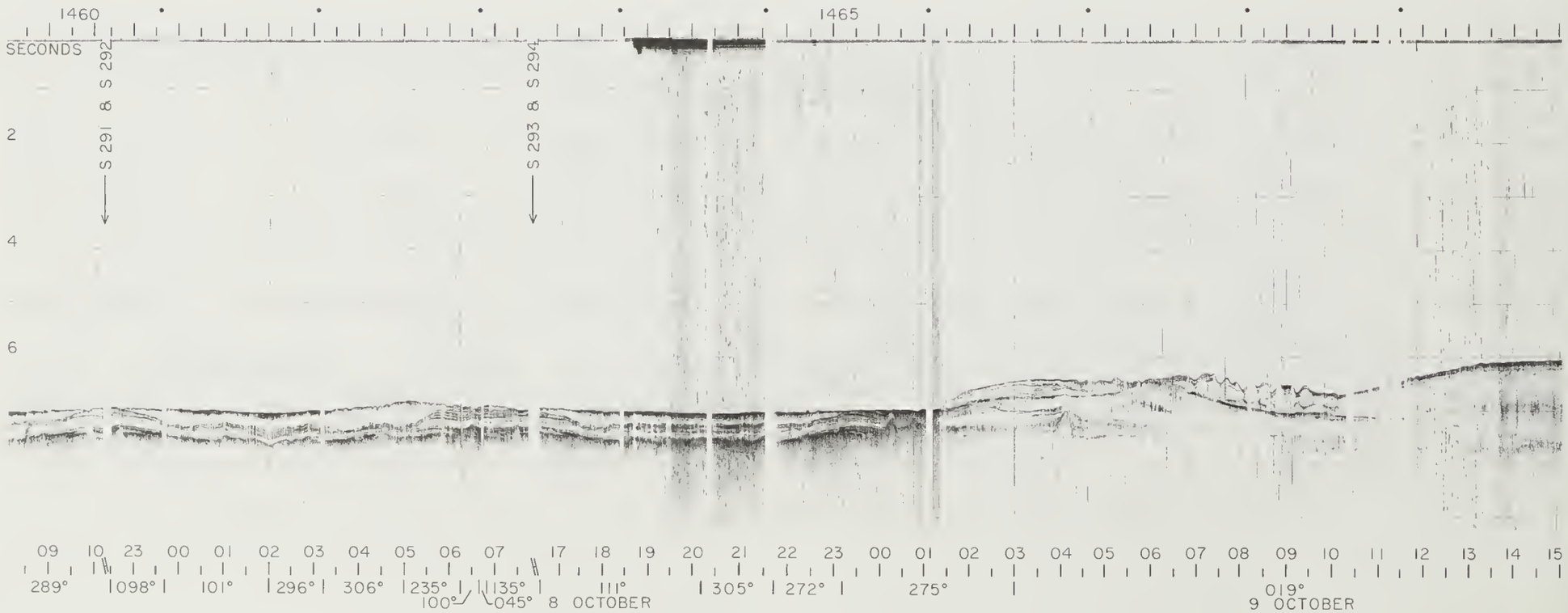

1375
1380
FATHOMS
S 273
800
2400
3200
10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 15 16 17 18 19 20 21 22 23
216°
21 SEPTEMBER
268°
285°
1075°
070°
074°
277°
22 SEPTEMBER
000°
278°
075°
1390
1395
FATHOMS
S 275
800
1600
3200
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 21 22 23 00 01 02 03
070°
075°
298°
062°
106°
25 SEPTEMBER
098°
056°
1966

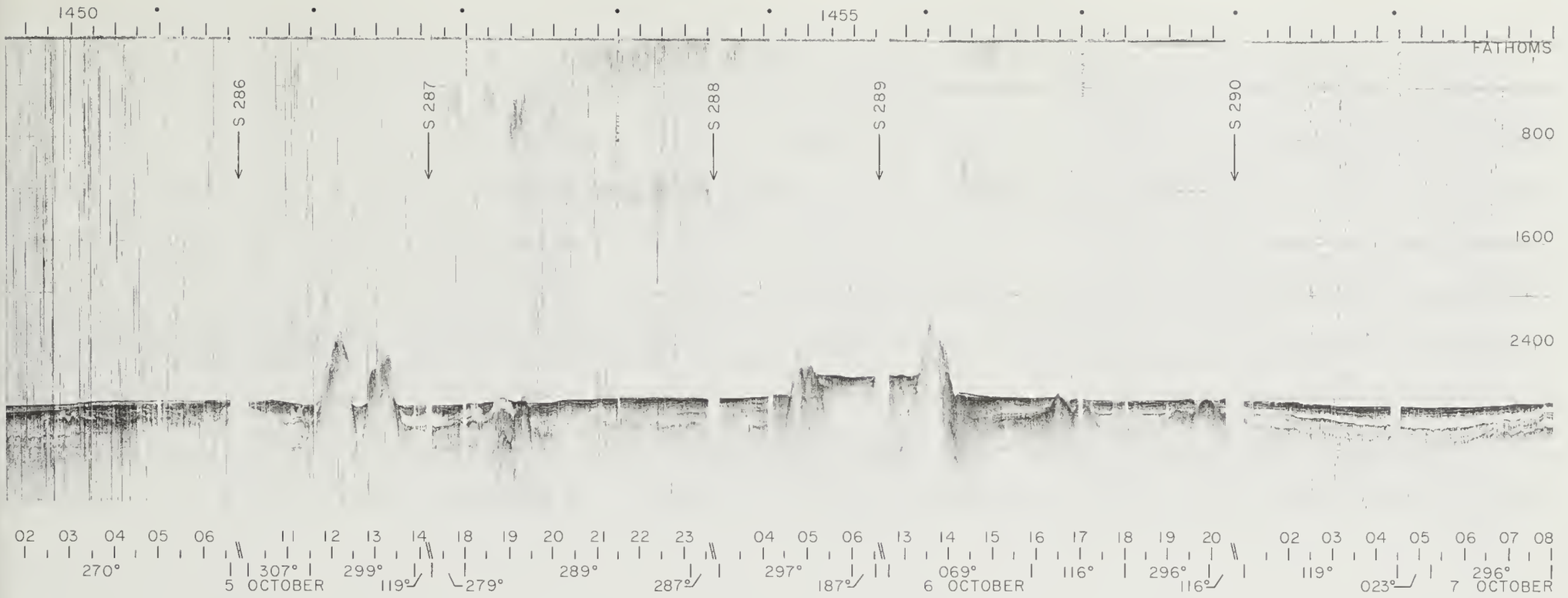

1400
1405
SECONDS
2
4
8
S 276
S 277
S 278
04 05 06 07 08 12 13 14 15 16 17 18 22 23 00 01 02 03 04 05 06 07 08 09 14 15 16 17 18 19 20 21 22 23 00
071°
065°
070°
013°
113°
010°
C 10
26 SEPTEMBER
27 SEPTEMBER
1420
1425
SECONDS
1
4
6
8
17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03
090° 080° 075° 065° 077° 045° 037° 045° 102° 045° 30 SEPTEMBER 102° 106° 090° 095°

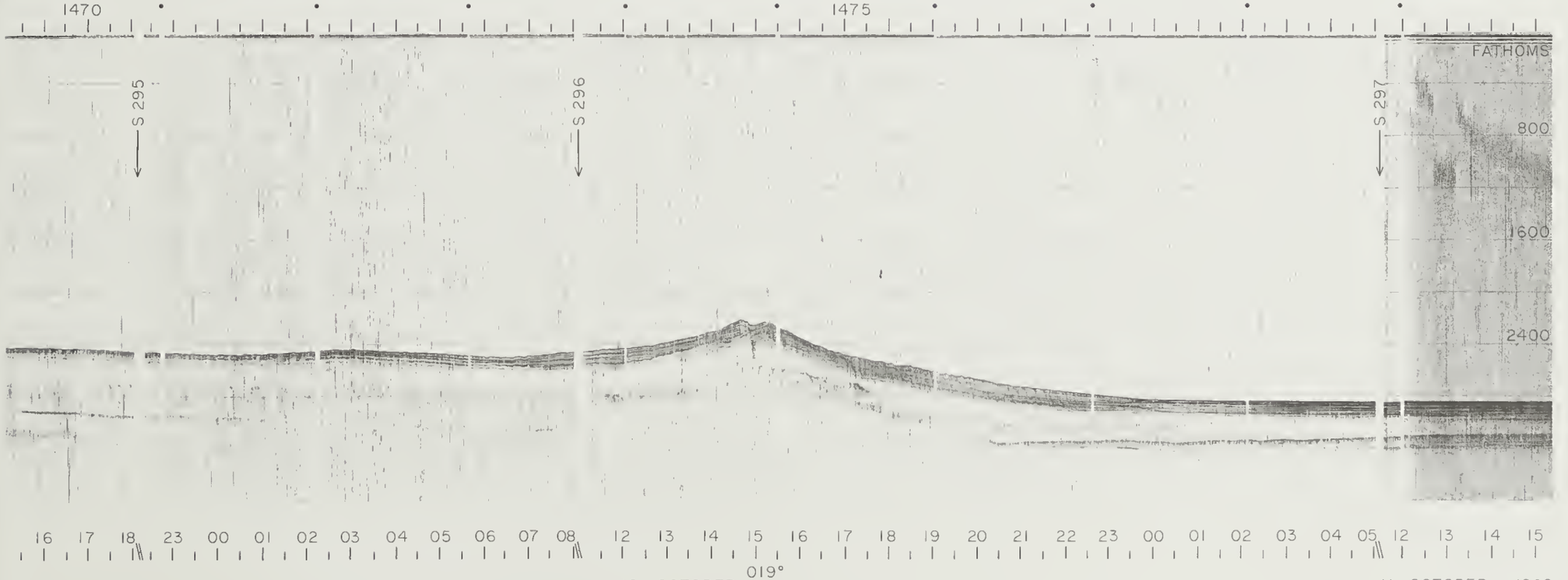

1410
1415
S 279
FATHOMS
800
1600
2400
3200
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20
03 04 05 06 07 08 09 10 11 12 13 14 15 16
117°
113°
085°
160°
113°
120°
113°
801°
113°
105°
105°
113°
092°
28 SEPTEMBER
29 SEPTEMBER

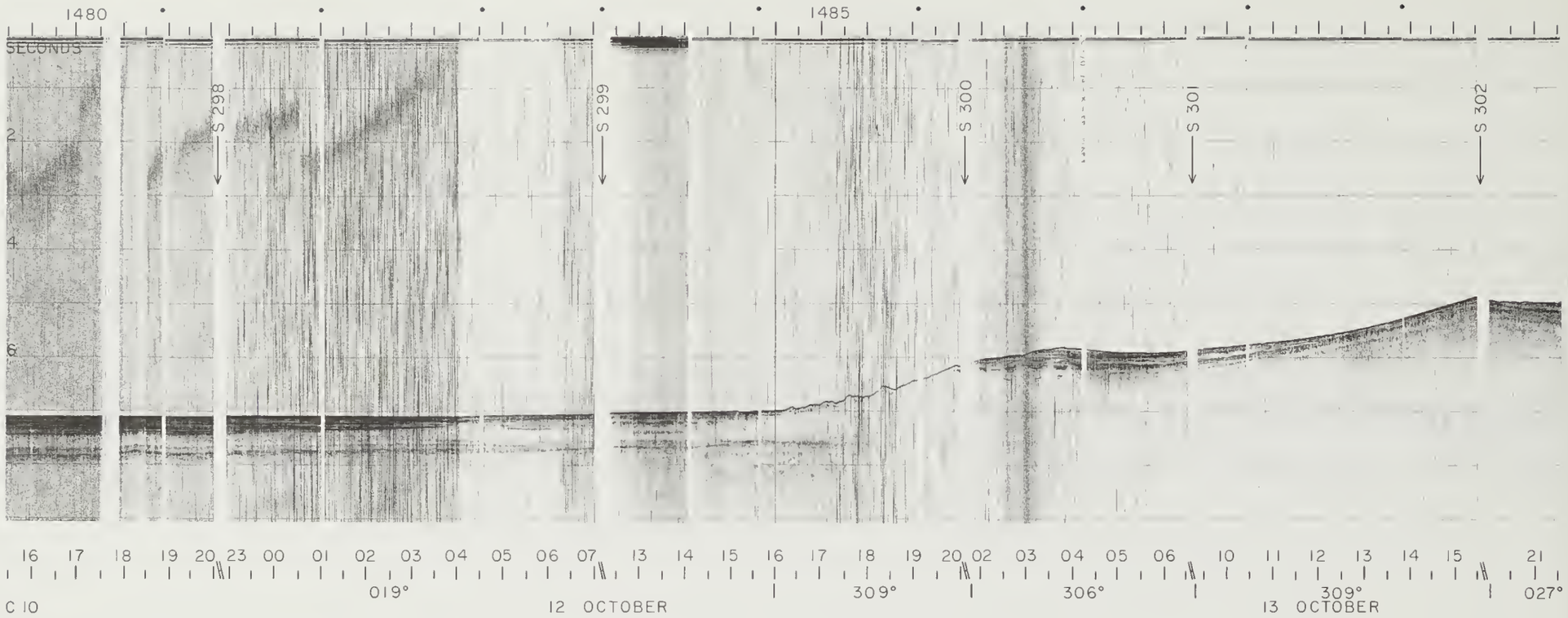

1430
1435
S 280
S 281
S 282
S 283
FATHOMS
800
1600
2400
3200
04 05 06 07 08 09 10 11 12 13 14 15 16
21 22 23
04 05 06 07 08
15 16 17 18
23 00 01 02 03 04 05 06
126°
150°
153°
166°
159°
011°
090°
192°
195°
180°
090°
221°
120°
023°
195°
195°
110°
1 OCTOBER
2 OCTOBER
1966


1440
1445
SECONDS
2
4
6
8
S 284 & S 285
07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 18 19 20 21 22 23 00 01
C 10
3 OCTOBER
135°
180°
090°
4 OCTOBER
270°
360°

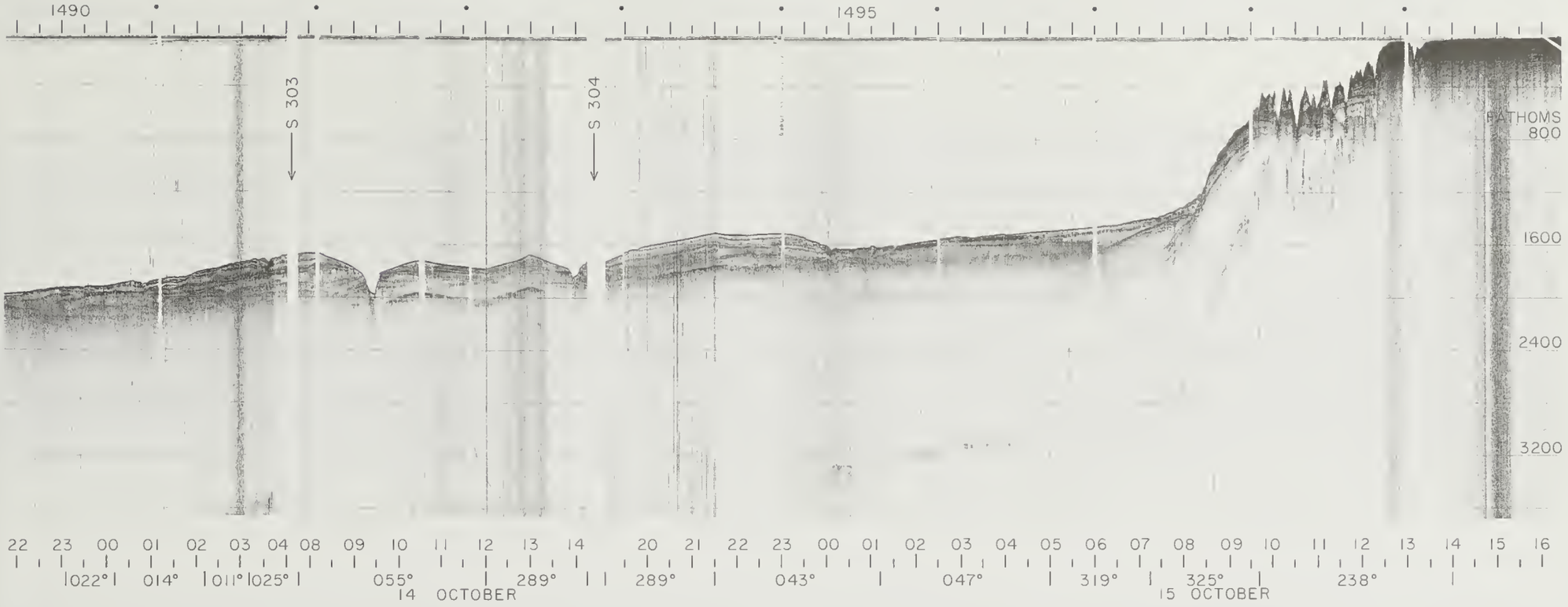

1460
1465
SECONDS
2
4
6
S 291 & S 292
S 293 & S 294
09 10 23 00 01 02 03 04 05 06 07 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
289°
098°
101°
296°
306°
235°
135°
100°
045°
8 OCTOBER
111°
305°
272°
275°
019°
9 OCTOBER

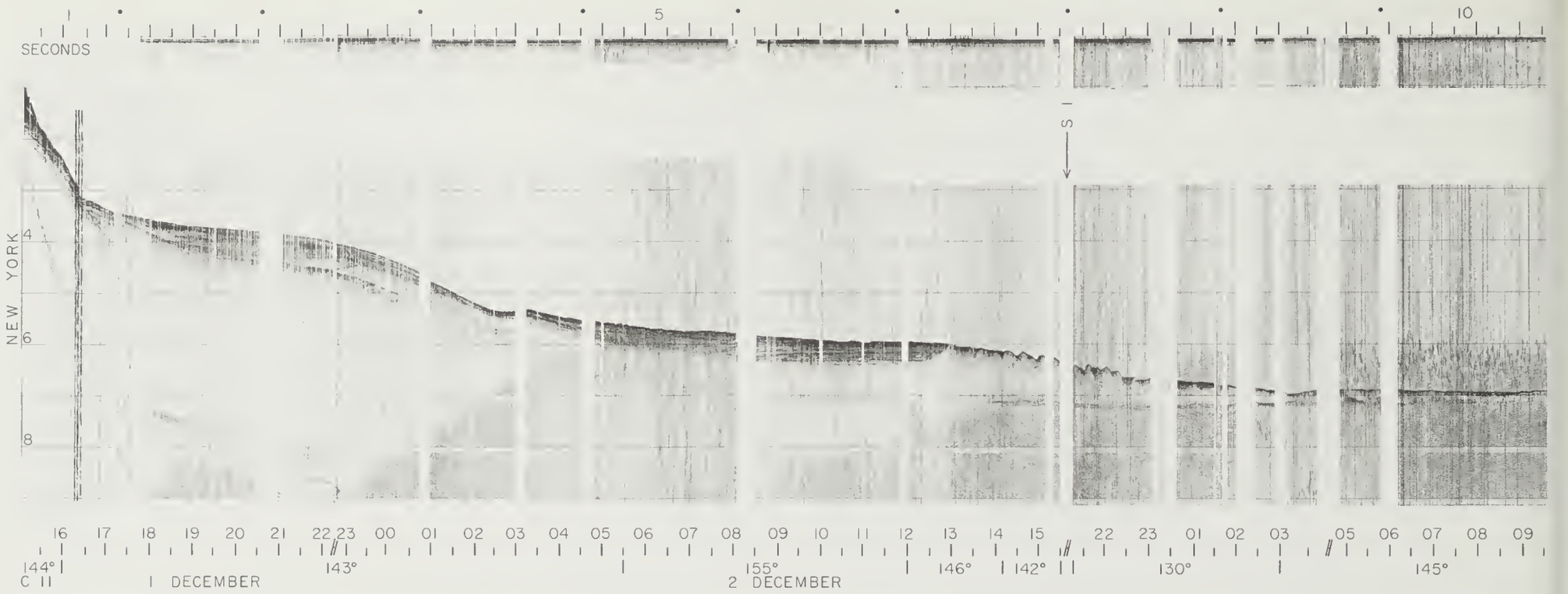

1450
1455
FATHOMS
S 286
S 287
S 288
S 289
S 290
800
1600
2400
02 03 04 05 06 11 12 13 14 18 19 20 21 22 23 04 05 06 13 14 15 16 17 18 19 20 02 03 04 05 06 07 08
270°
307°
299°
119°
279°
289°
287°
297°
187°
069°
116°
296°
116°
119°
023°
296°
5 OCTOBER
6 OCTOBER
7 OCTOBER

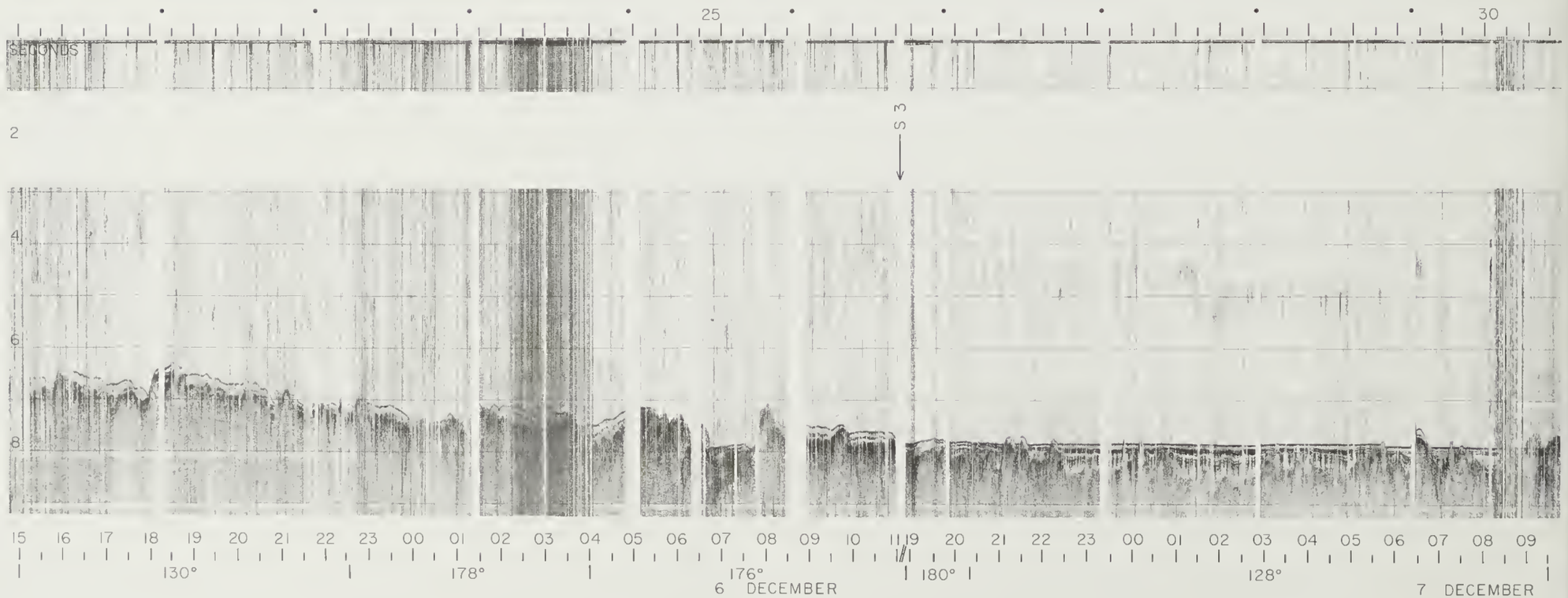

1470
1475
FATHOMS
S 295
S 296
S 297
800
1600
2400
16 17 18 23 00 01 02 03 04 05 06 07 08 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 12 13 14 15
019°
10 OCTOBER
11 OCTOBER 1966

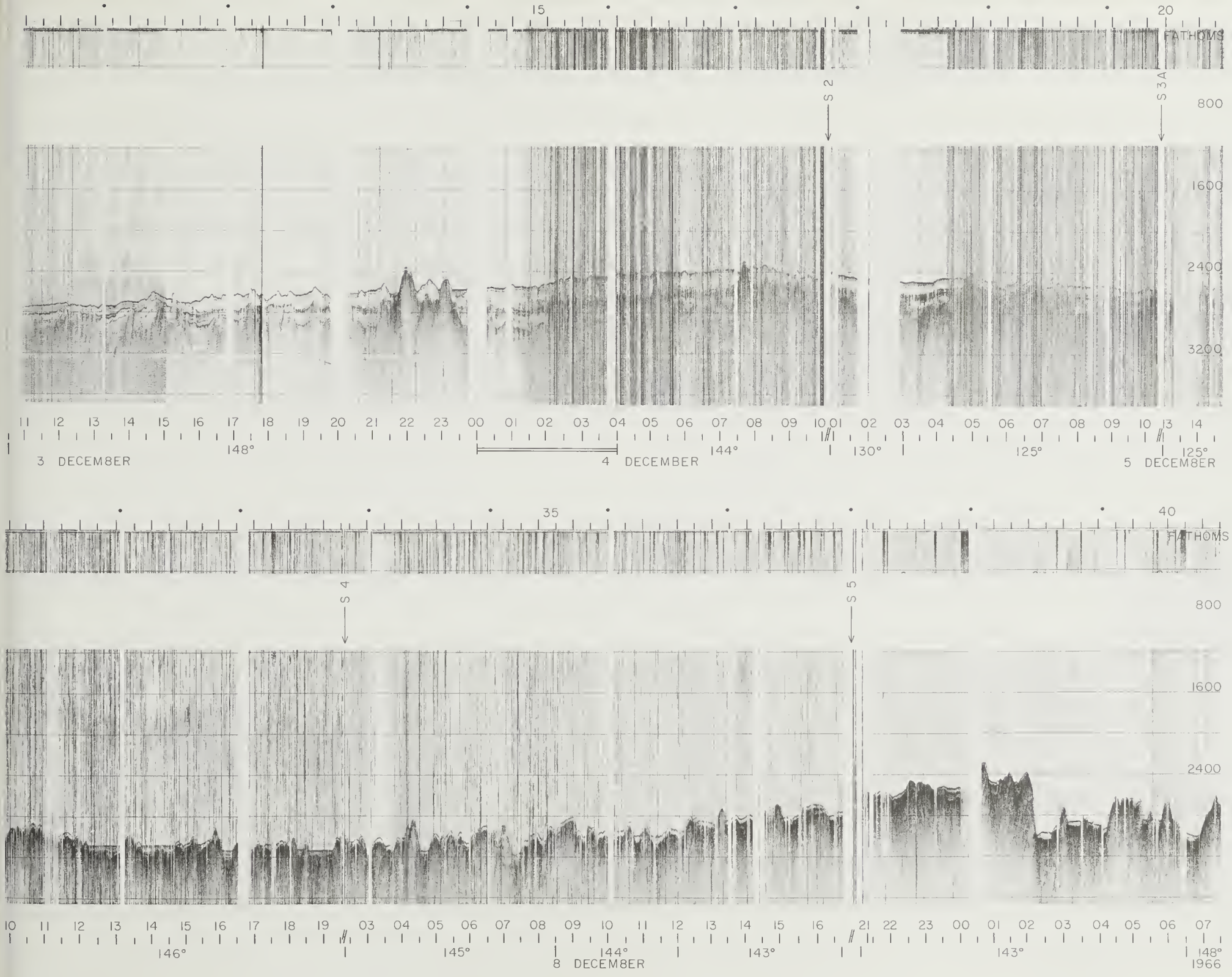

1480
1485
SECONDS
2
4
6
S 298
S 299
S 300
S 301
S 302
16 17 18 19 20 23 00 01 02 03 04 05 06 07 13 14 15 16 17 18 19 20 02 03 04 05 06 10 11 12 13 14 15 21
019°
309°
306°
309°
027°
C 10
12 OCTOBER
13 OCTOBER

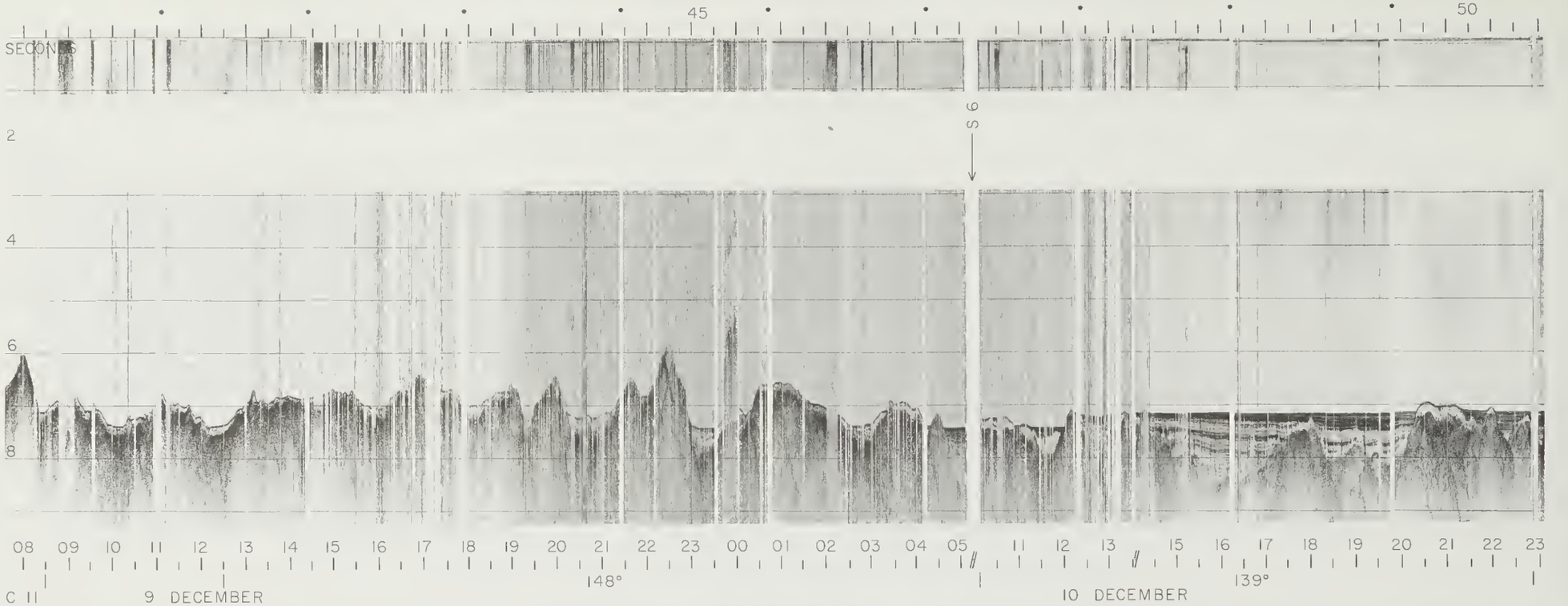

1500
NEW YORK
17 18
343°
1966

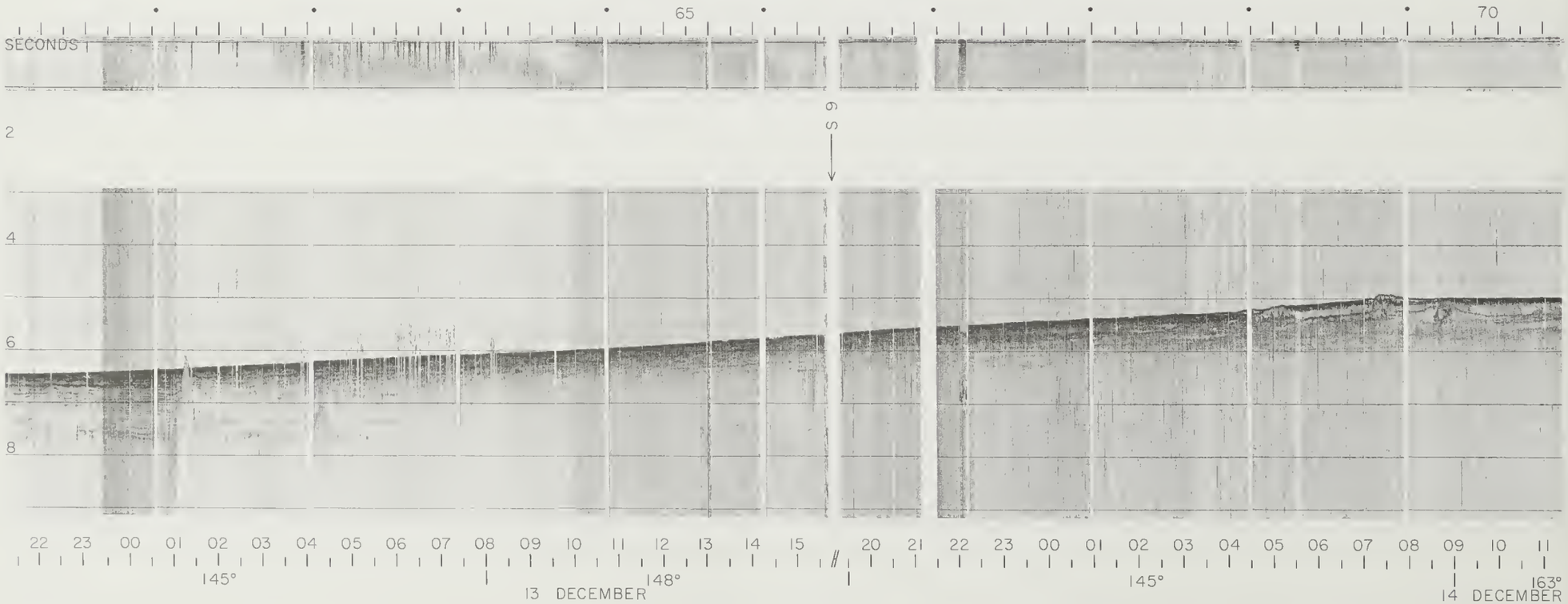

1490
1495
S 303
S 304
FATHOMS
800
1600
2400
3200
22 23 00 01 02 03 04 08 09 10 11 12 13 14 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16
022° 014° 011° 025° 055° 289° 289° 043° 047° 319° 325° 238°
14 OCTOBER
15 OCTOBER

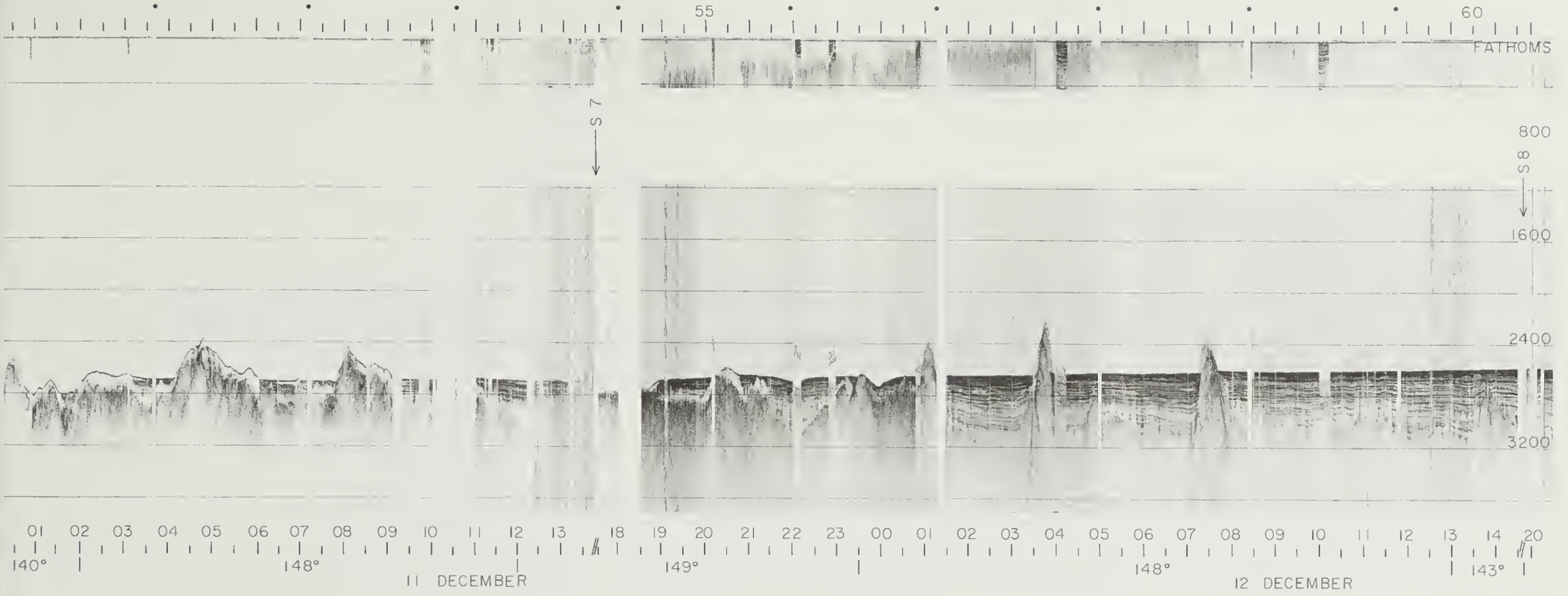

SECONDS
1
5
10
S 1
NEW YORK
4
6
8
16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 22 23 01 02 03 05 06 07 08 09
144°
C 11
1 DECEMBER
143°
155°
146°
142°
2 DECEMBER
130°
145°

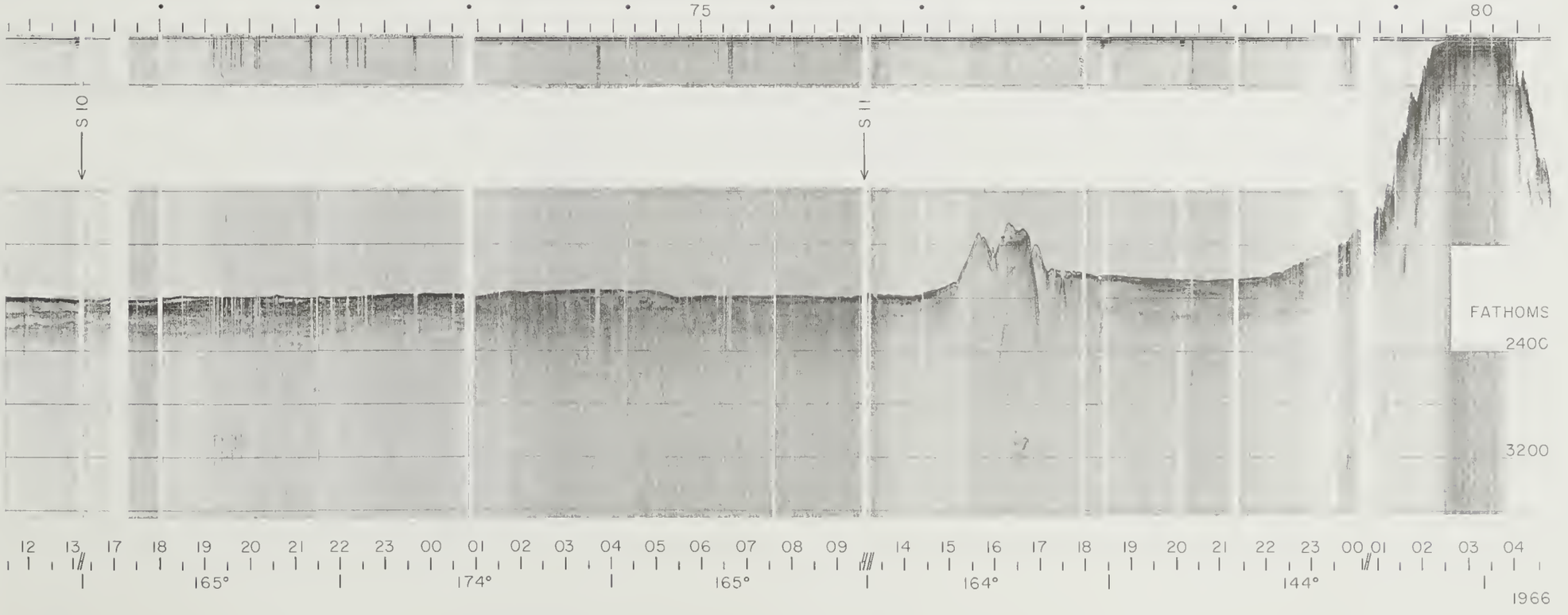

SECONDS
25
30
2
S 3
4
6
8
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
130°
178°
176°
6 DECEMBER
180°
128°
7 DECEMBER

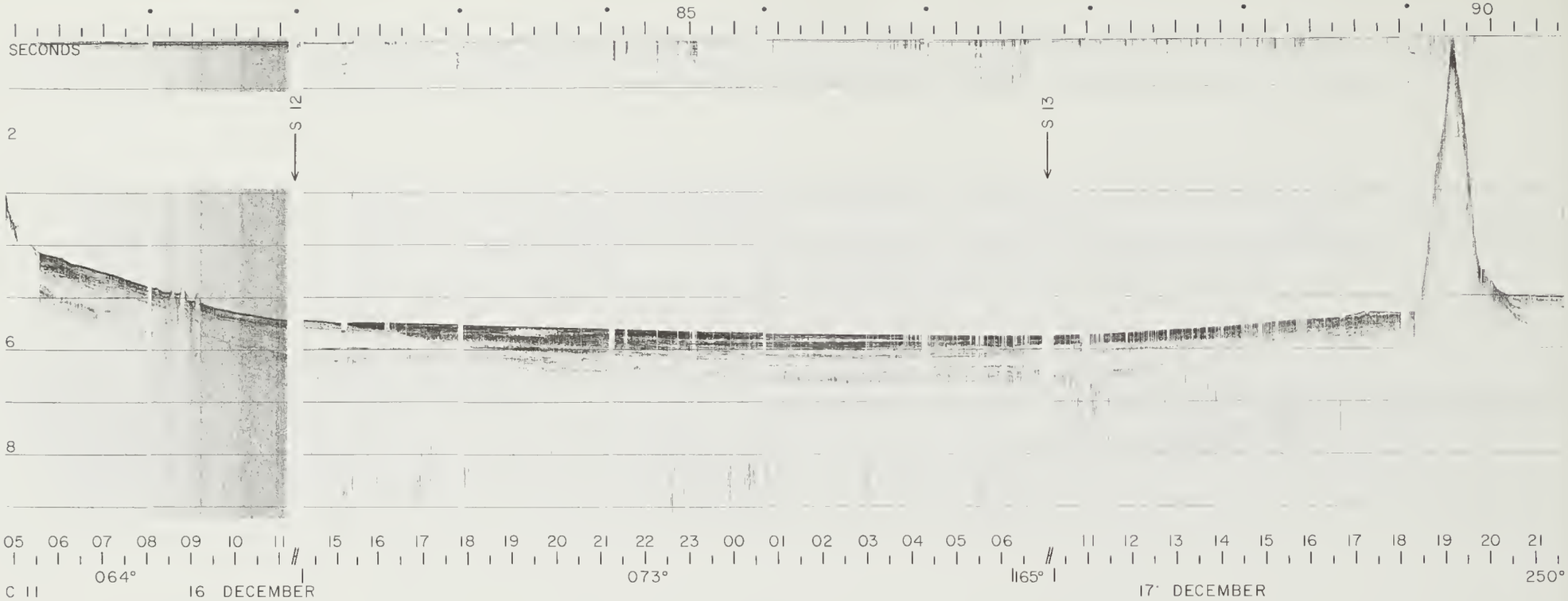

15
20
FATHOMS
S 2
S 3A
800
1600
2400
3200
11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 01 02 03 04 05 06 07 08 09 10 13 14
148°
144°
130°
125°
125°
3 DECEMBER
4 DECEMBER
5 DECEMBER
35
40
FATHOMS
S 4
S 5
800
1600
2400
10 11 12 13 14 15 16 17 18 19 03 04 05 06 07 08 09 10 11 12 13 14 15 16 21 22 23 00 01 02 03 04 05 06 07
146°
145°
144°
143°
143°
148°
8 DECEMBER
1966

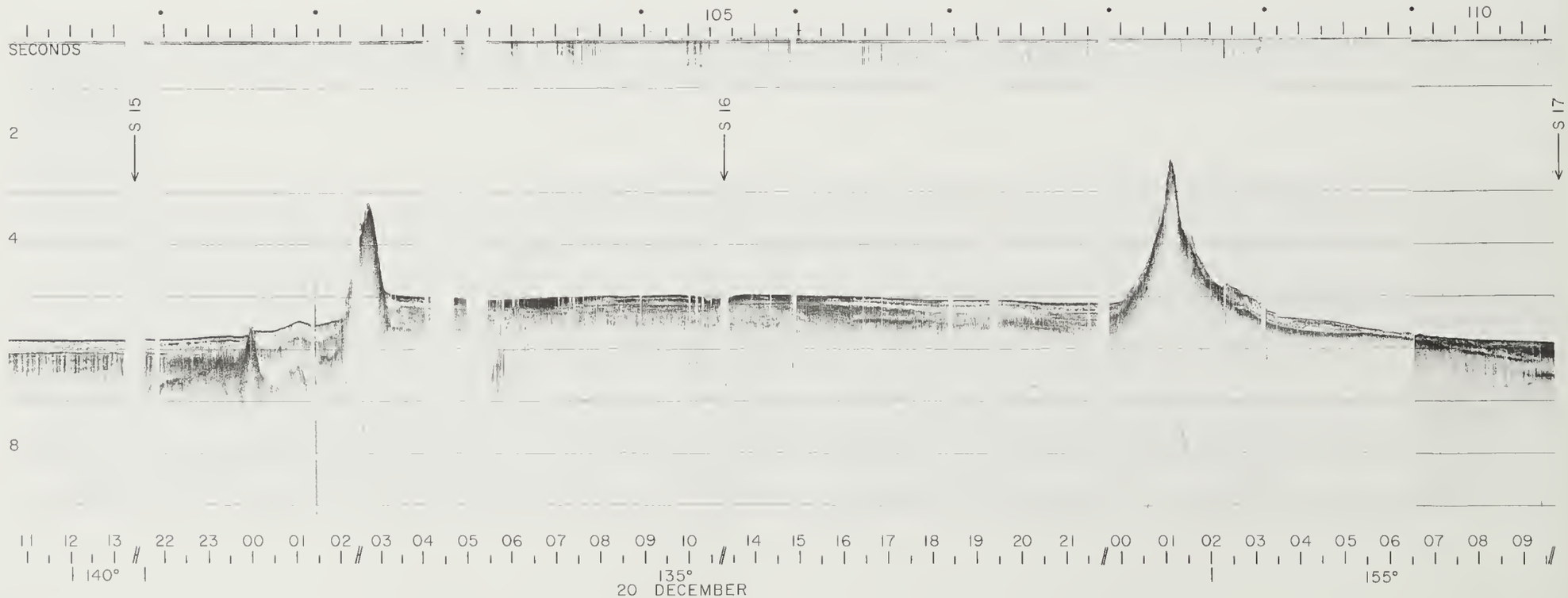

SECONDS
45
50
2
4
6
8
S 6
08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05
11 12 13 15 16 17 18 19 20 21 22 23
148°
139°
C 11
9 DECEMBER
10 DECEMBER

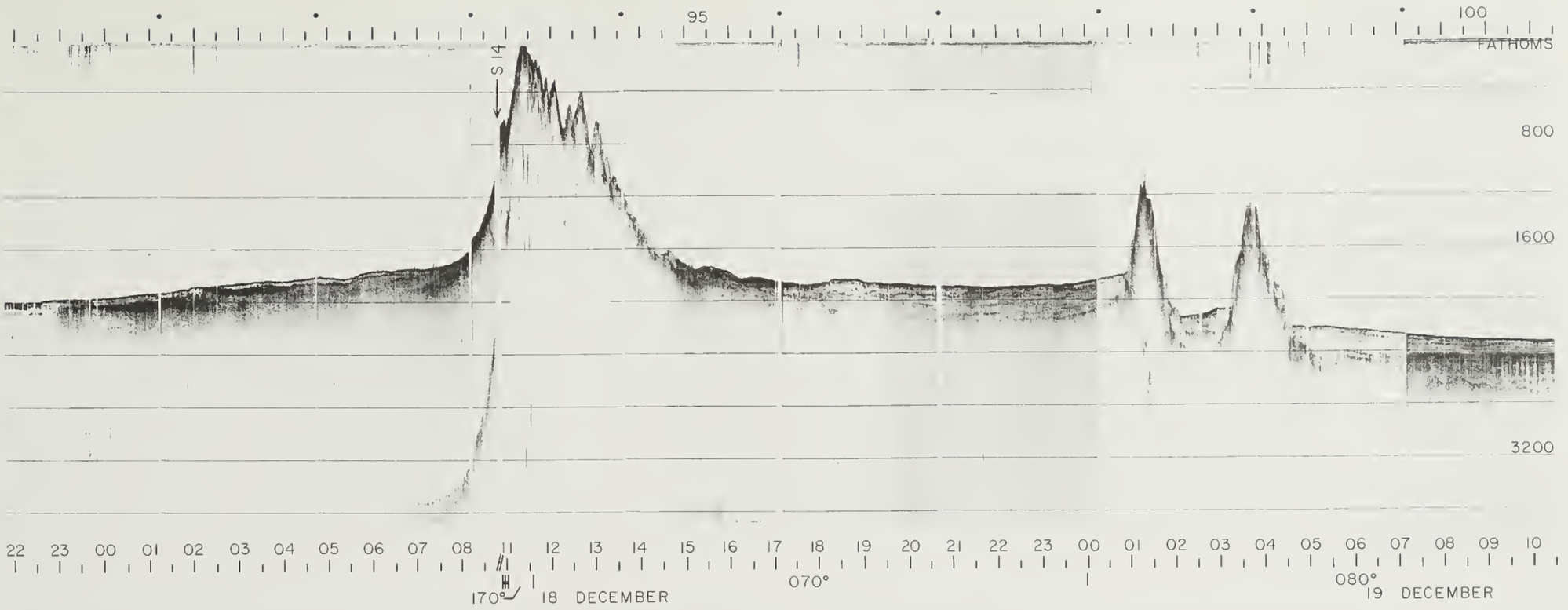

SECONDS
65
70
2
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6
8
S 6
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11
145°
148°
145°
163°
13 DECEMBER
14 DECEMBER

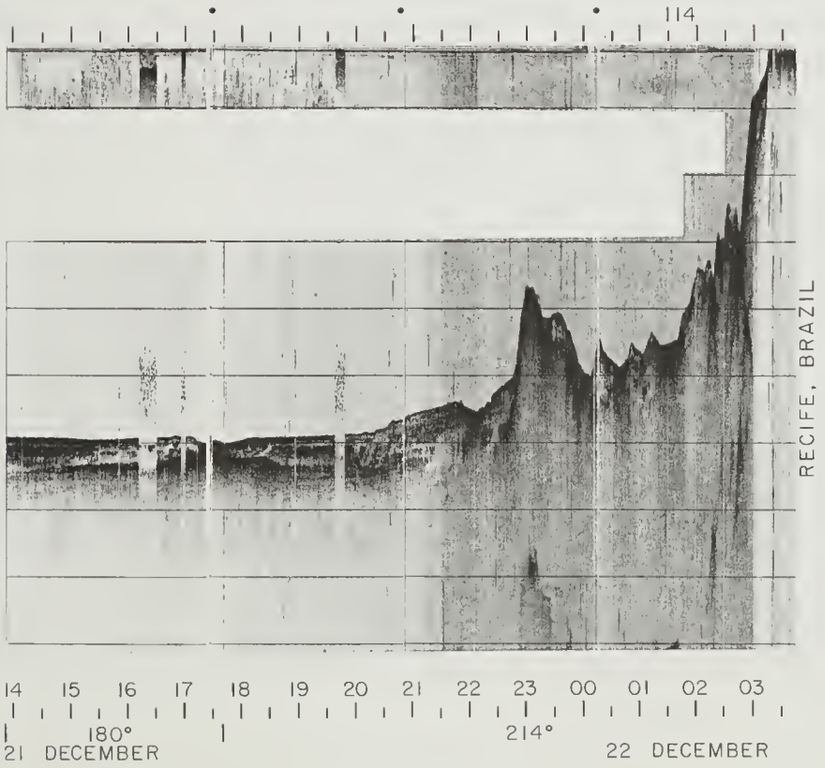

55
60
FATHOMS
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800
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1600
2400
3200
01 02 03 04 05 06 07 08 09 10 11 12 13 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 20
140°
148°
11 DECEMBER
149°
148°
12 DECEMBER
143°

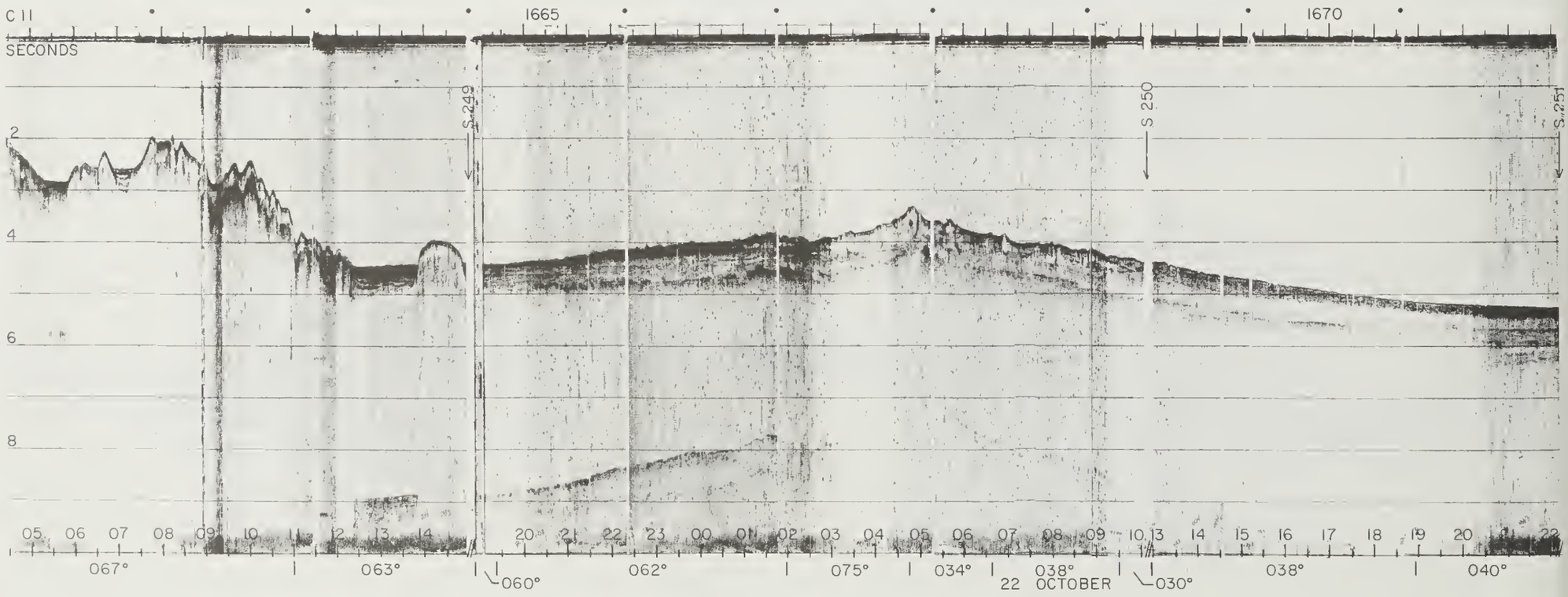

75
80
S 10
S 11
FATHOMS
2400
3200
12 13 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
165°
174°
165°
164°
144°
1966

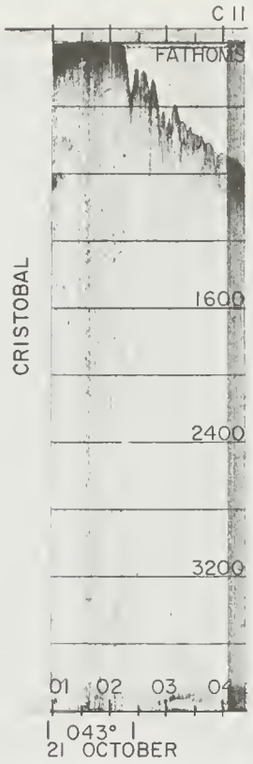

85
90
SECONDS
2
6
8
S 12
S 13
05 06 07 08 09 10 11 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 11 12 13 14 15 16 17 18 19 20 21
064°
073°
165°
250°
C 11
16 DECEMBER
17 DECEMBER

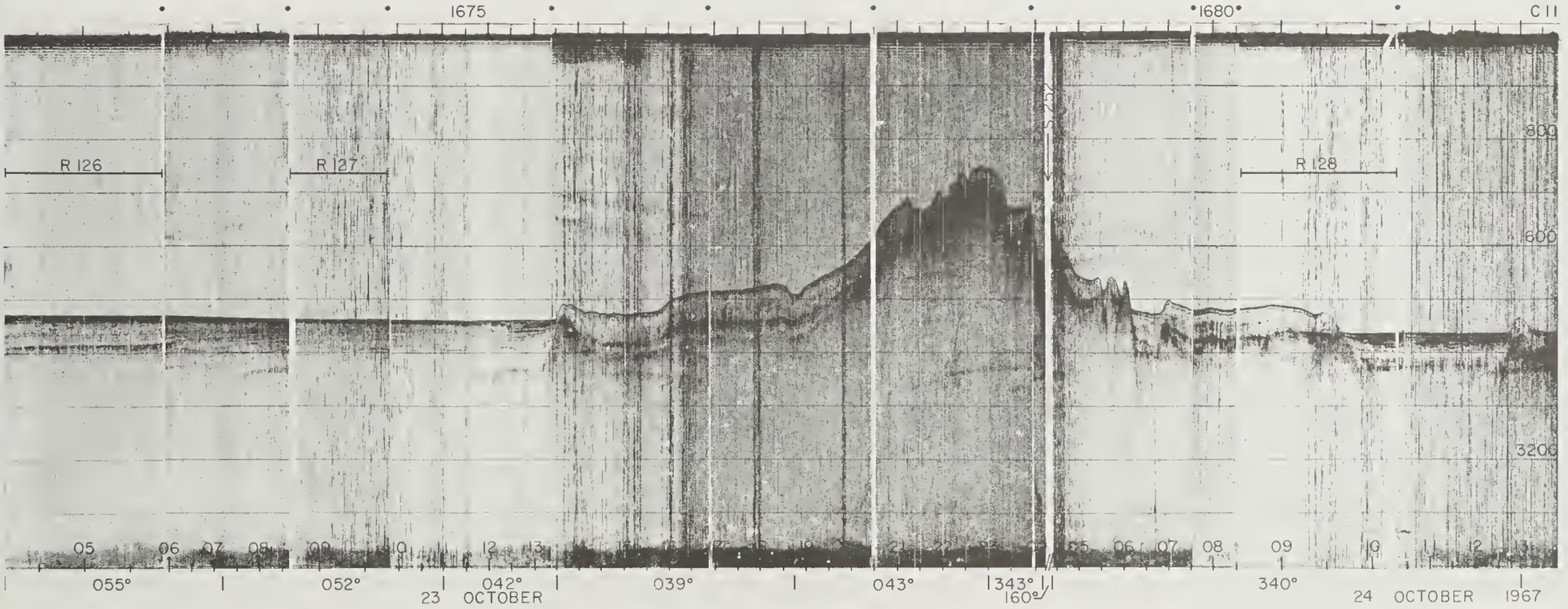

105
110
SECONDS
2
4
8
S 15
S 16
S 17
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140°
135°
155°
20 DECEMBER

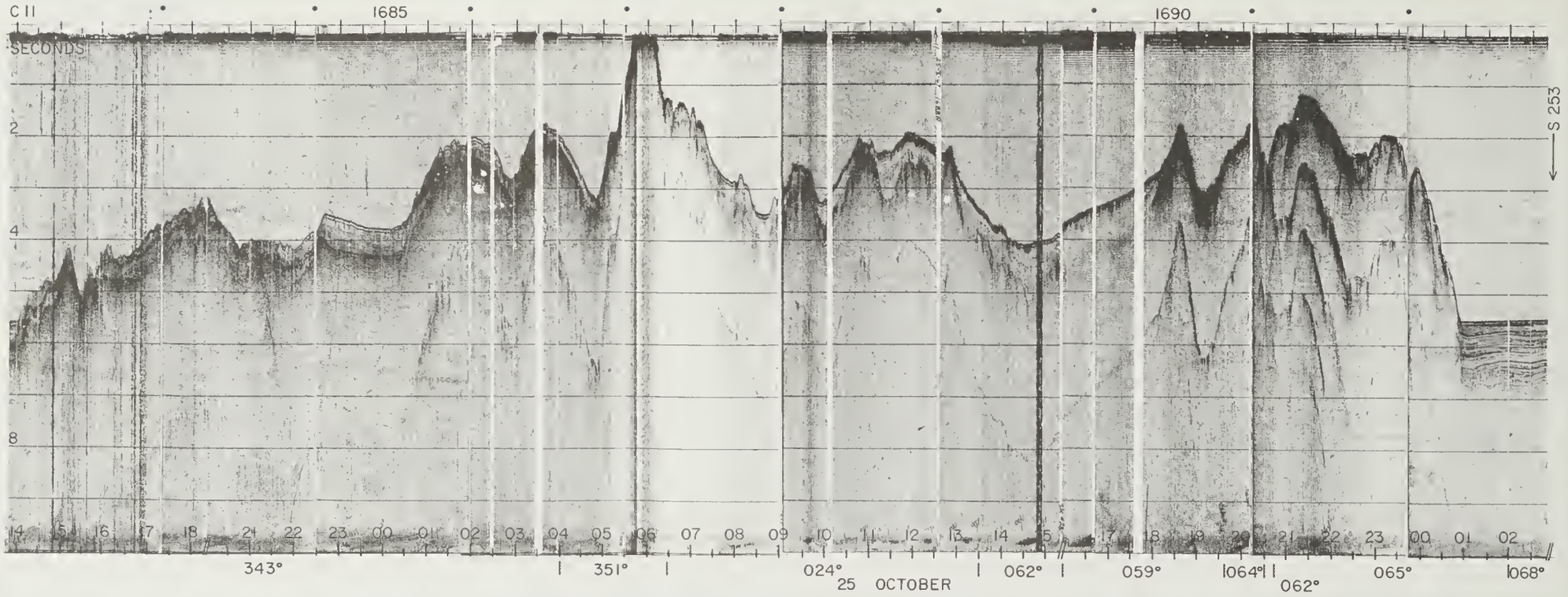

95
100
FATHOMS
S 14
800
1600
3200
22 23 00 01 02 03 04 05 06 07 08 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10
170°
18 DECEMBER
070°
080°
19 DECEMBER

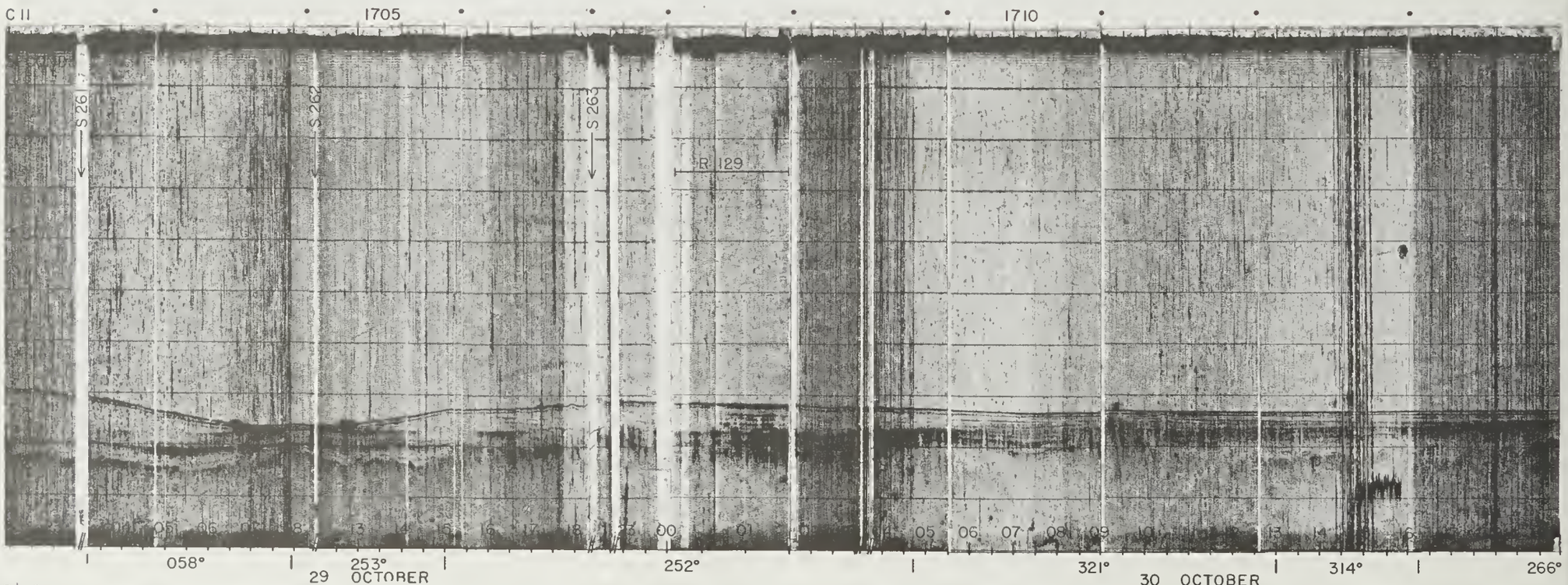

114
RECIFE, BRAZIL
14 15 16 17 18 19 20 21 22 23 00 01 02 03
180°
21 DECEMBER
214°
22 DECEMBER

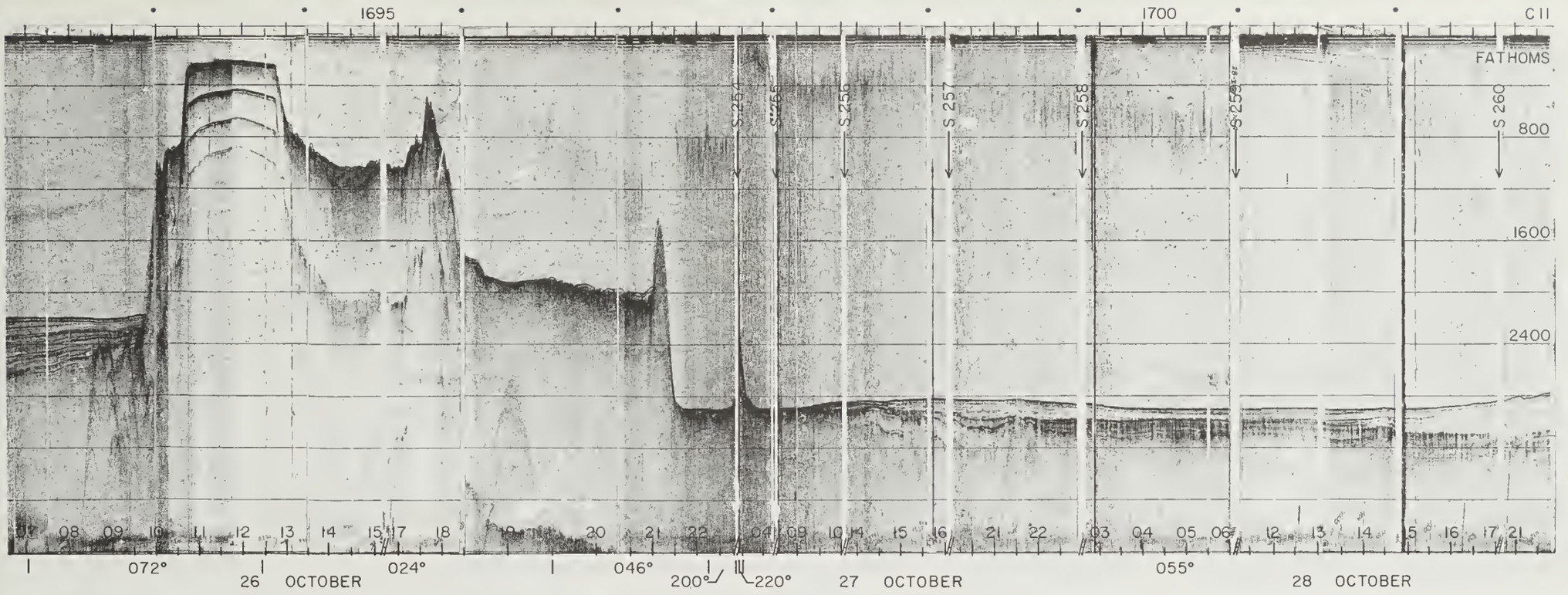

C 11
1665
1670
SECONDS
2
4
6
8
S.249
S.250
S.251
05 06 07 08 09 10 12 13 14 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 13 14 15 16 17 18 19 20 21 22
067°
063°
060°
062°
075°
034°
038°
22 OCTOBER
030°
038°
040°

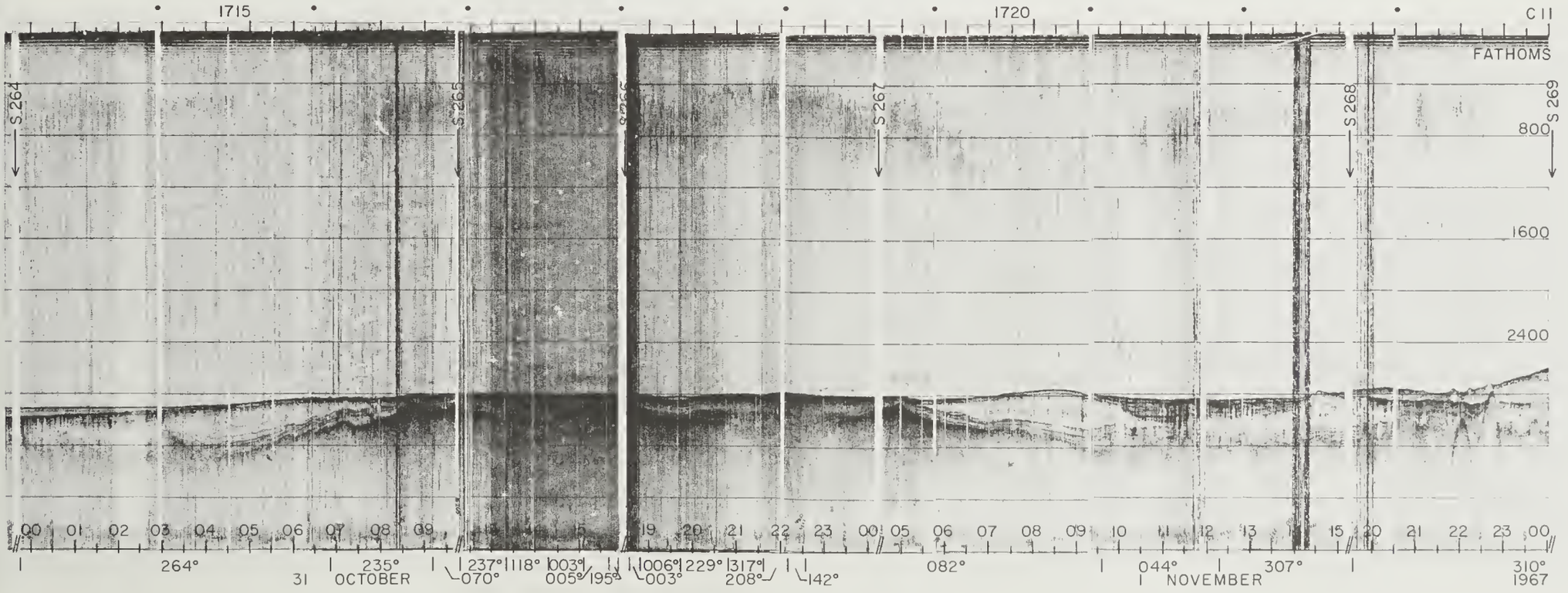

C 11
FATHOMS
CRISTOBAL
1600
2400
3200
01 02 03 04
043°
21 OCTOBER

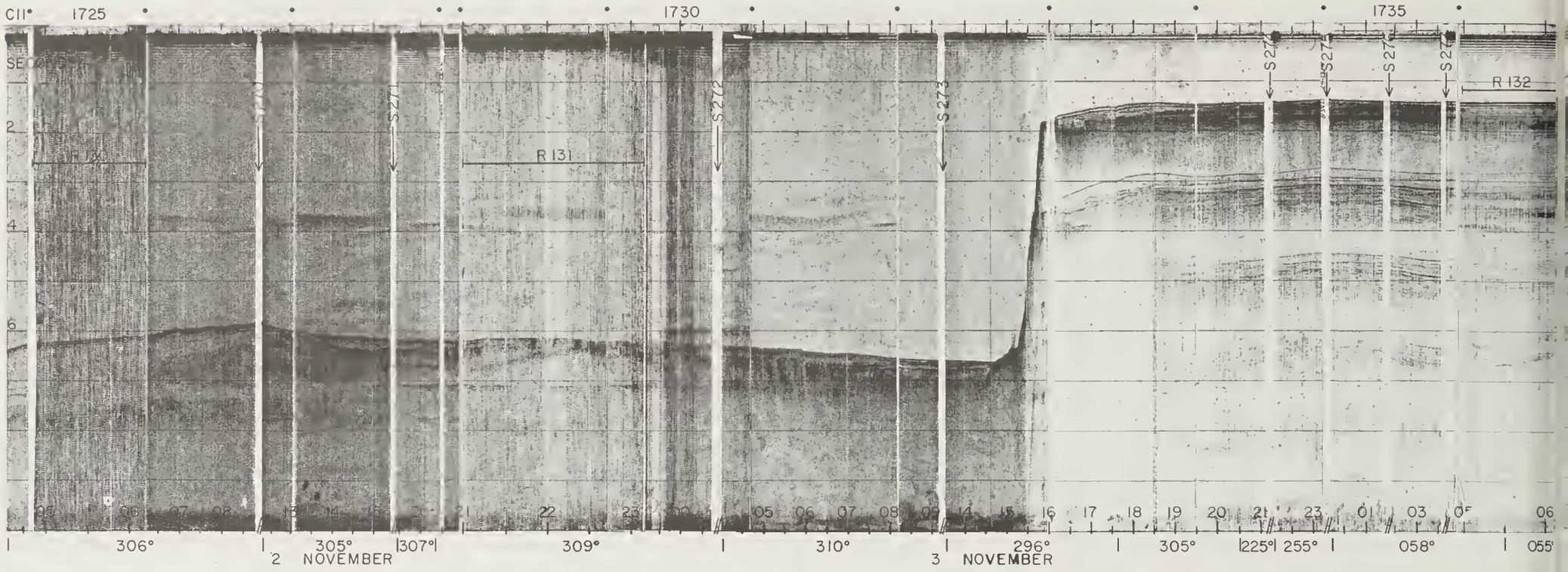

1675
1680
C 11
R 126
R 127
R 128
252
800
1600
3200
05 06 07 08 09 10 12 13 15 16 21 22 05 06 07 08 09 10 12 13
055°
052°
042°
039°
043°
343°
340°
23 OCTOBER
160º
24 OCTOBER 1967

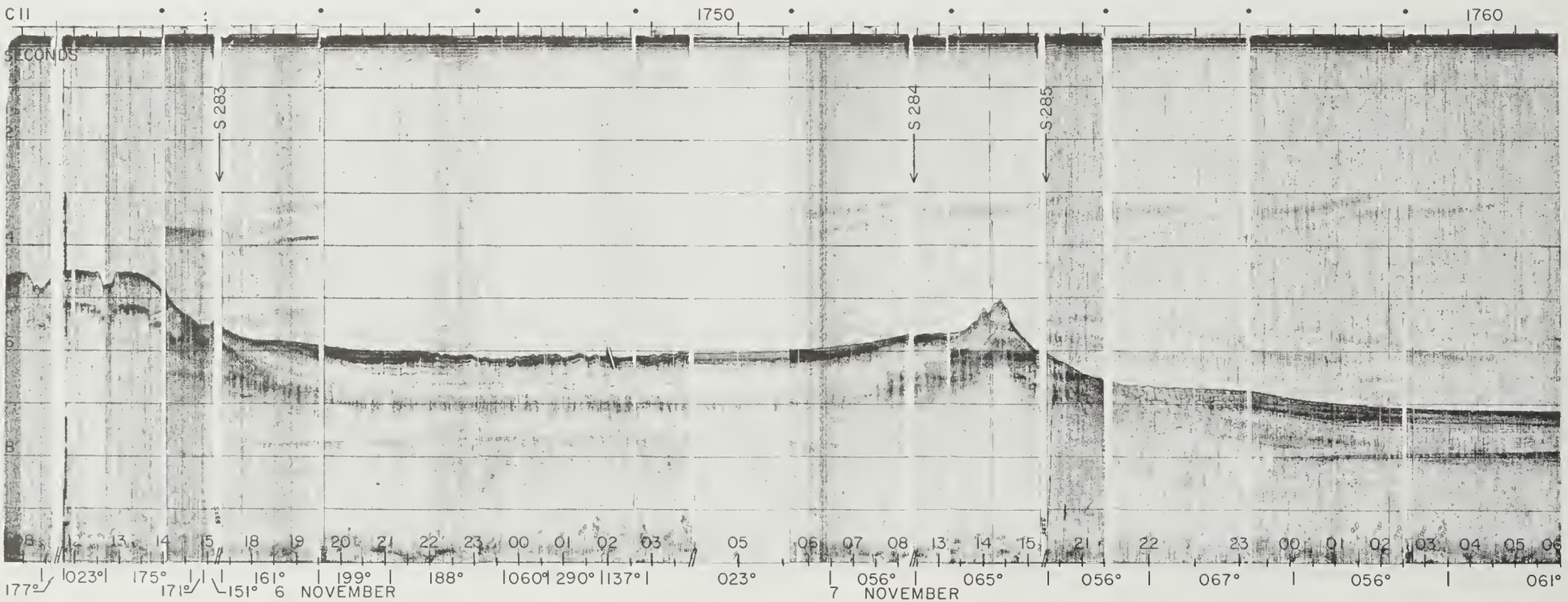

C 11
1685
1690
SECONDS
2
4
8
S 253
14 15 16 17 18 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 17 18 19 20 21 22 23 00 01 02
343°
351°
024°
062°
059°
064°
062°
065°
068°
25 OCTOBER

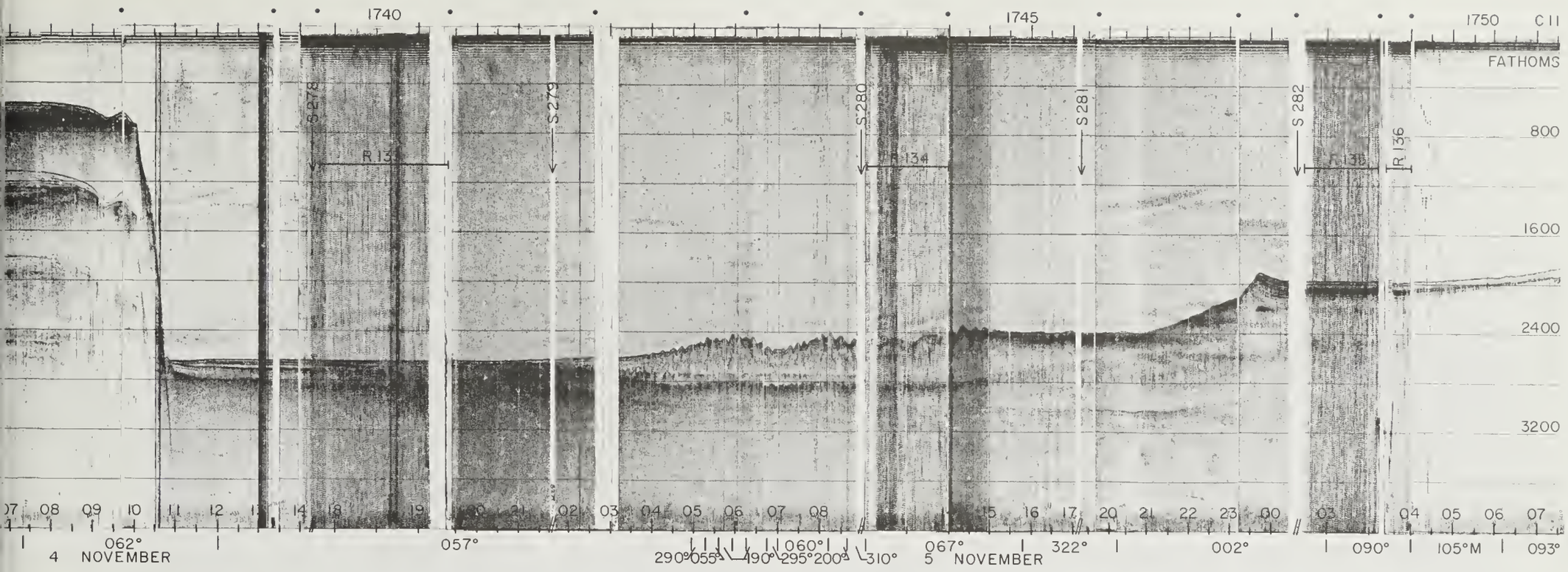

C 11
1705
1710
S 261
S 262
S 263
R 129
05 06 08 13 14 16 17 18 00 01 05 06 07 08 09 13 14 16
058°
253°
252°
321°
314°
266°
29 OCTOBER
30 OCTOBER

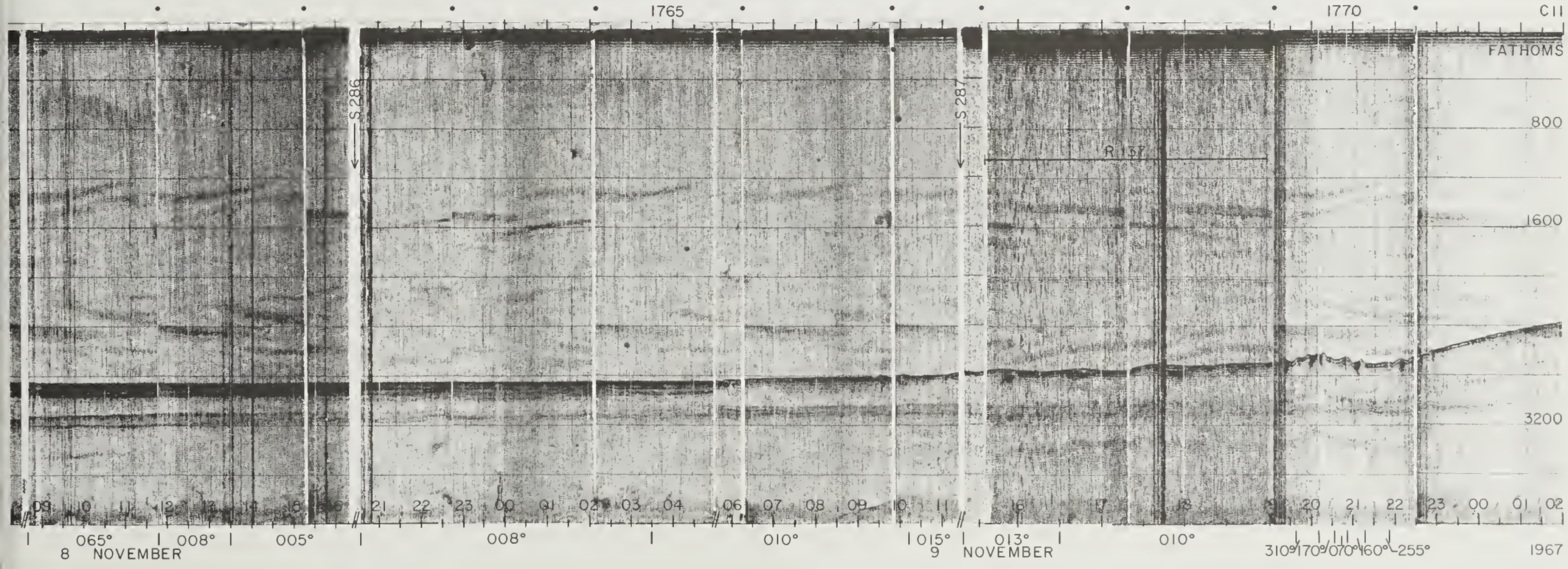

1695
1700
C 11
FATHOMS
S 255
S 256
S 257
S 258
S 259
S 260
800
1600
2400
072°
026 OCTOBER
024°
046°
200°
220°
027 OCTOBER
055°
028 OCTOBER

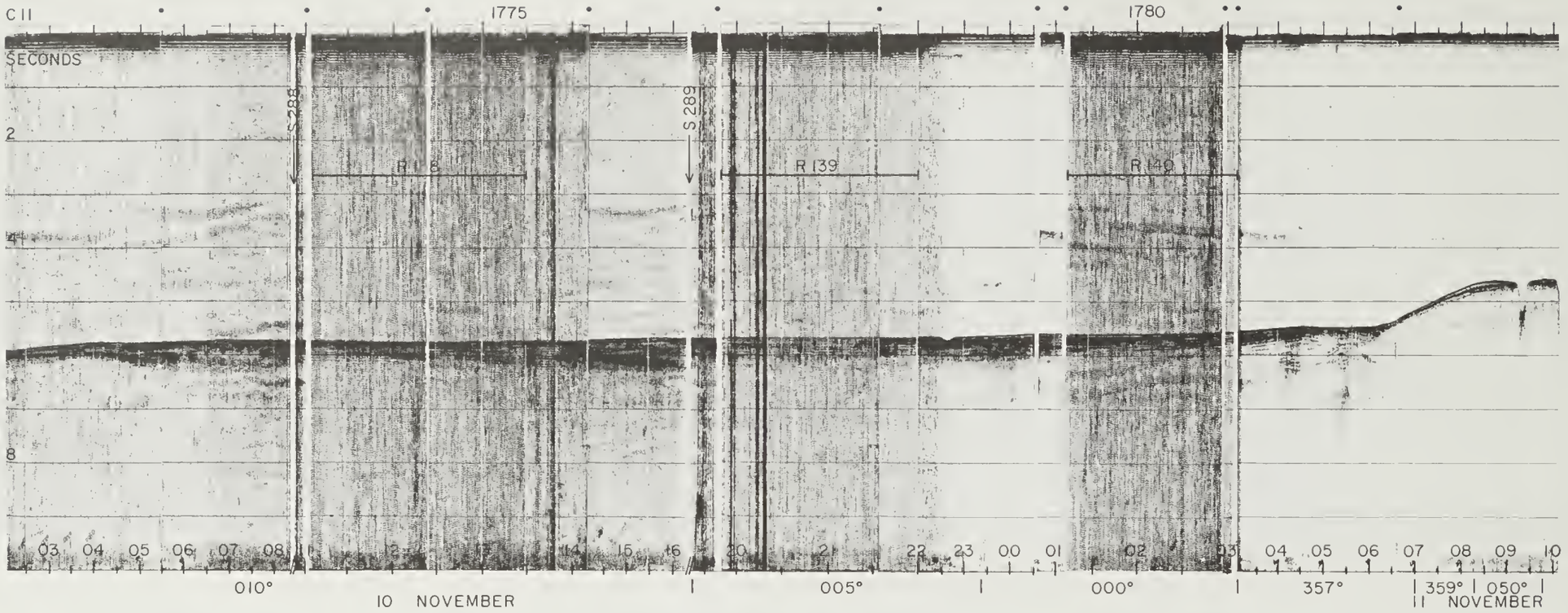

1715
1720
C 11
FATHOMS
S 264
S 265
S 267
S 268
S 269
800
1600
2400
264°
235°
31 OCTOBER
237°
070°
118°
003°
005°
195°
006°
003°
229°
317°
208°
142°
082°
044°
307°
NOVEMBER
310°
1967

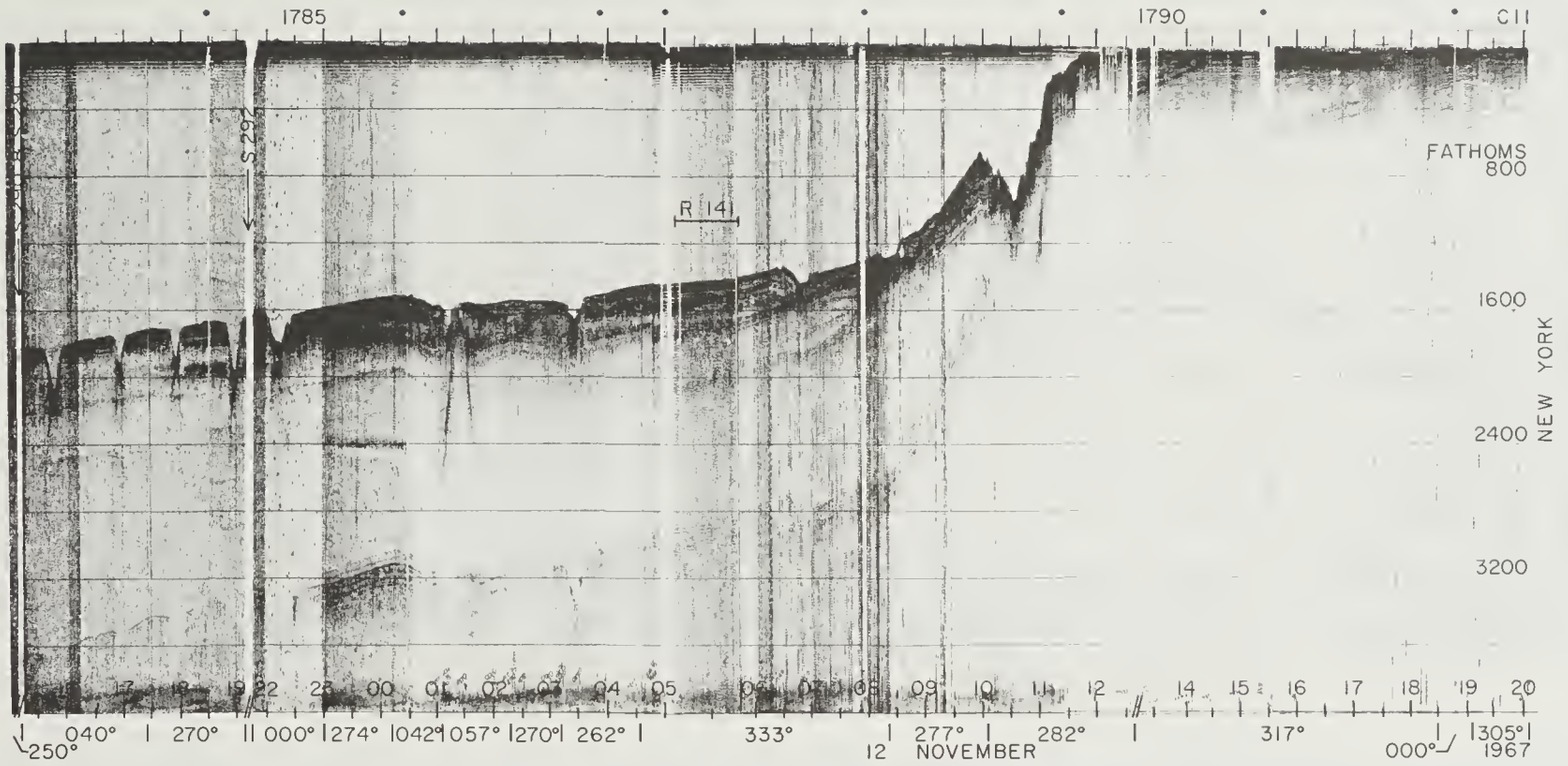

C11
1725
1730
1735
SECONDS
2
4
6
S 271
S 272
S 273
S 274
S 275
S 276
S 277
R 131
R 132
306°
305°
307°
309°
310°
296°
305°
225°
255°
058°
055°
2 NOVEMBER
3 NOVEMBER

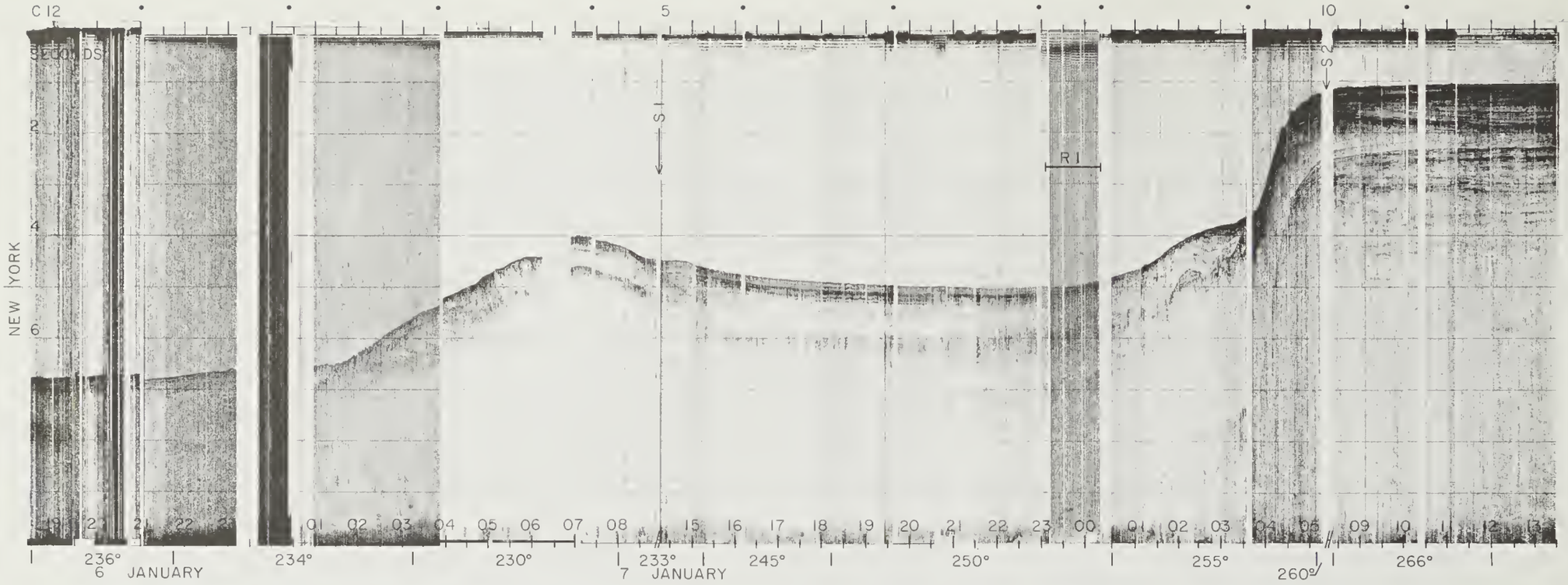

C11
1750
1760
SECONDS
2
4
6
8
S 283
S 284
S 285
177°
023°
175°
171°
151°
161°
199°
188°
060°
290°
137°
023°
056°
065°
056°
067°
056°
061°
6 NOVEMBER
7 NOVEMBER

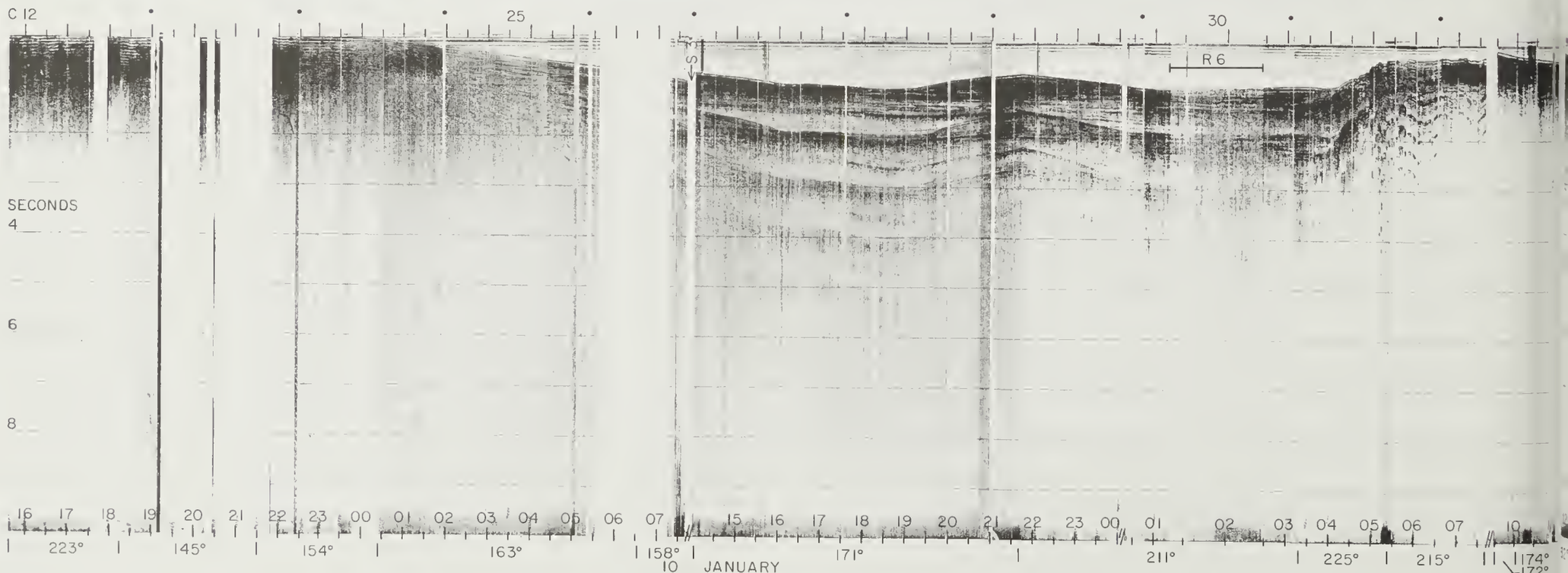

1740
1745
1750
C 11
FATHOMS
800
1600
2400
3200
S 278
S 279
S 280
S 281
S 282
R 133
R 134
R 135
R 136
062°
057°
060°
067°
322°
002°
090°
105°M
093°
4 NOVEMBER
5 NOVEMBER

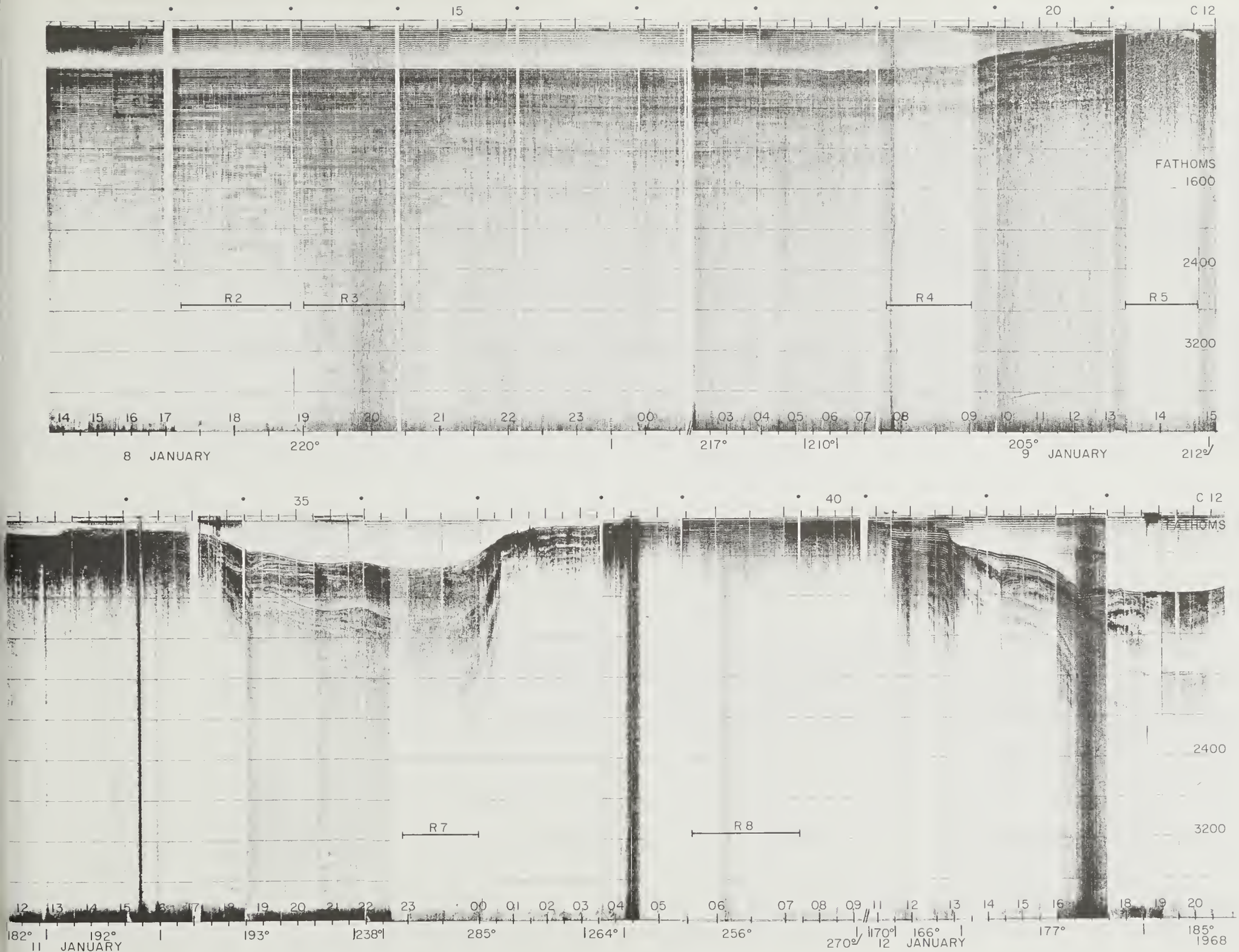

1765
1770
C 11
FATHOMS
800
1600
3200
S 286
S 287
R 137
065°
008°
005°
008°
010°
015°
013°
010°
8 NOVEMBER
9 NOVEMBER
1967

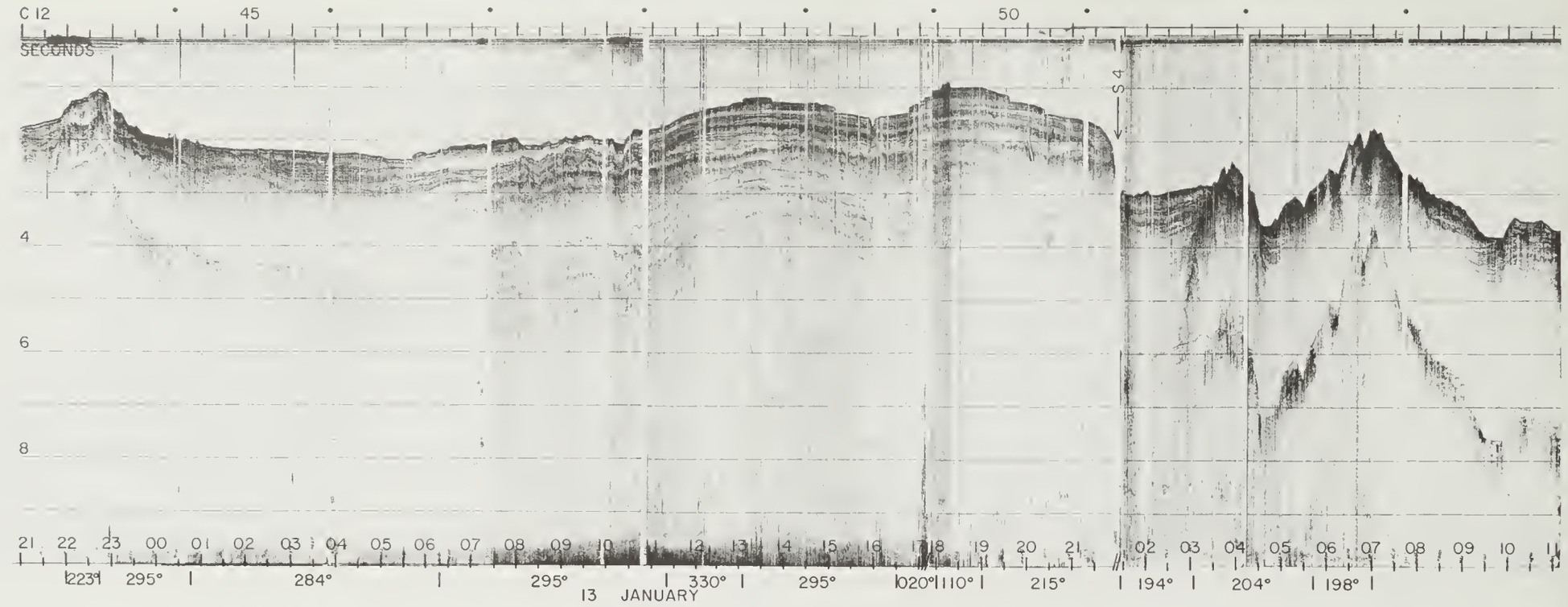

C 11
1775
1780
SECONDS
2
4
8
S 288
S 289
R 138
R 139
R 140
03 04 05 06 07 08 09 10 11 12 13 14 15 16 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10
010°
005°
000°
357°
359°
050°
10 NOVEMBER
11 NOVEMBER

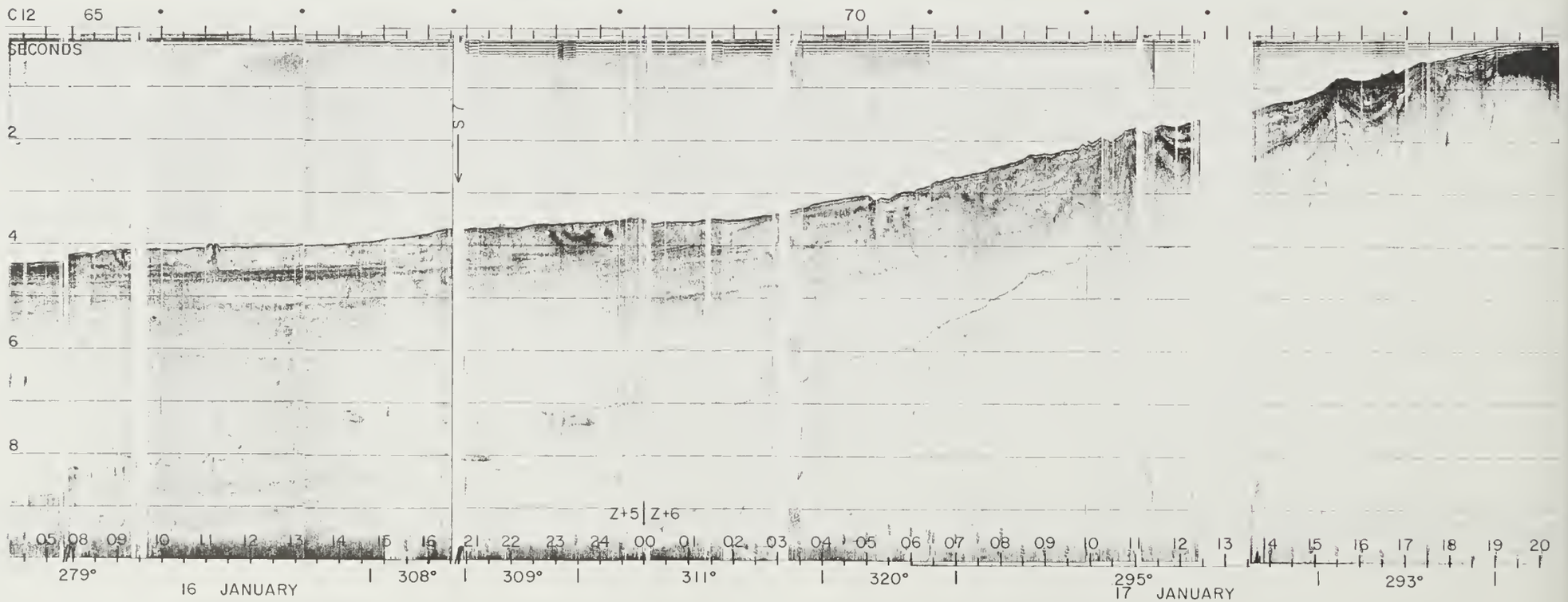

1785
1790
C11
FATHOMS
800
1600
2400
3200
NEW YORK
R 14
S 262°
250°
040°
270°
000°
274°
042°
057°
270°
262°
333°
277°
282°
317°
000°
305°
1967
12 NOVEMBER

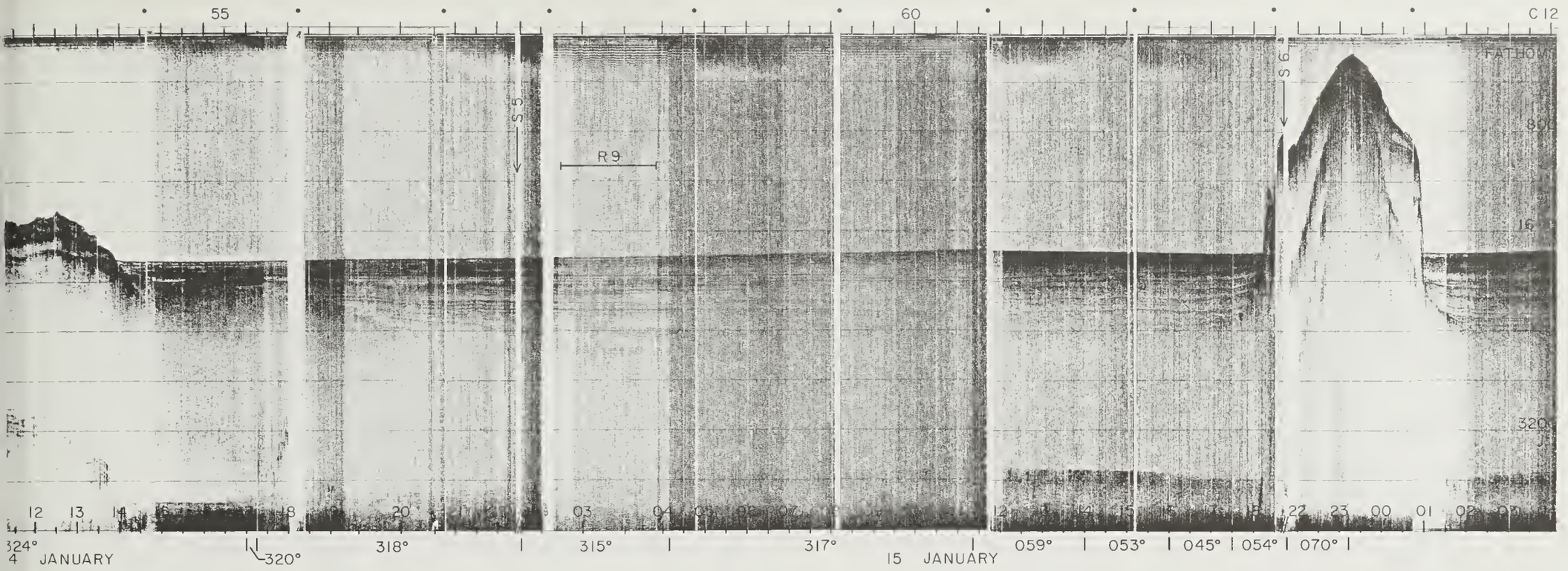

C 12
5
10
SECONDS
2
4
6
NEW YORK
S1
S2
R1
19 20 21 22 23 01 02 03 04 05 06 07 08 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 09 10 11 12 13
236°
6 JANUARY
234°
230°
233°
7 JANUARY
245°
250°
255°
260°
266°

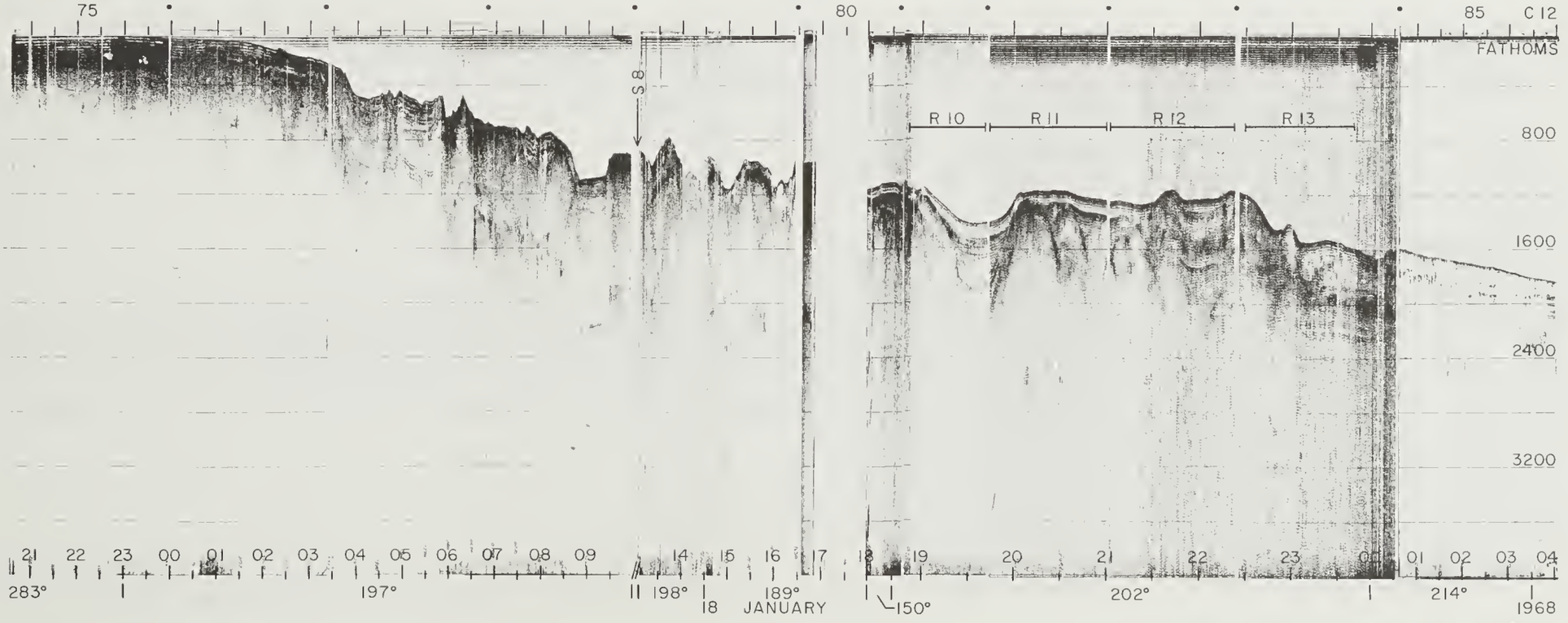

C 12
25
30
SECONDS
4
6
8
S1
S2
R6
16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 10
223°
145°
154°
163°
158°
10 JANUARY
171°
211°
225°
215°
174°
172°

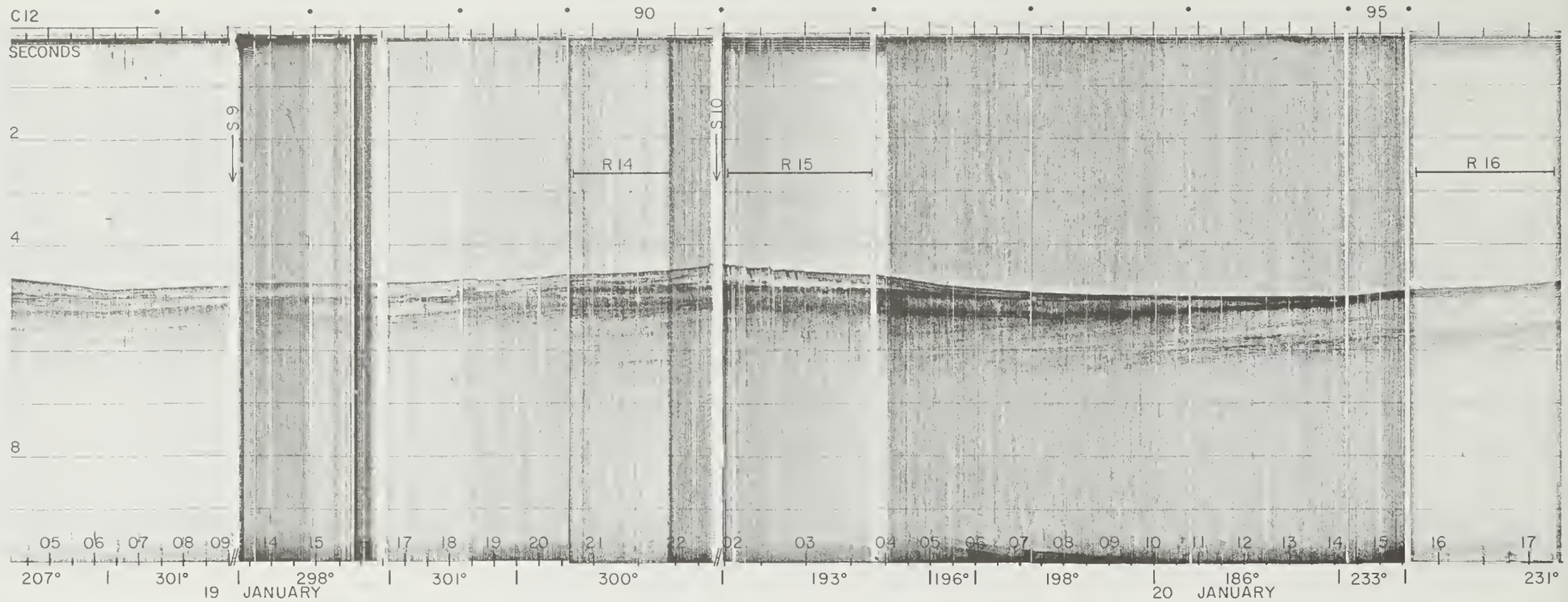

15
20
C 12
FATHOMS
1600
2400
3200
R2
R3
R4
R5
14 15 16 17 18 19 20 21 22 23 00 03 04 05 06 07 08 09 10 11 12 13 14 15
220°
217°
210°
205°
212°
8 JANUARY
9 JANUARY
35
40
C 12
FATHOMS
2400
3200
R7
R8
12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 11 12 13 14 15 16 18 19 20
182°
192°
193°
238°
285°
264°
256°
270°
170°
166°
177°
185°
11 JANUARY
12 JANUARY
1968

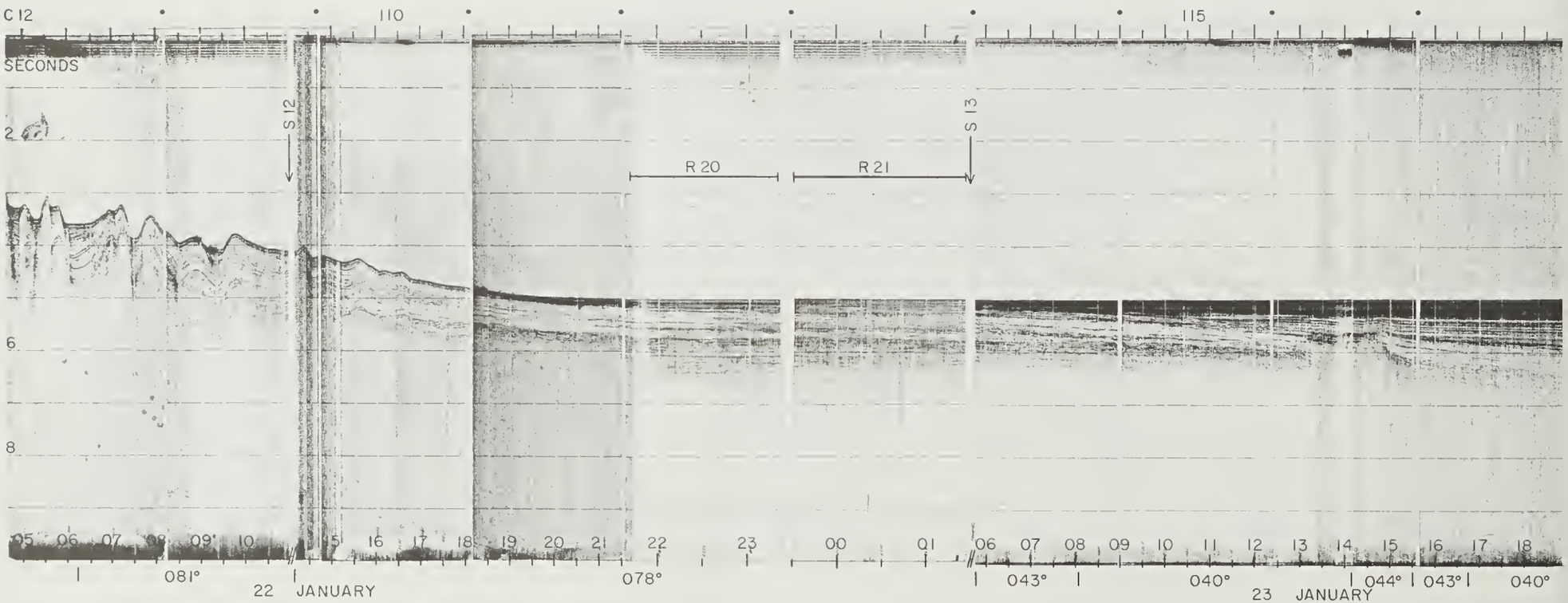

C 12
45
50
SECONDS
S 4
4
6
8
21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 02 03 04 05 06 07 08 09 10 11
2239
295°
284°
295°
330°
295°
020°
110°
215°
194°
204°
198°
13 JANUARY

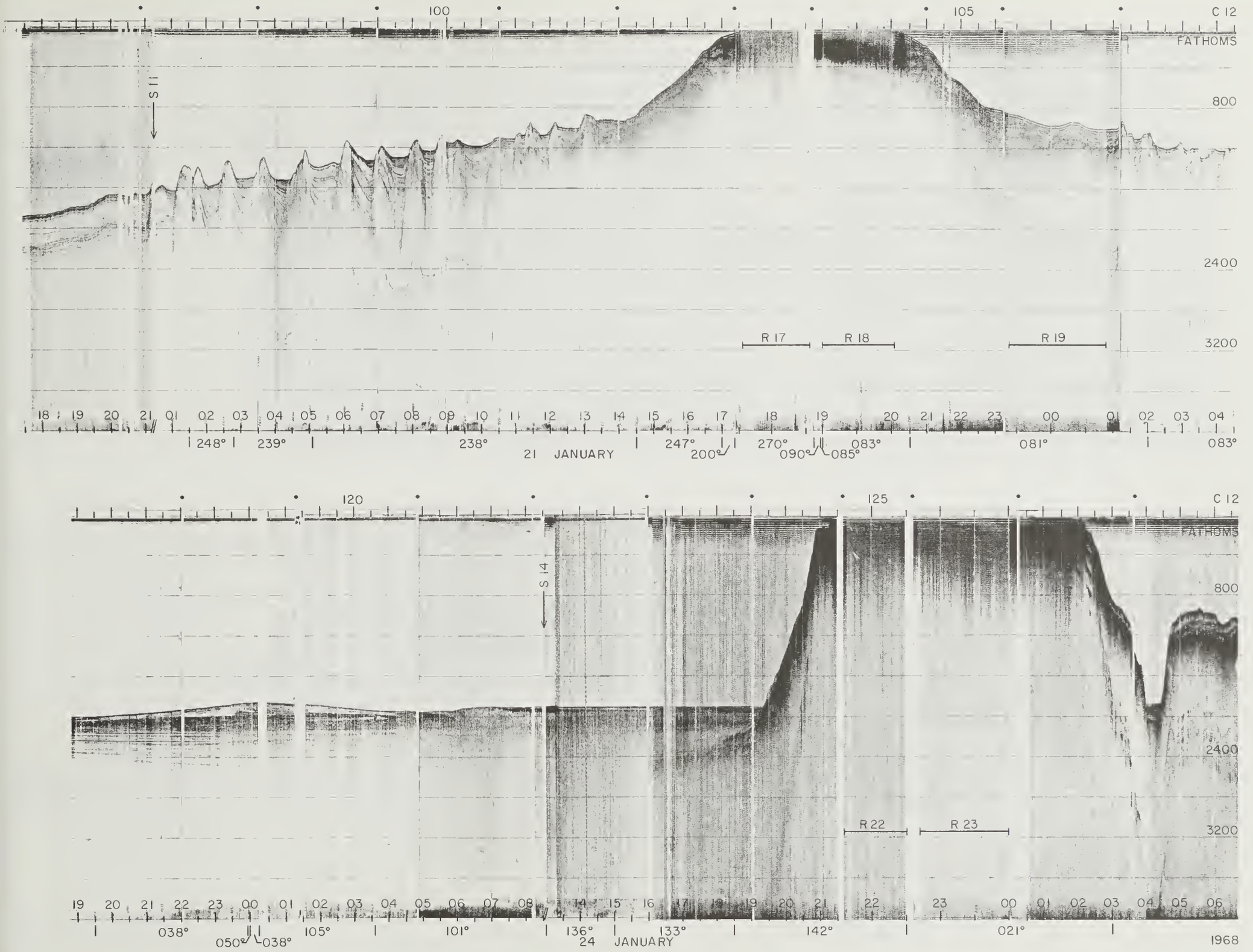

C 12
65
70
SECONDS
S 7
2
4
6
8
Z+5
Z+6
05 08 09 10 11 12 13 14 15 16 21 22 23 24 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20
279°
308°
309°
311°
320°
295°
293°
16 JANUARY
17 JANUARY

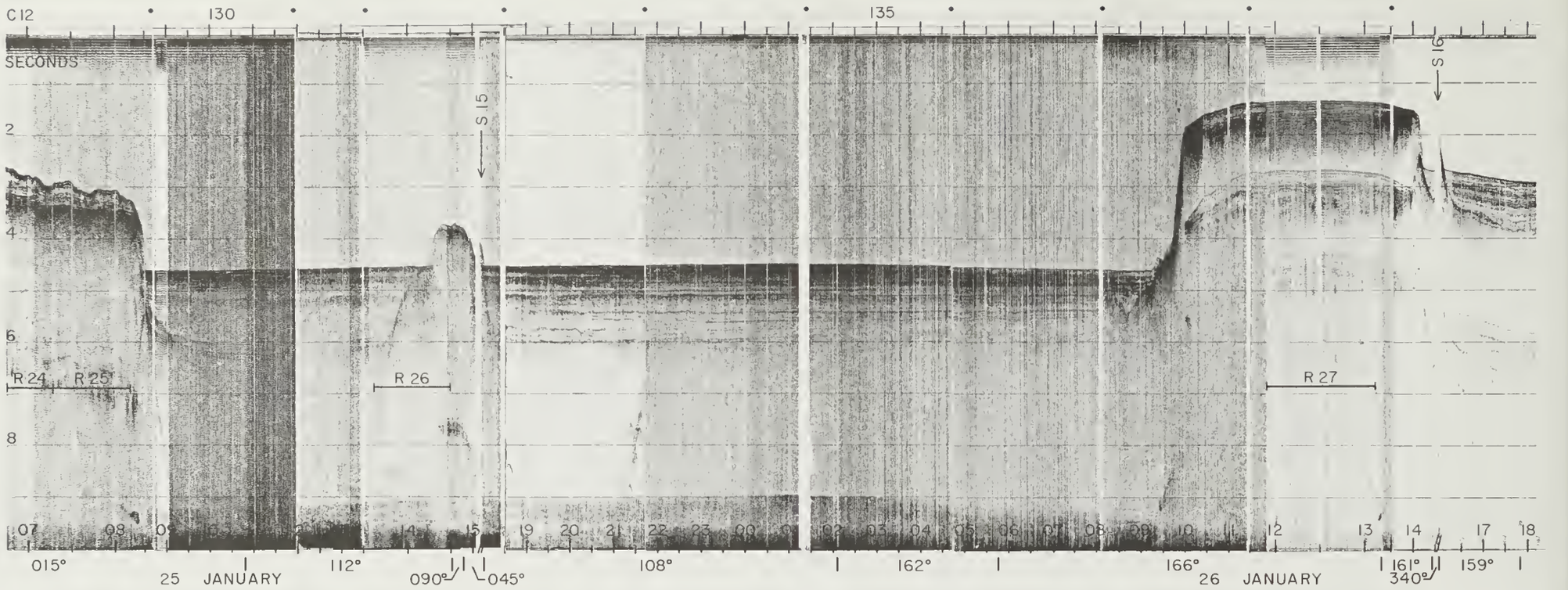

55
60
C 12
FATHOMS
S 5
S 6
R 9
800
1600
3200
12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03
324°
320°
318°
315°
317°
059°
053°
045°
054°
070°
4 JANUARY
15 JANUARY

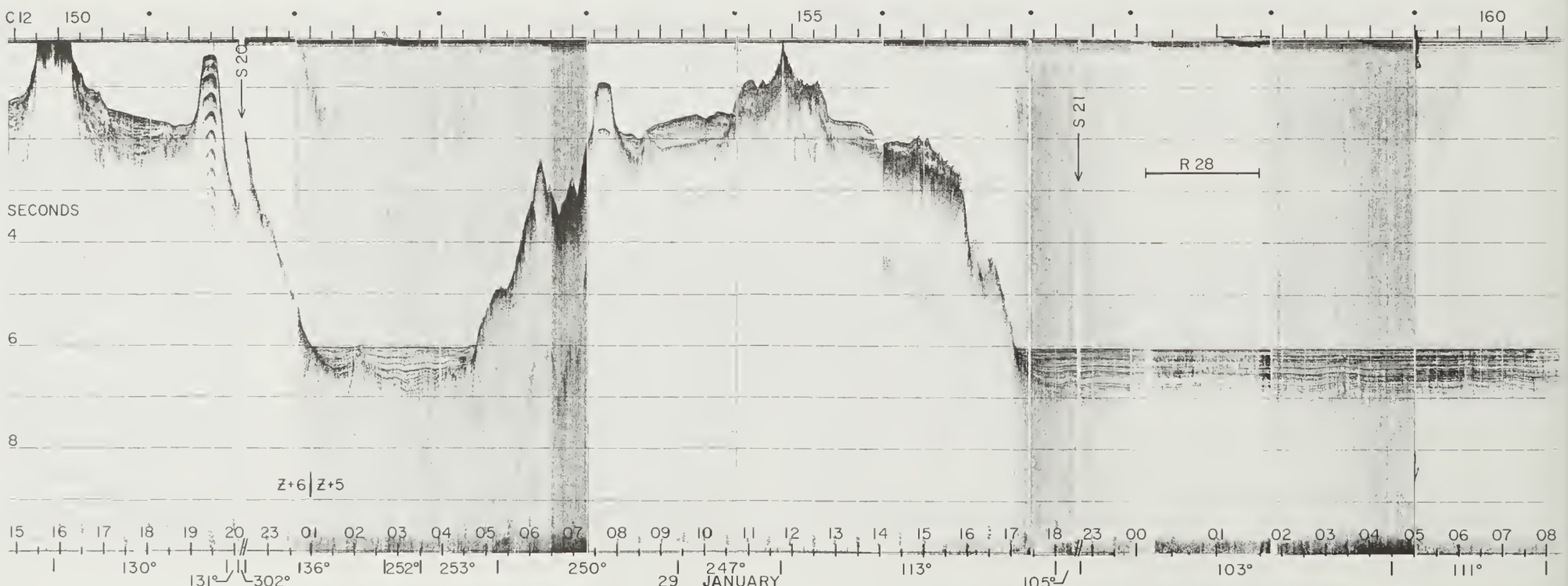

75
80
85
C 12
FATHOMS
S 8
R 10
R 11
R 12
R 13
800
1600
2400
3200
21 22 23 00 01 02 03 04 05 06 07 08 09 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
283°
197°
198°
189°
150°
202°
214°
18 JANUARY
1968

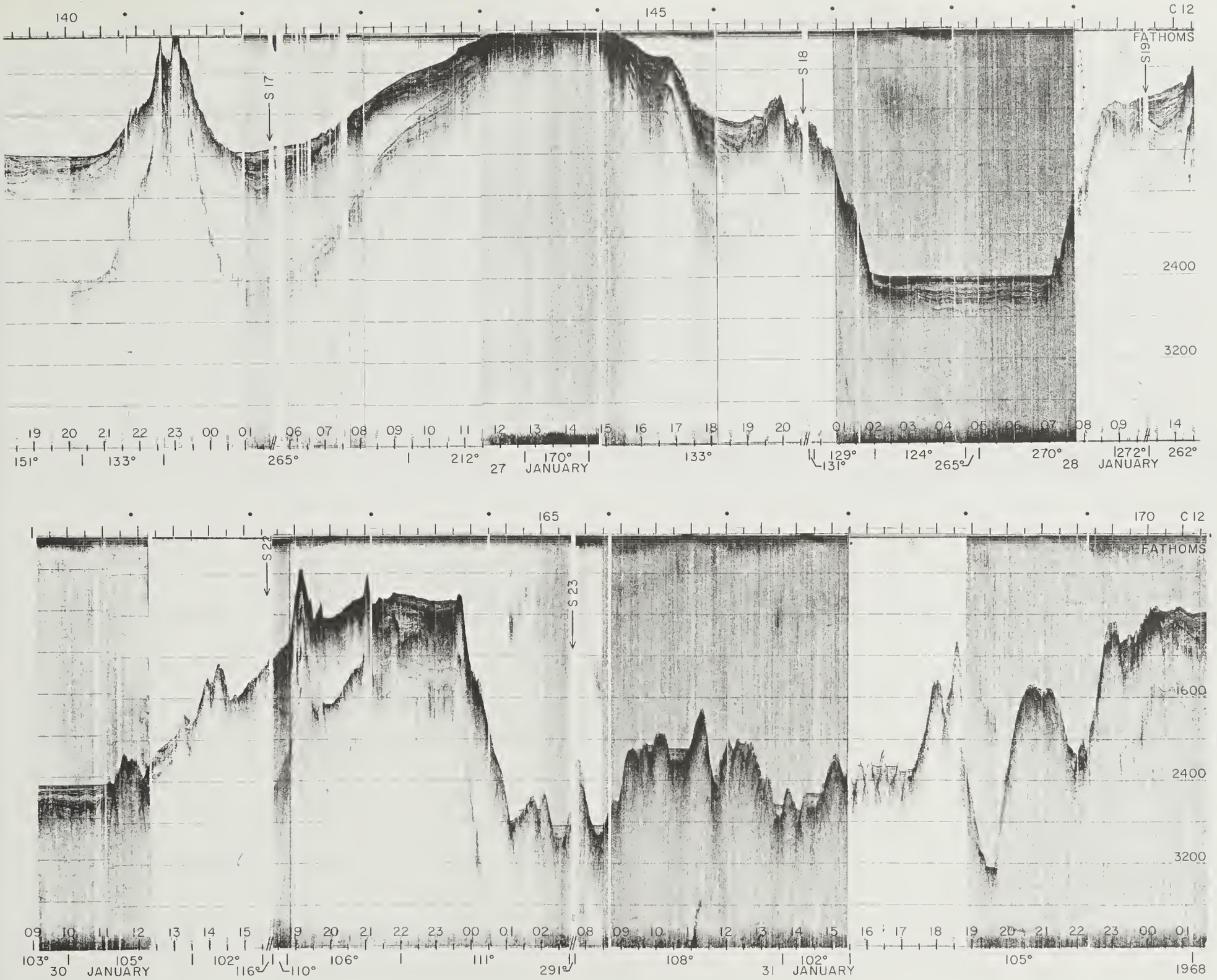

C12
90
95
SECONDS
2
4
8
S 9
S 10
R 14
R 15
R 16
05 06 07 08 09 14 15 17 18 19 20 21 22 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17
207° 301° 298° 301° 300° 193° 196° 198° 186° 233° 231°
19 JANUARY
20 JANUARY

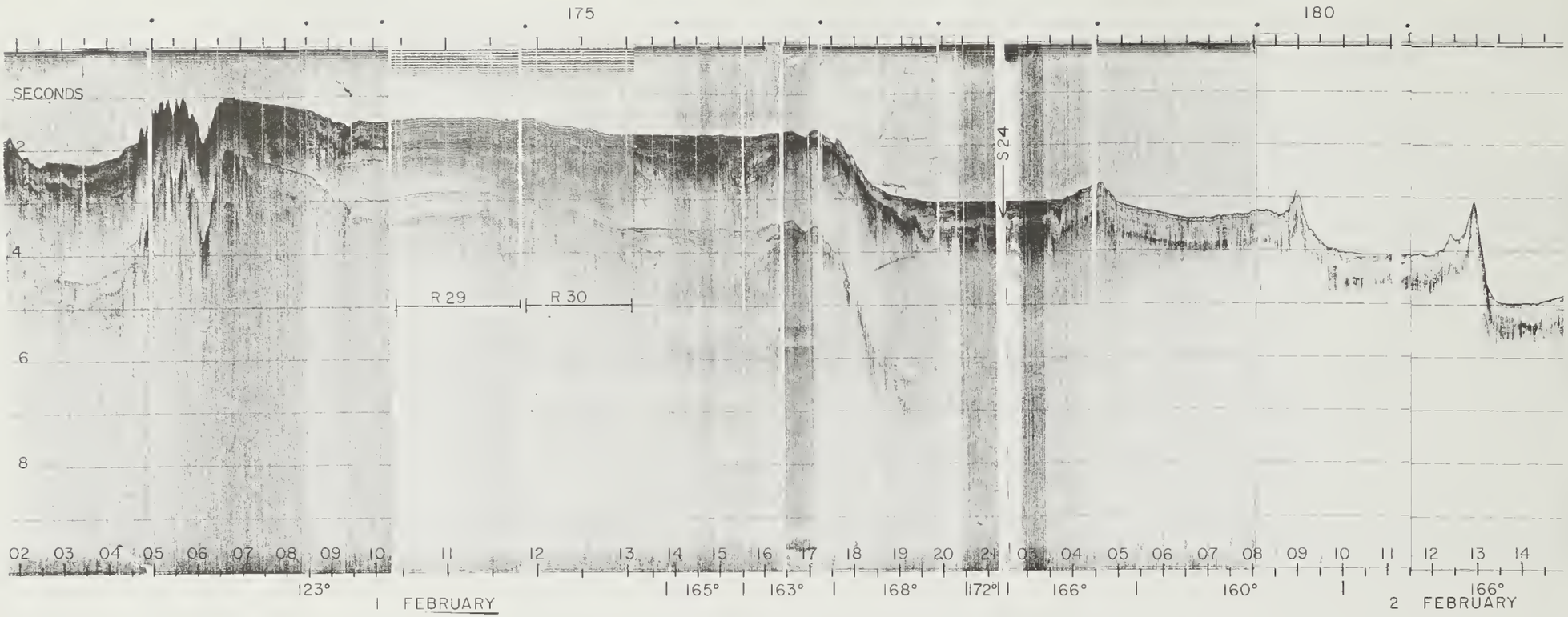

C12
110
115
SECONDS
2
6
8
S 12
S 13
R 20
R 21
05 06 07 08 09 10 15 16 17 18 19 20 21 22 23 00 01 06 07 08 09 10 11 12 13 14 15 16 17 18
081° 078° 043° 040° 044° 043° 040°
22 JANUARY
23 JANUARY

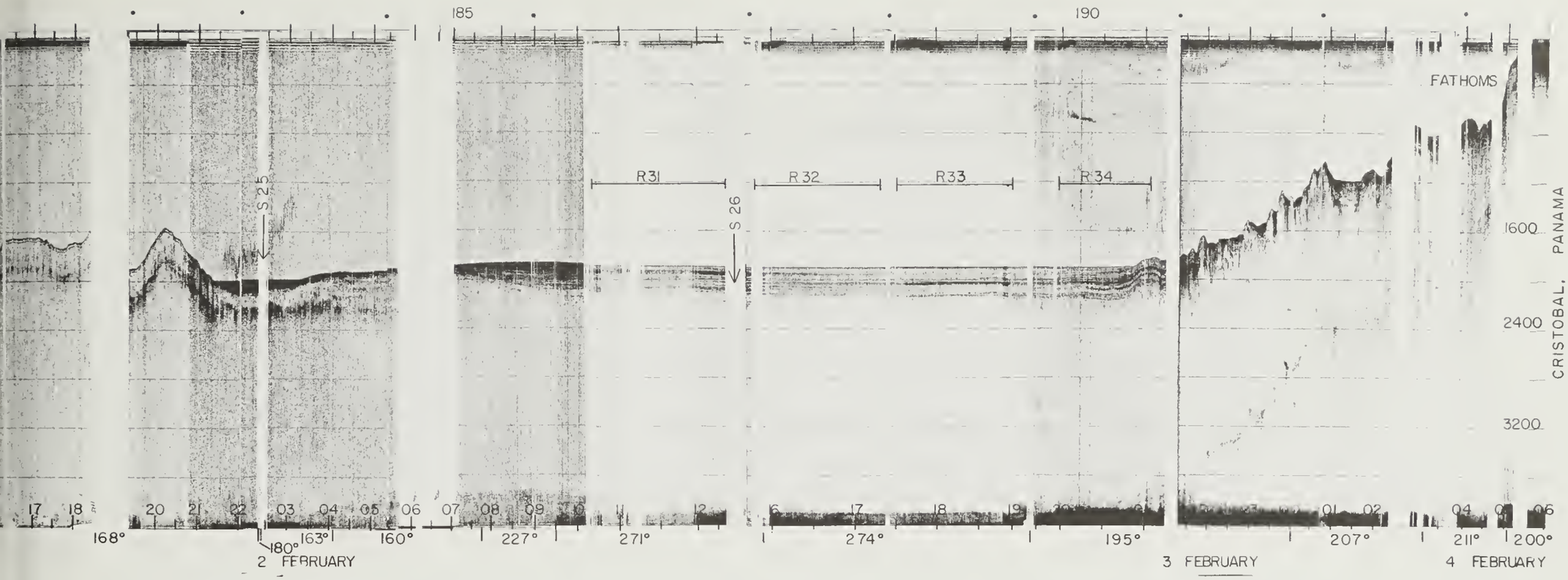

100
105
C 12
FATHOMS
800
2400
3200
S 11
R 17
R 18
R 19
18 19 20 21 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
248°
239°
238°
247°
270°
083°
081°
083°
200°
090°
085°
21 JANUARY
120
125
C 12
FATHOMS
800
2400
3200
S 14
R 22
R 23
19 20 21 22 23 00 01 02 03 04 05 06 07 08 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06
038°
105°
101°
136°
133°
142°
021°
050°
038°
24 JANUARY
1968

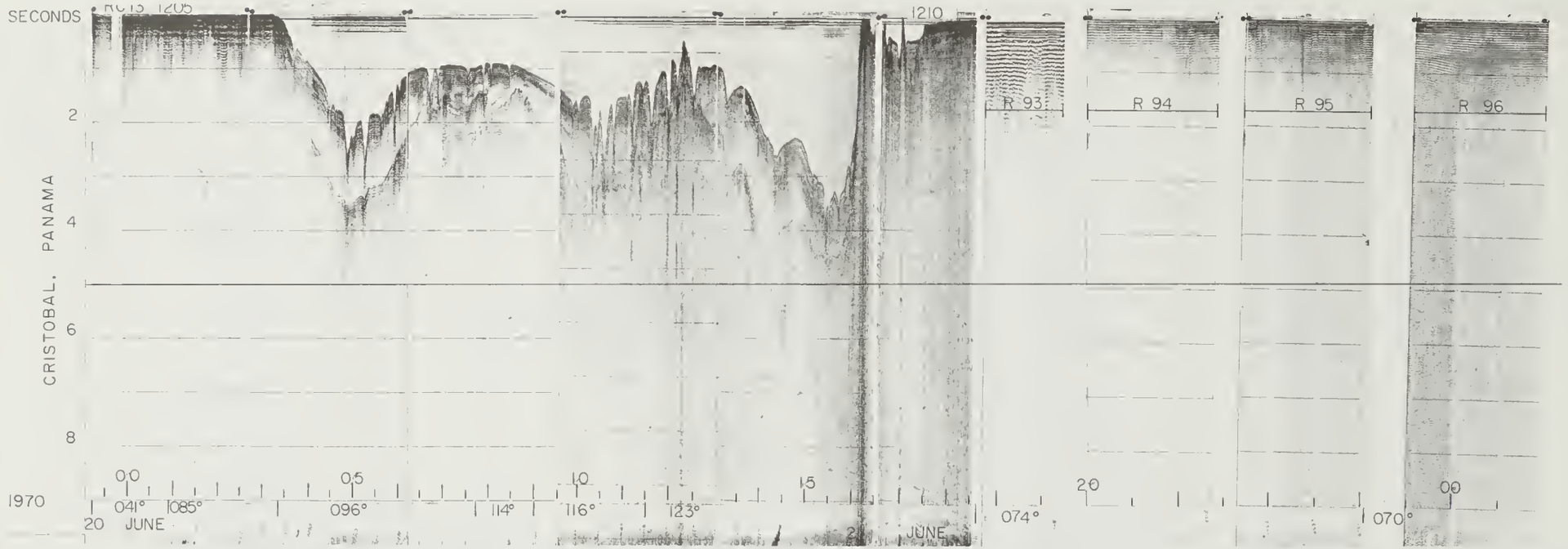

C12
130
135
SECONDS
2
4
6
8
S 15
S 16
R 24
R 25
R 26
R 27
07 08 09 10 11 12 13 14 15 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 17 18
015°
25 JANUARY
112°
090°
045°
108°
162°
166°
26 JANUARY
161°
340°
159°

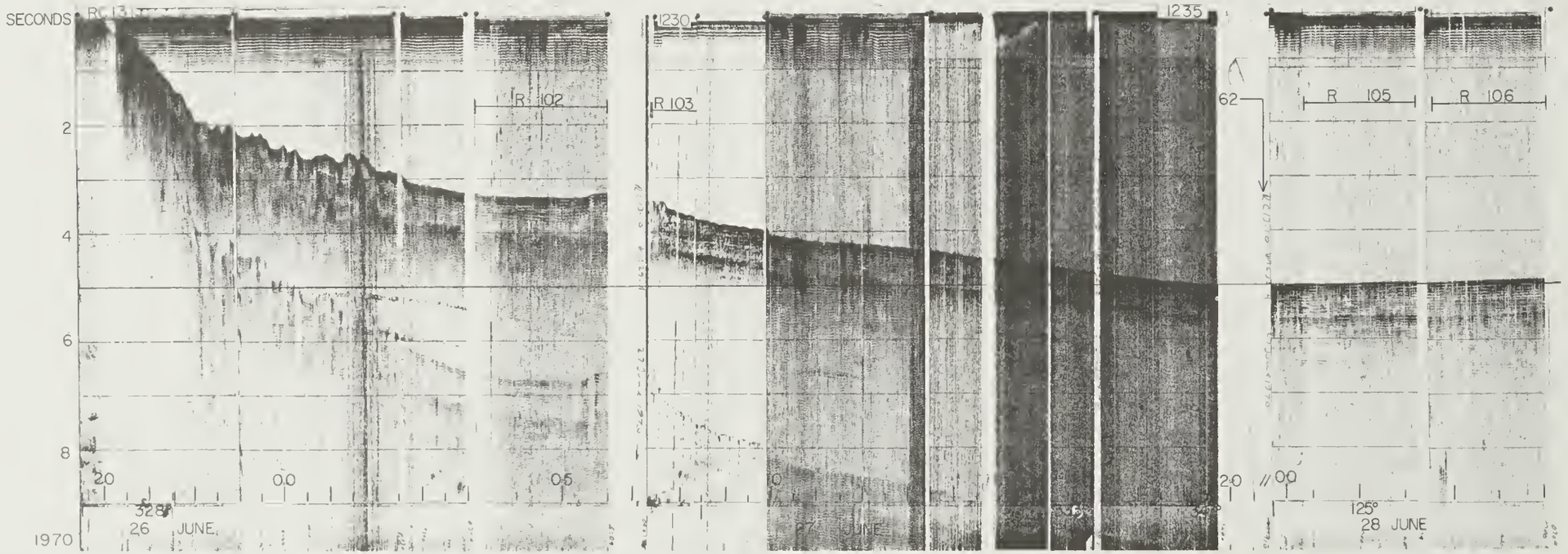

C12
150
155
160
SECONDS
4
6
8
S 20
S 21
R 28
Z+6
Z+5
15 16 17 18 19 20 23 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 23 00 01 02 03 04 05 06 07 08
130°
131°
302°
136°
252°
253°
250°
29 JANUARY
247°
113°
105°
103°
111°

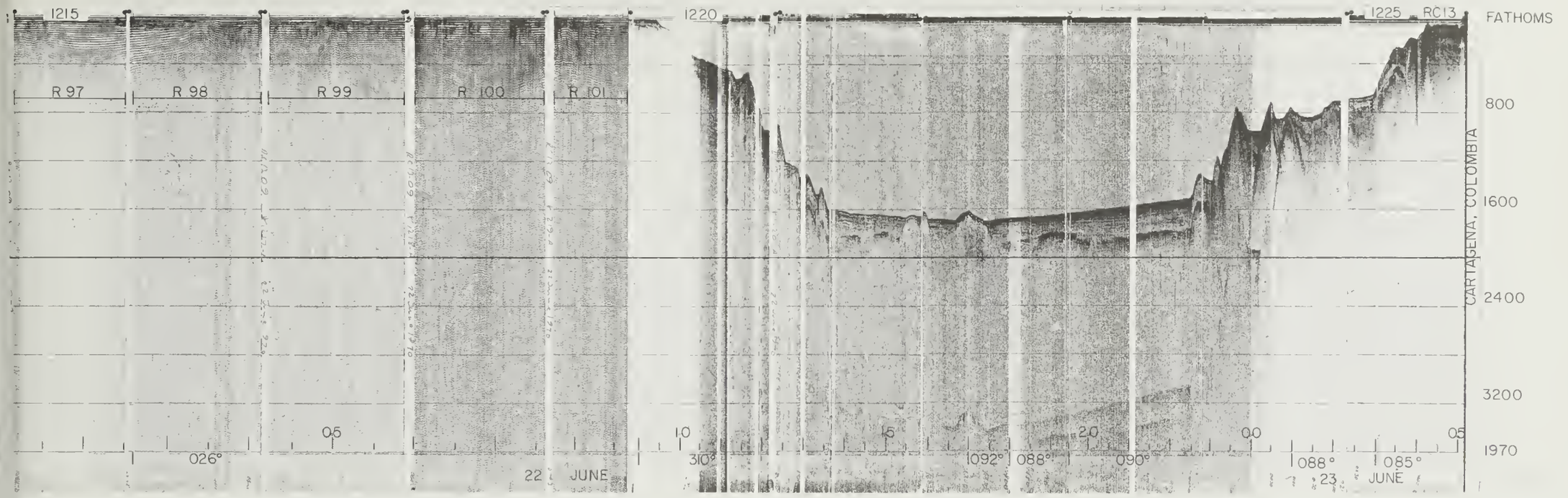

140
145
C 12
FATHOMS
S 17
S 18
S 19
2400
3200
19 20 21 22 23 00 01 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 01 02 03 04 05 06 07 08 09 14
151° 133° 265° 212° 170° 133° 129° 131° 124° 265° 270° 272° 262°
27 JANUARY
28 JANUARY
165
170
C 12
FATHOMS
S 22
S 23
1600
2400
3200
09 10 11 12 13 14 15 19 20 21 22 23 00 01 02 08 09 10 12 13 14 15 16 17 18 19 20 21 22 23 00 01
103° 105° 102° 116° 110° 106° 111° 291° 108° 102° 105°
30 JANUARY
31 JANUARY
1968

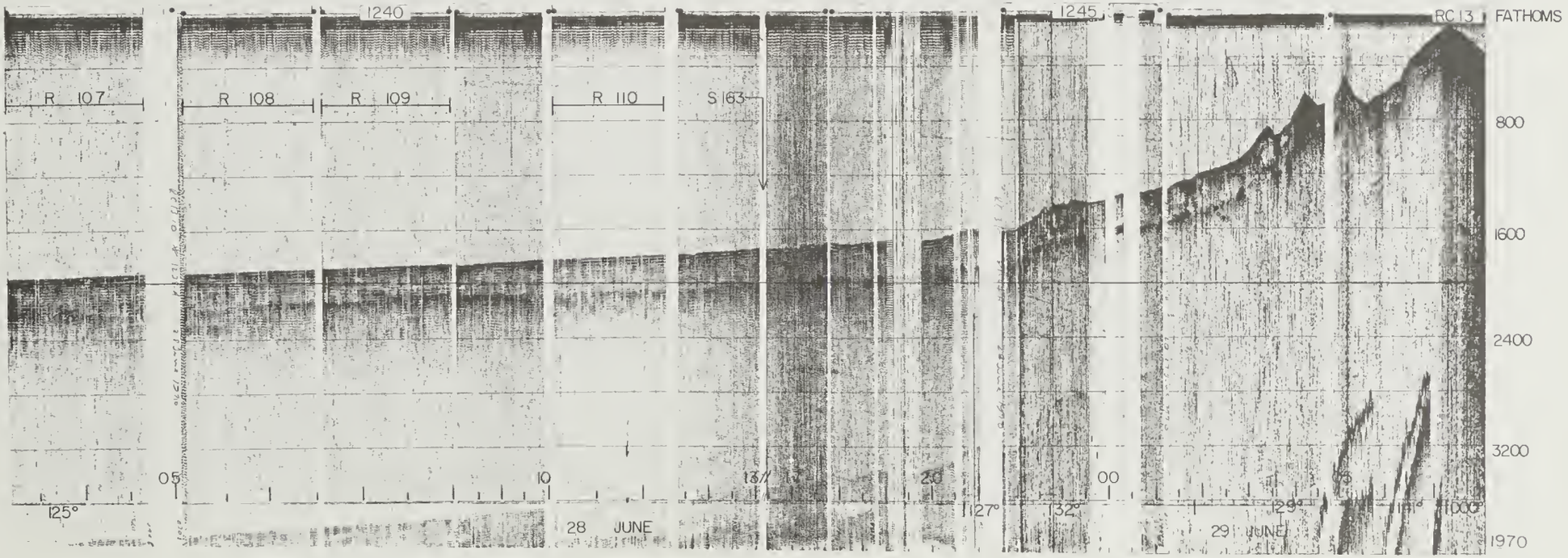

175
180
SECONDS
2
4
6
8
S24
R 29
R 30
02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 03 04 05 06 07 08 09 10 11 12 13 14
123°
165°
163°
168°
172°
166°
160°
166°
1 FEBRUARY
2 FEBRUARY

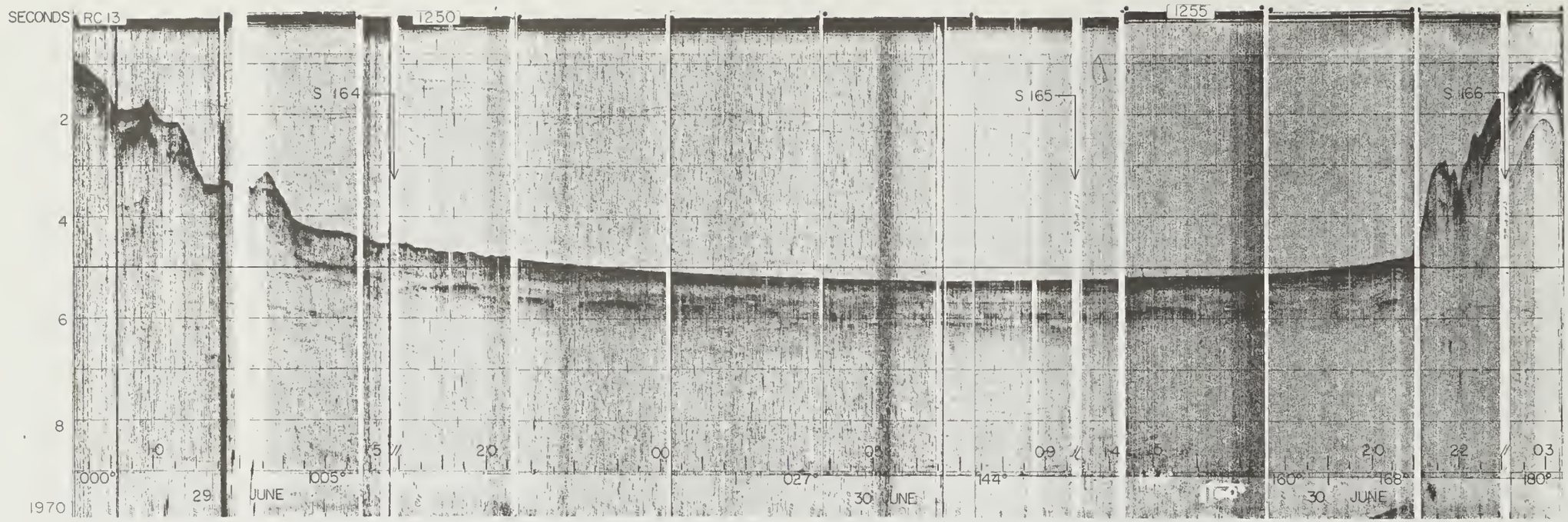

185
190
FATHOMS
1600
2400
3200
CRISTOBAL, PANAMA
S 25
S 26
R31
R32
R33
R34
17 18 20 21 22 03 04 05 06 07 08 09 10 12 16 17 18 19 01 02 04 06
168°
163°
180°
160°
227°
271°
274°
195°
207°
211°
200°
2 FEBRUARY
3 FEBRUARY
4 FEBRUARY

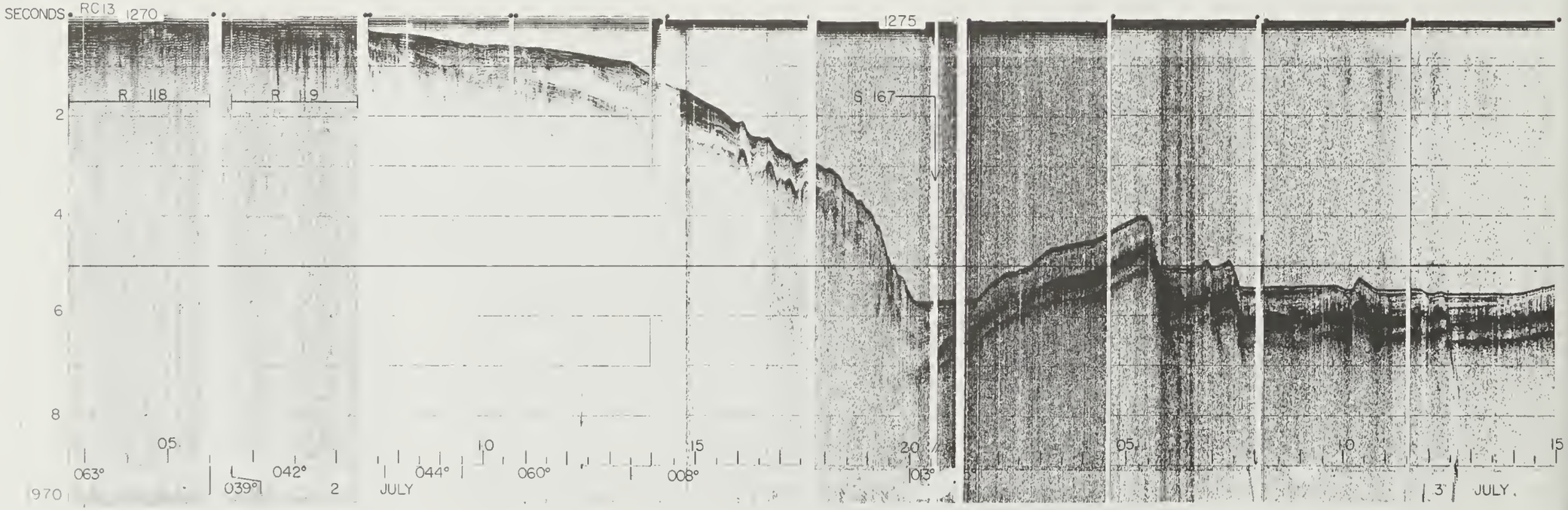

SECONDS
RC13 1205
1210
R 93
R 94
R 95
R 96
CRISTOBAL, PANAMA
2
4
6
8
0.0
0.5
1.0
1.5
2.0
0.0
1970
041°
085°
096°
114°
116°
123°
074°
070°
20 JUNE
21 JUNE

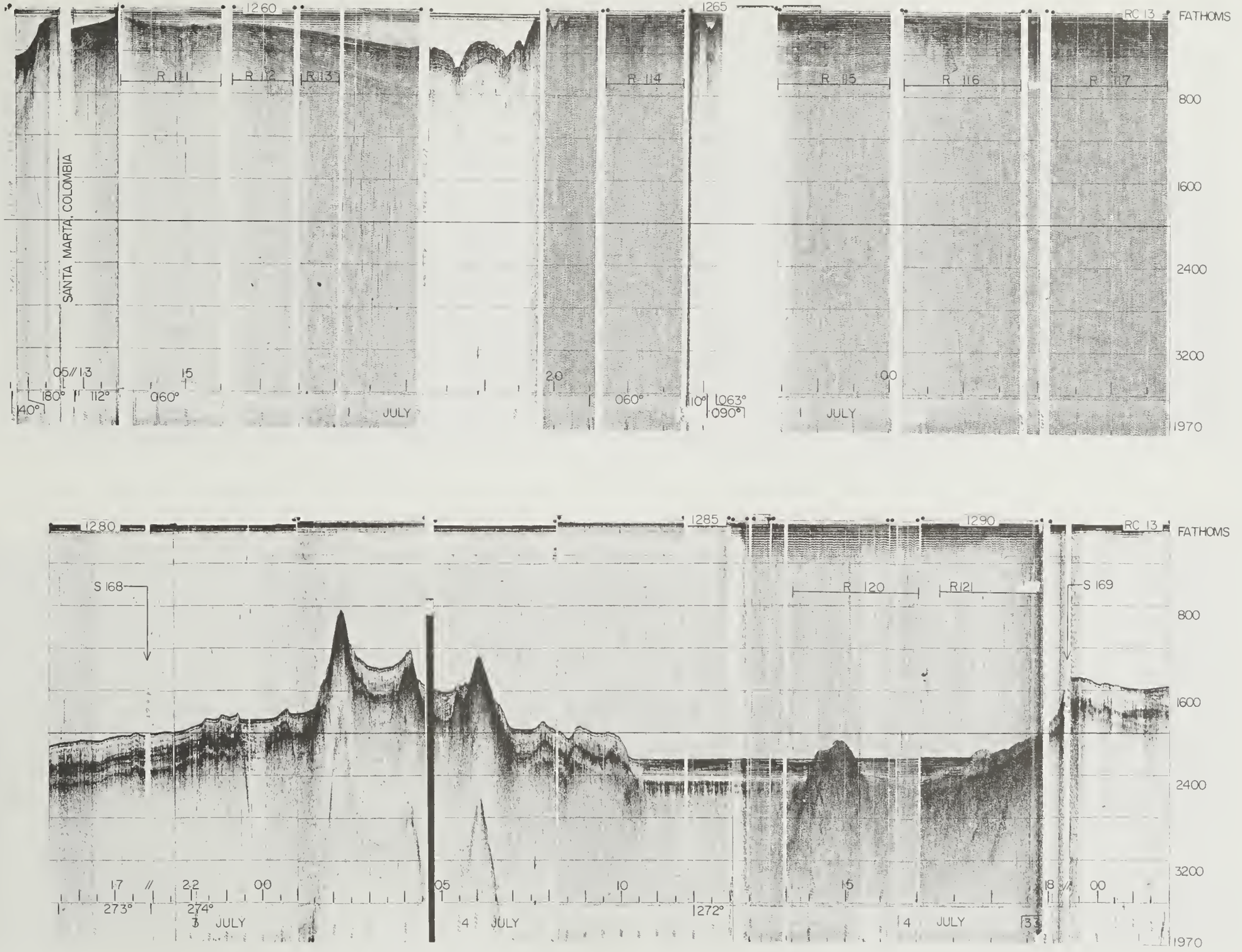

SECONDS
RC13
R 102
R 103
1230
1235
R 105
R 106
62
2
4
6
8
2.0
0.0
0.5
0
2.0
0.0
328°
26 JUNE.
27 JUNE
125°
28 JUNE
1970

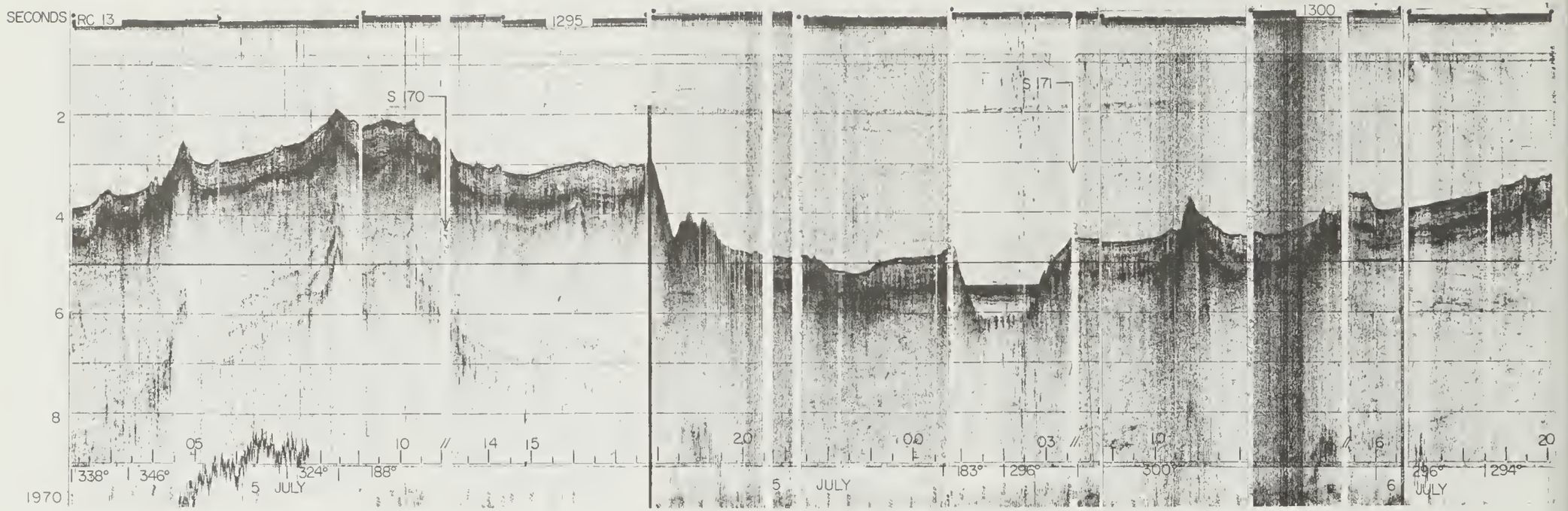

1215
R 97
R 98
R 99
R 100
R 101
05
026°
22 JUNE
1220
10
310°
15
1092°
088°
20
090°
00
088°
1225
RC13
05
085°
23 JUNE
FATHOMS
800
1600
2400
3200
1970
CARTAGENA, COLOMBIA

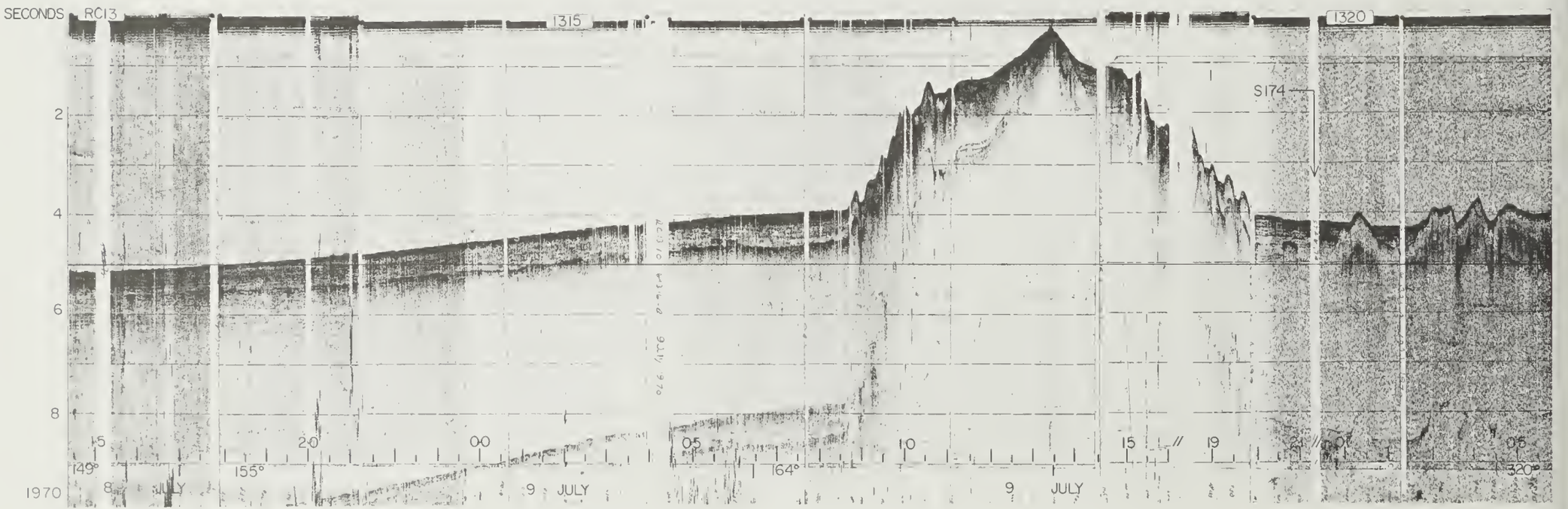

1240
R 107
R 108
R 109
R 110
S 163
05
125°
10
28 JUNE
15
20
127°
00
32°
1245
RC13
129°
29 JUNE
FATHOMS
800
1600
2400
3200
1970

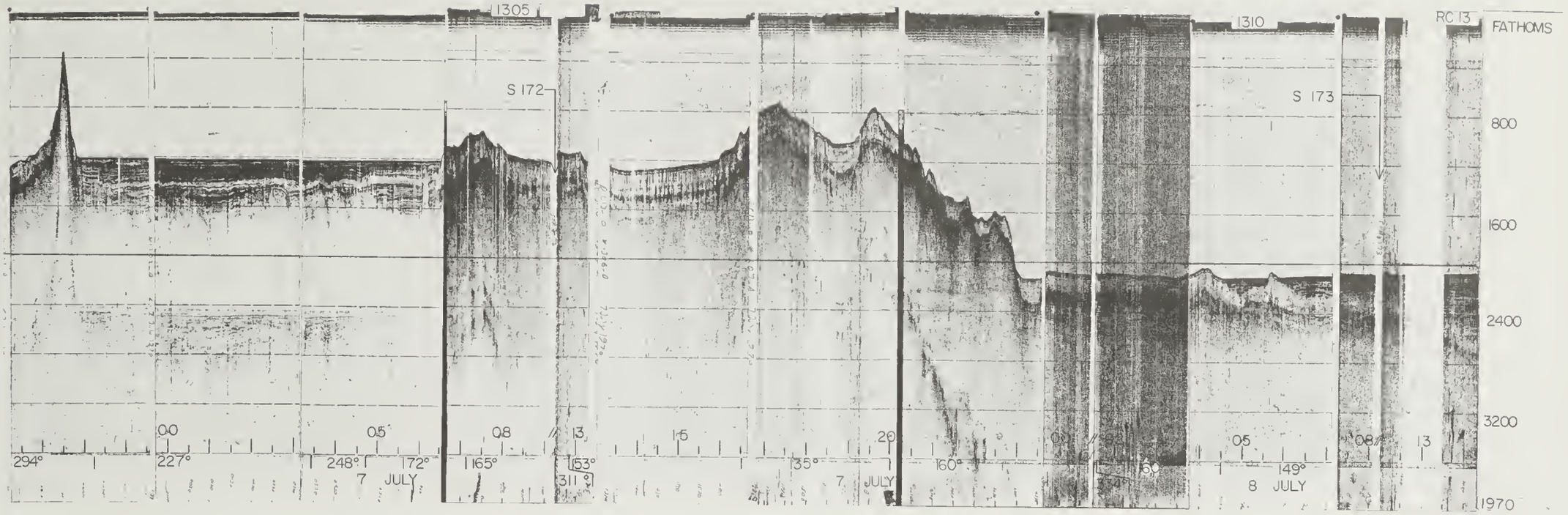

SECONDS
RC 13
1250
1255
S 164
S 165
S 166
2
4
6
8
000°
005°
027°
144°
180°
168°
180°
29 JUNE
30 JUNE
30 JUNE
1970

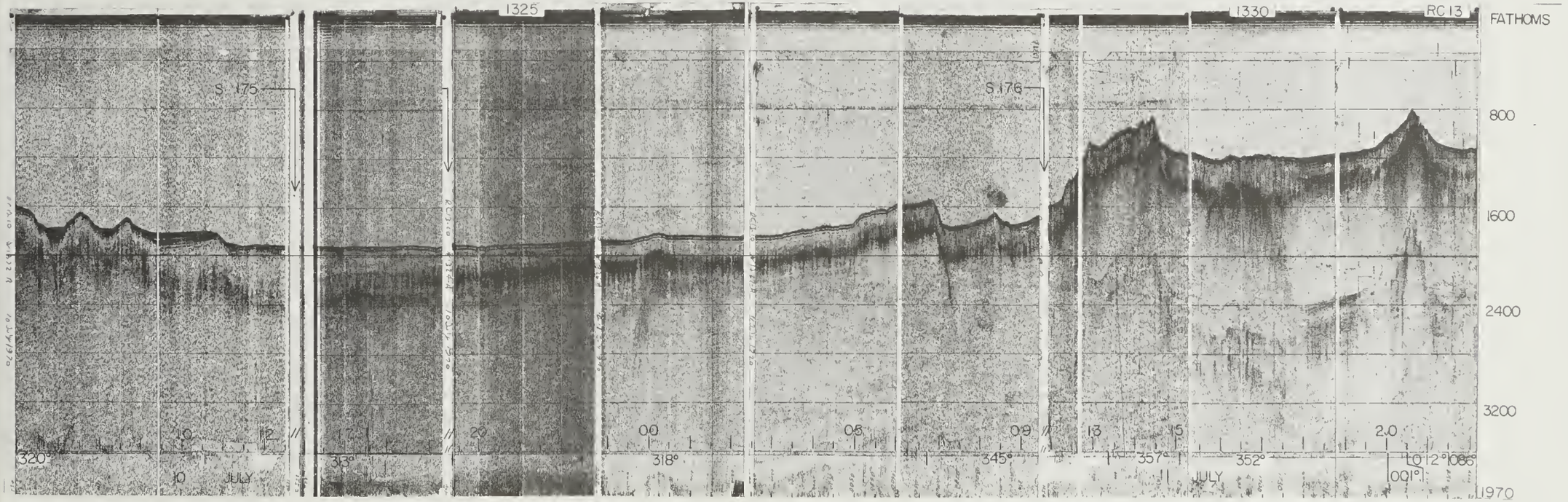

SECONDS
RC 13
1270
1275
R 118
R 119
S 167
2
4
6
8
063°
042°
039°
044°
060°
008°
103°
2 JULY
3 JULY.
1970

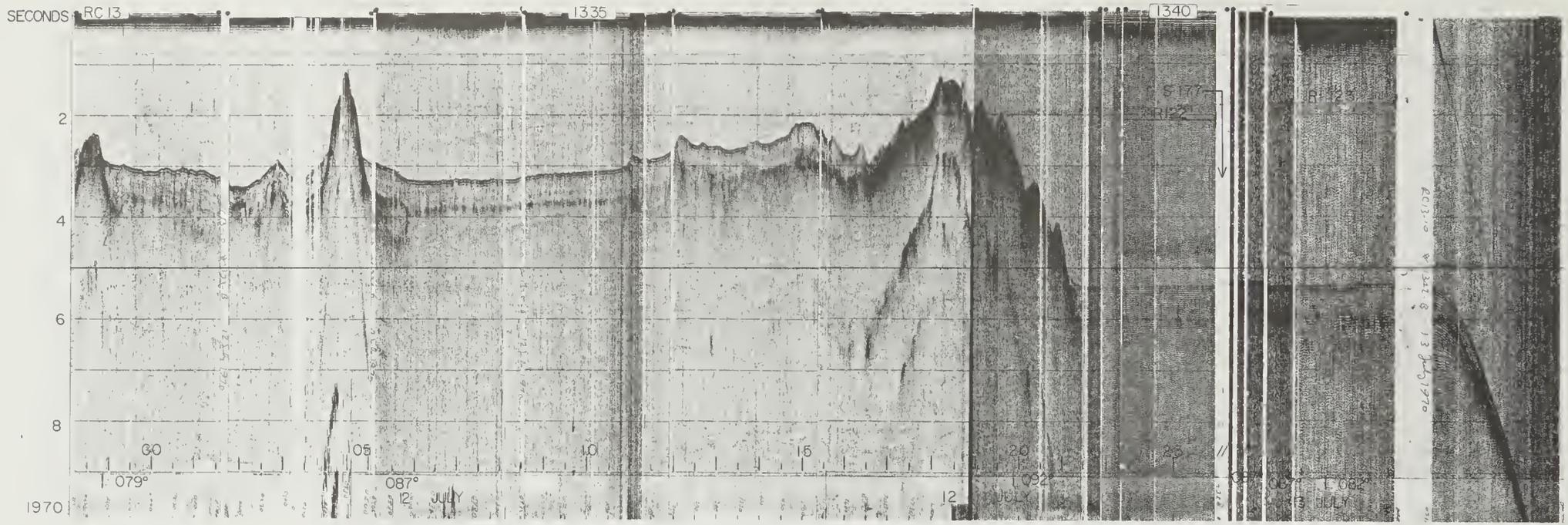

1260
1265
RC 13
FATHOMS
R 111
R 112
R 113
R 114
R 115
R 116
R 117
SANTA MARTA, COLOMBIA
800
1600
2400
3200
1970
05// 13
15
20
00
180°
112°
060°
040°
060°
10°
063°
090°
JULY
JULY
1280
1285
1290
RC 13
FATHOMS
S 168
R 120
R121
S 169
800
1600
2400
3200
1970
17
//
22
00
05
10
15
18
//
00
273°
274°
1272°
3 JULY
4 JULY
4 JULY
33

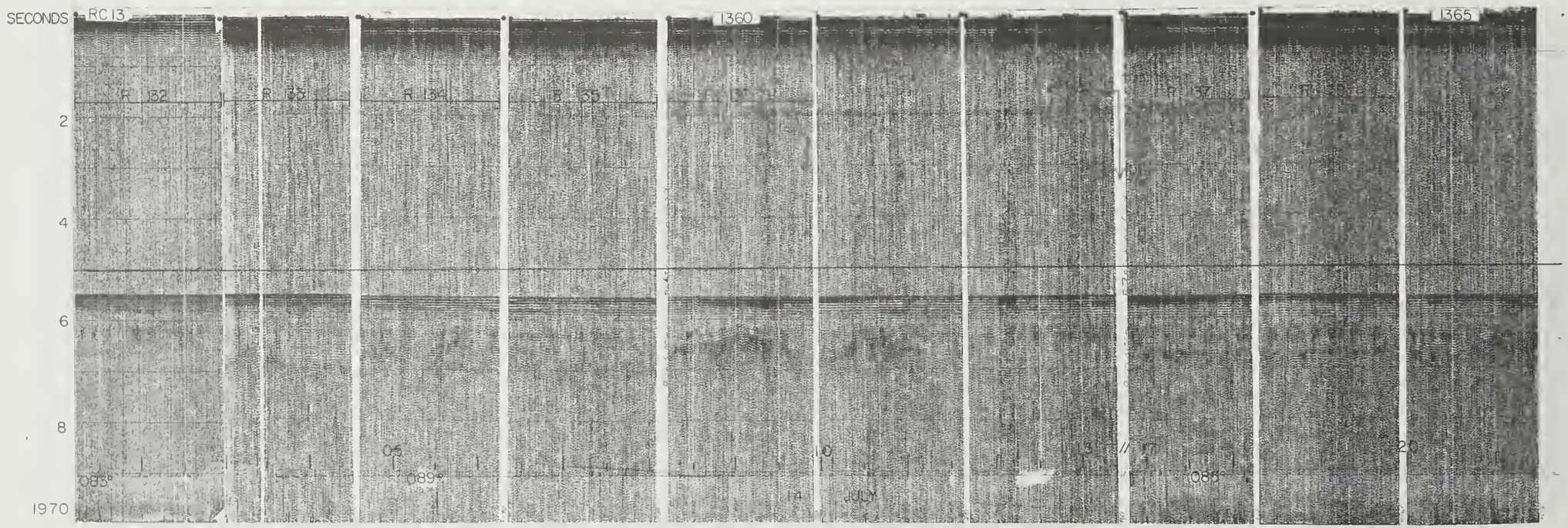

SECONDS
RC 13
1295
1300
S 170
S 171
2
4
6
8
05
10
14
15
20
00
03
10
16
20
338°
346°
324°
188°
183°
296°
300°
296°
294°
5 JULY
5 JULY
6 JULY
1970

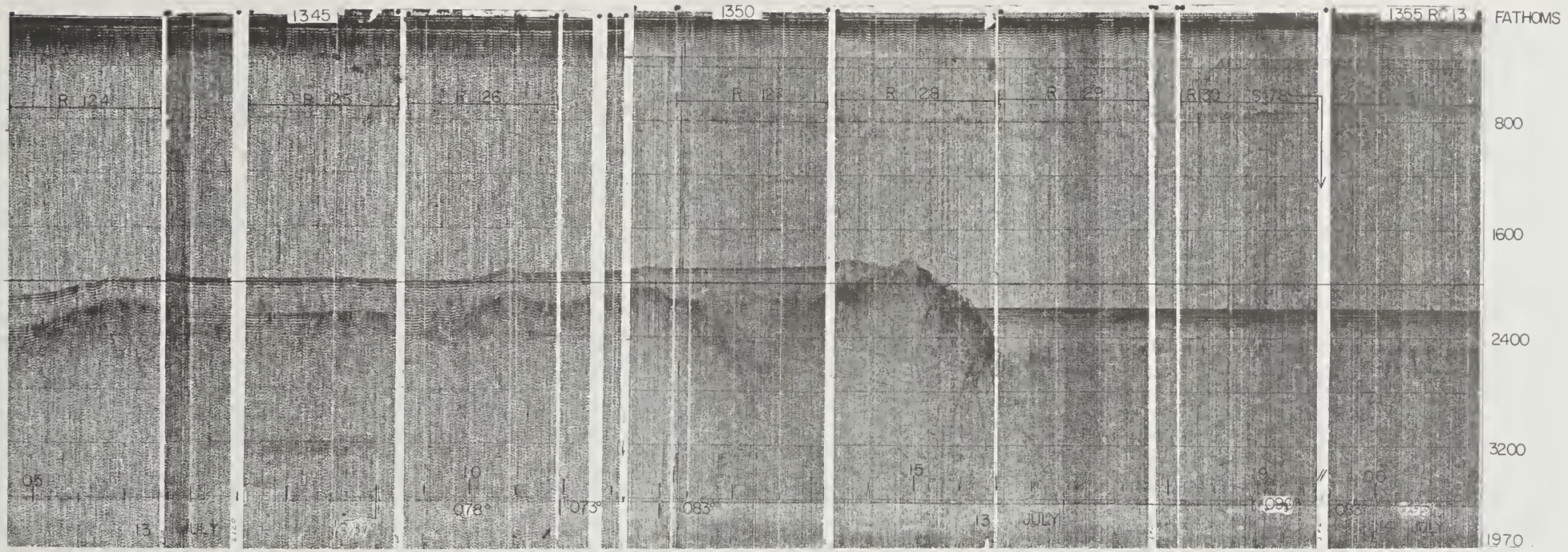

SECONDS
RC13
1315
1320
S174
2
4
6
8
15
20
00
05
10
15
19
00
05
149°
155°
164°
320°
8 JULY
9 JULY
9 JULY
1970

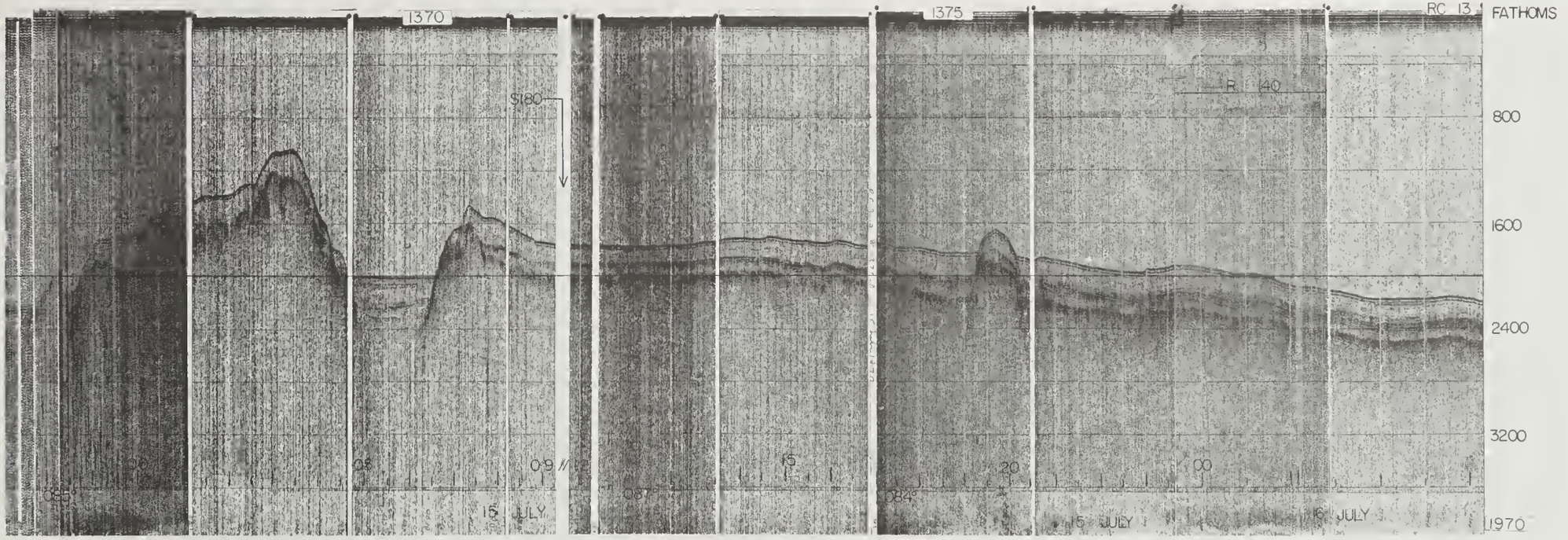

1305
S 172
1310
RC 13
FATHOMS
S 173
800
1600
2400
3200
1970
00
05
08
13
15
20
05
08
13
294°
227°
248°
172°
165°
153°
311°
7 JULY
35°
7 JULY
160°
149°
8 JULY

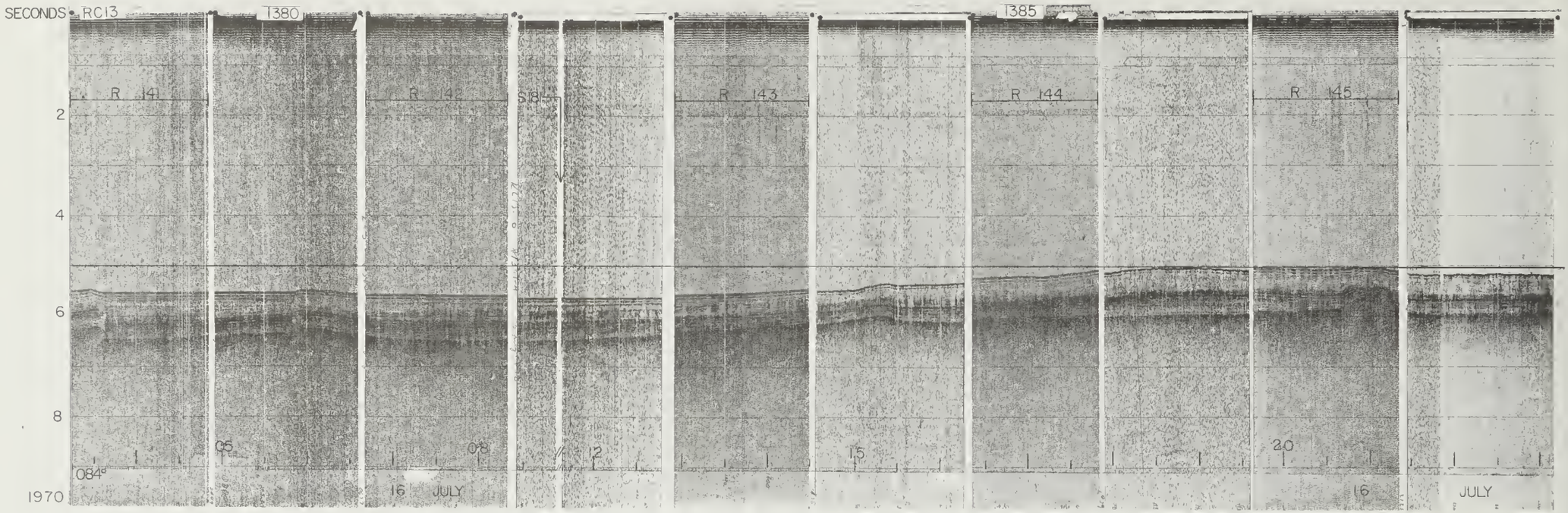

1325
1330
RC 13
FATHOMS
S 175
S 176
800
1600
2400
3200
1970
10
12
29
00
08
09
13
15
20
320°
10 JULY
313°
318°
345°
357°
352°
JULY
001°

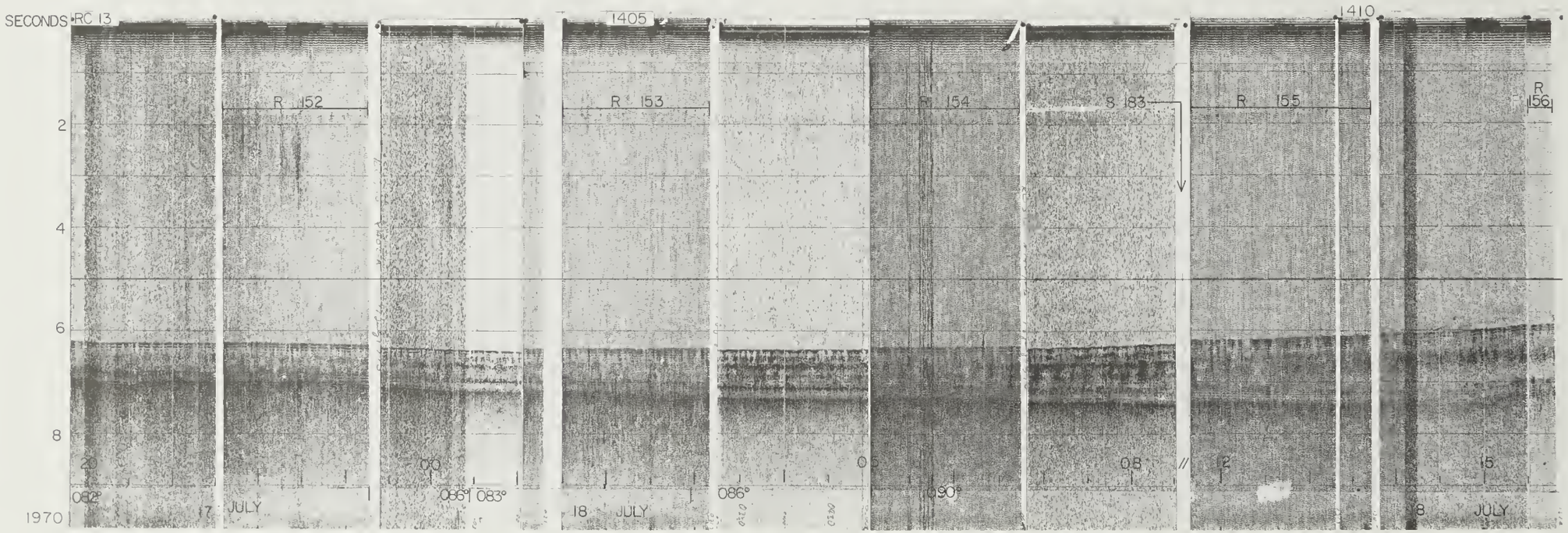

SECONDS
RC 13
1335
1340
2
4
6
8
1970
079°
087°
092
R 123
S 177
R 122
12 JULY
13 JULY

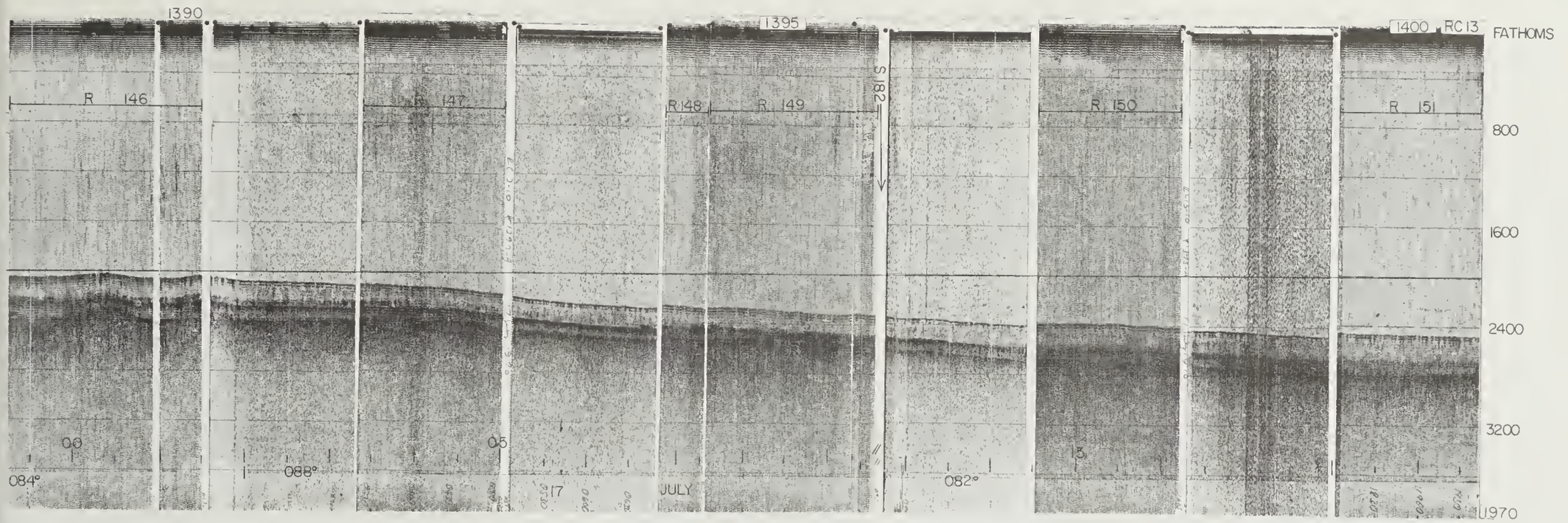

SECONDS
RC 13
1360
1365
R 132
R 133
R 134
R 135
R 137
2
4
6
8
1970
083°
089°
085°
14 JULY

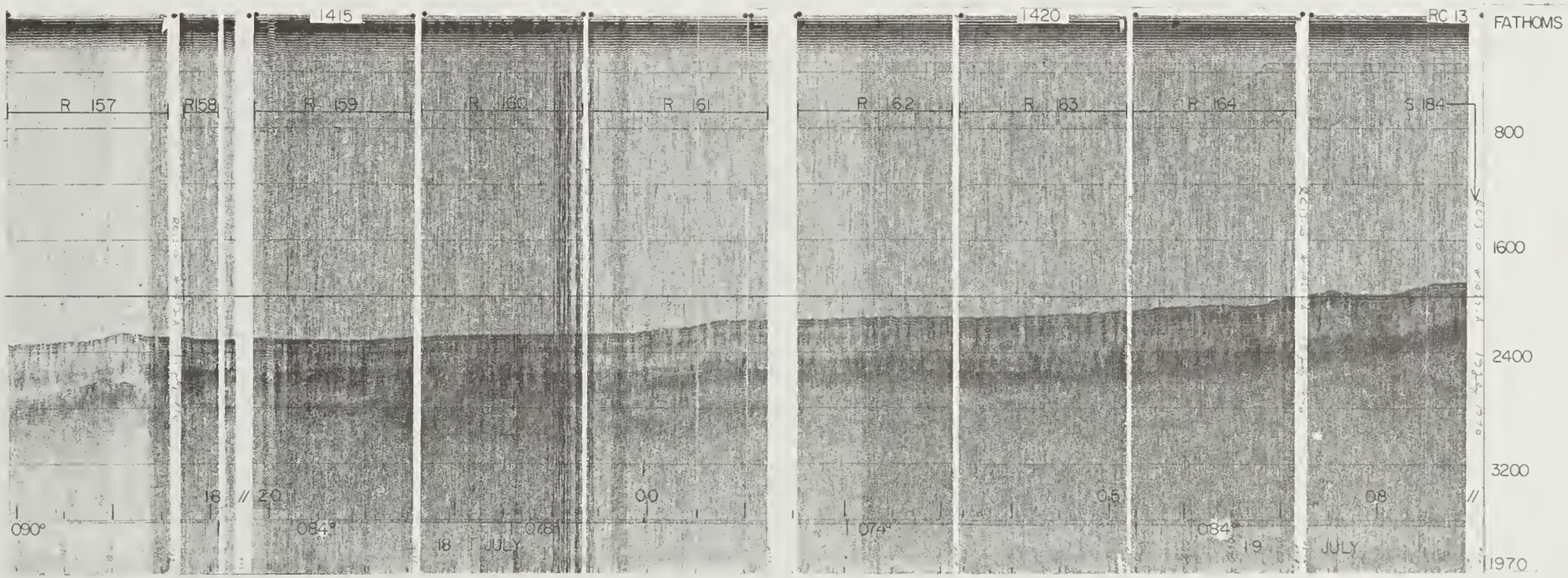

1345
1350
1355 RC 13
FATHOMS
R 124
R 125
R 126
R 127
R 128
R 129
R 130
S178
800
1600
2400
3200
1970
05
10
15
00
078°
073°
083°
088°
13 JULY
15 JULY

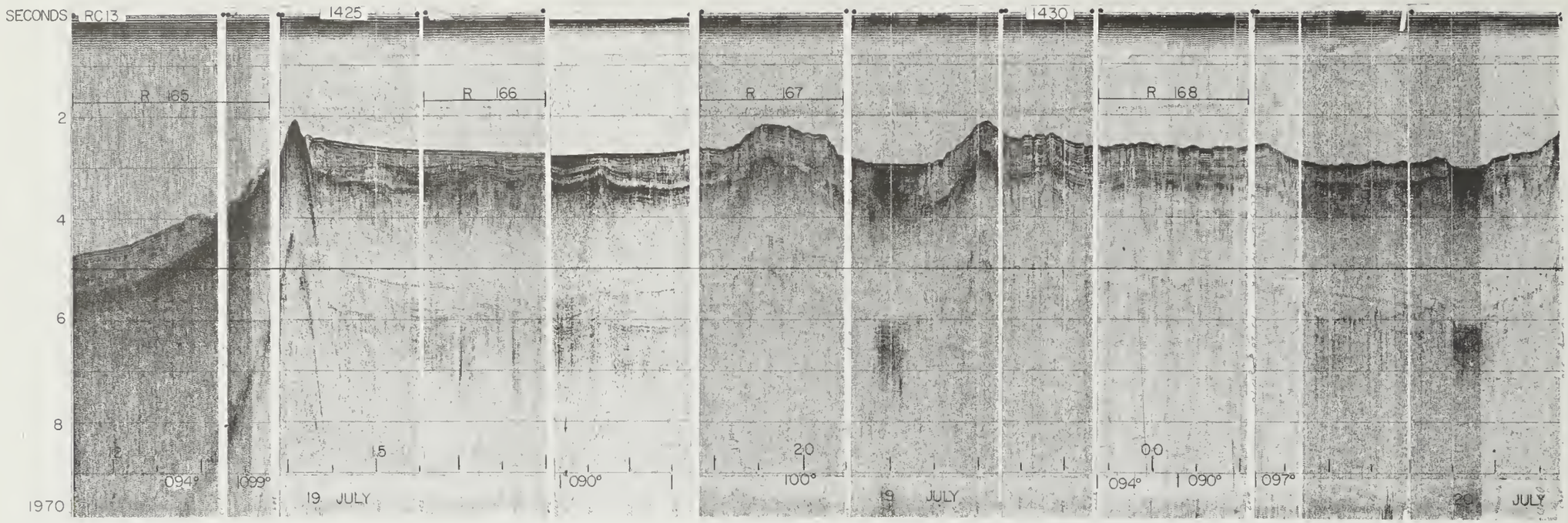

1370
1375
RC 13
FATHOMS
S180
R 140
800
1600
2400
3200
1970
08
09
15
20
00
085°
087°
084°
15 JULY
16 JULY

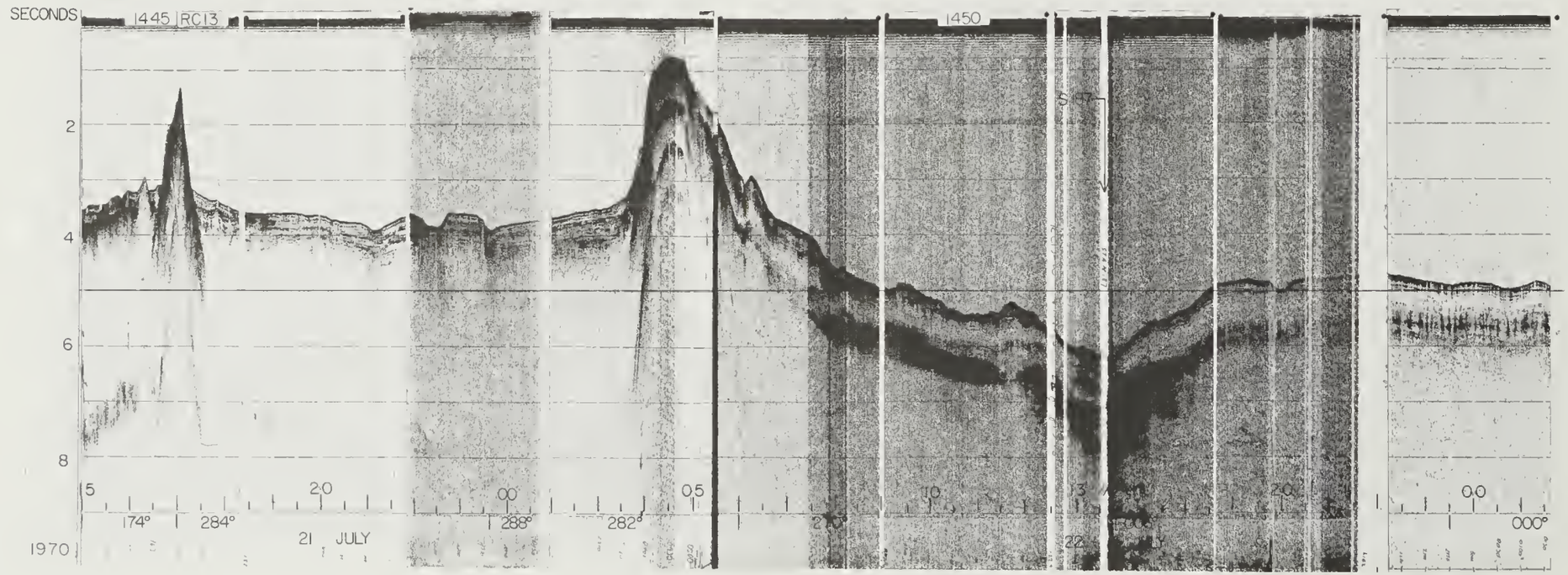

SECONDS
RC13
1380
1385
R 141
R 142
S 181
R 143
R 144
R 145
2
4
6
8
084°
16 JULY
1970
16 JULY

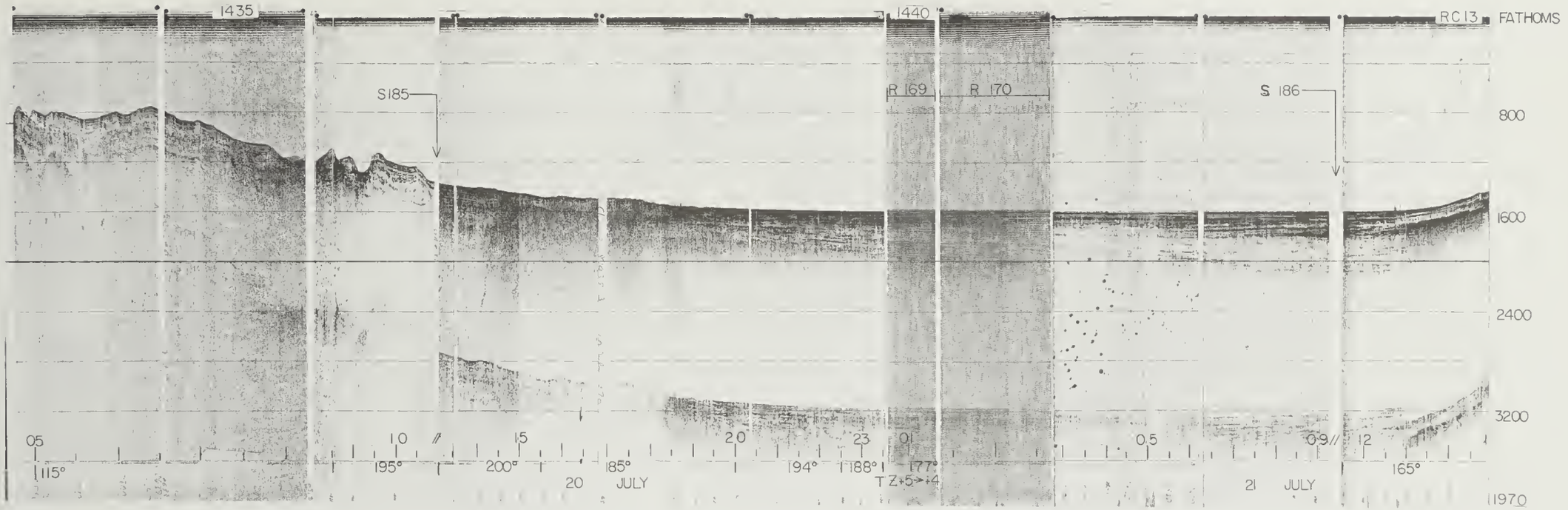

SECONDS
RC 13
1405
1410
R 152
R 153
R 154
S 183
R 155
R 156
2
4
6
8
082°
17 JULY
086° 083°
18 JULY
086°
090°
8 JULY
1970

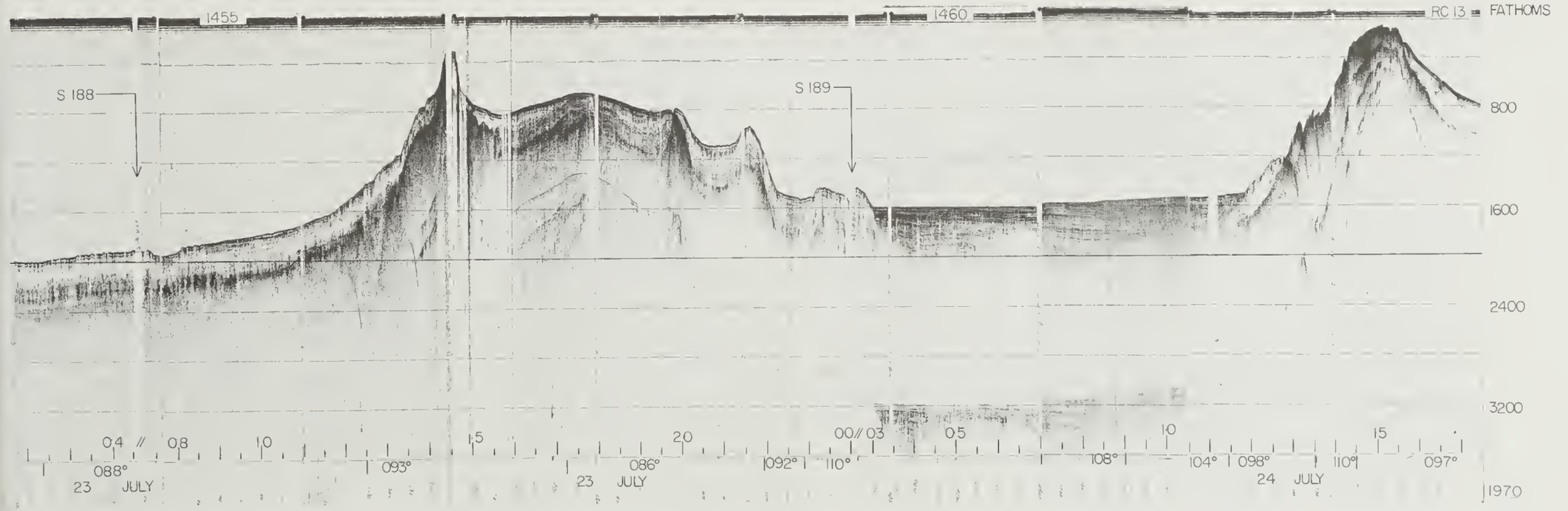

1390
1395
1400
RC 13
FATHOMS
R 146
R 147
R 148
R 149
S 182
R 150
R 151
800
1600
2400
3200
1970
0.0
0.5
1.5
084°
088°
082°
17
JULY

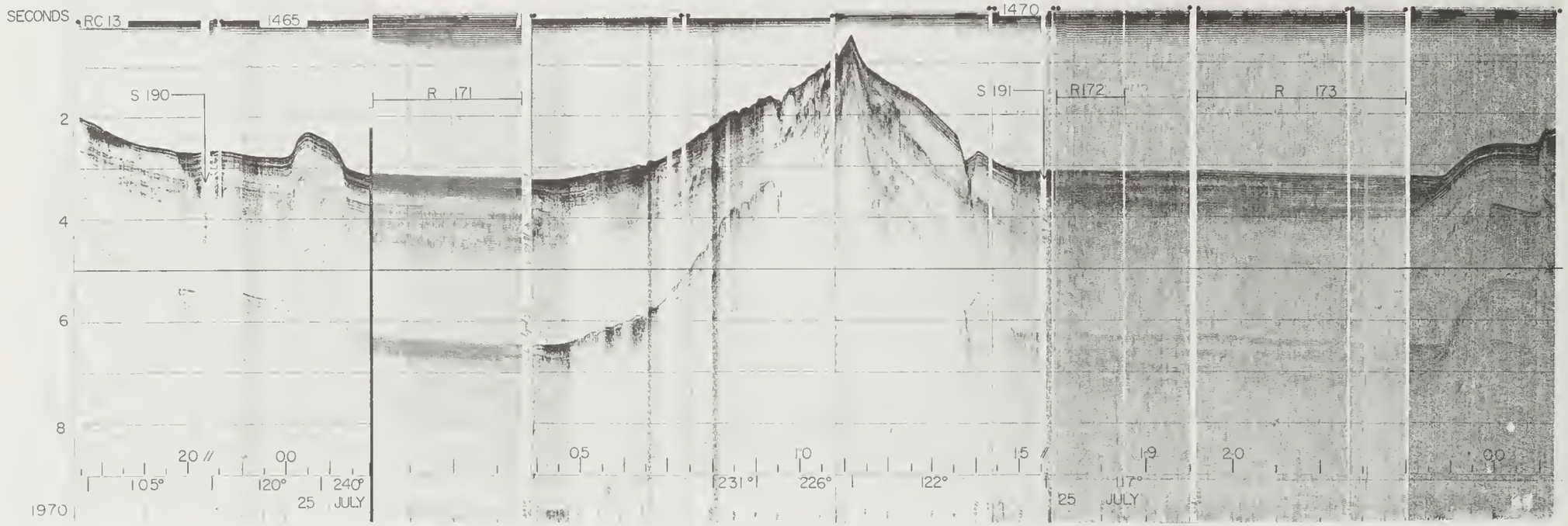

1415
1420
RC 13
FATHOMS
R 157
R158
R 159
R 160
R 161
R 162
R 163
R 164
S 184
800
1600
2400
3200
1970
090°
084°
086°
074°
084°
18
JULY
19
JULY

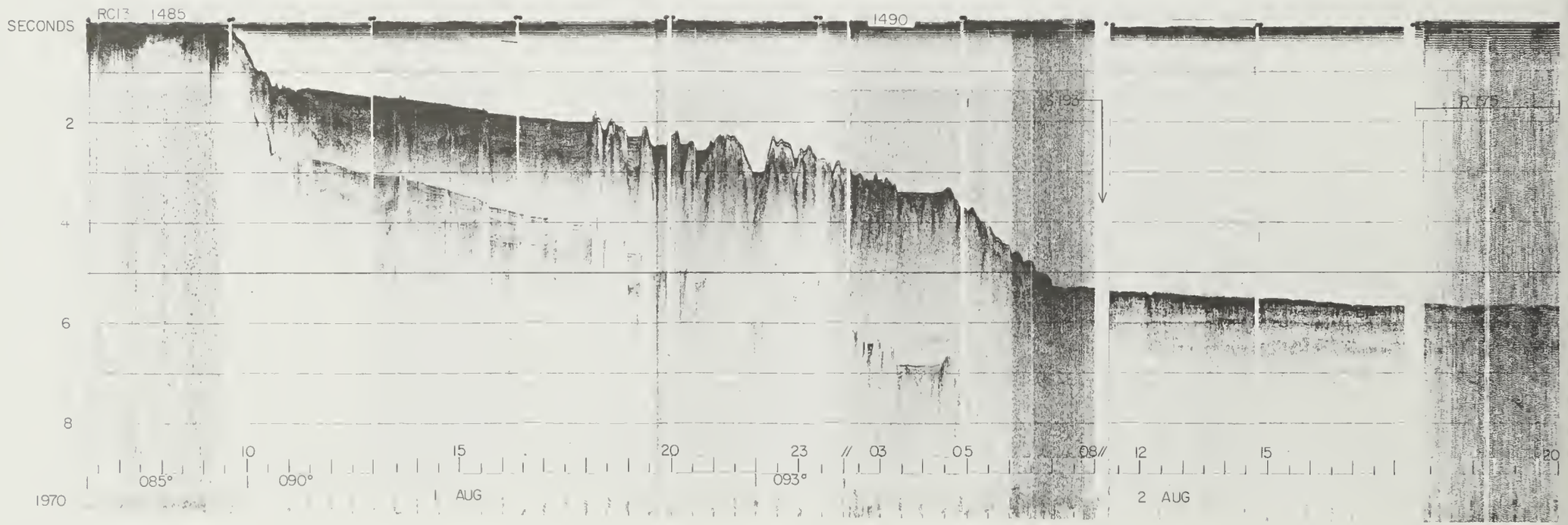

SECONDS
RC13
1425
1430
R 165
R 166
R 167
R 168
2
4
6
8
1970
094°
099°
19 JULY
090°
100°
094°
090°
097°
20 JULY

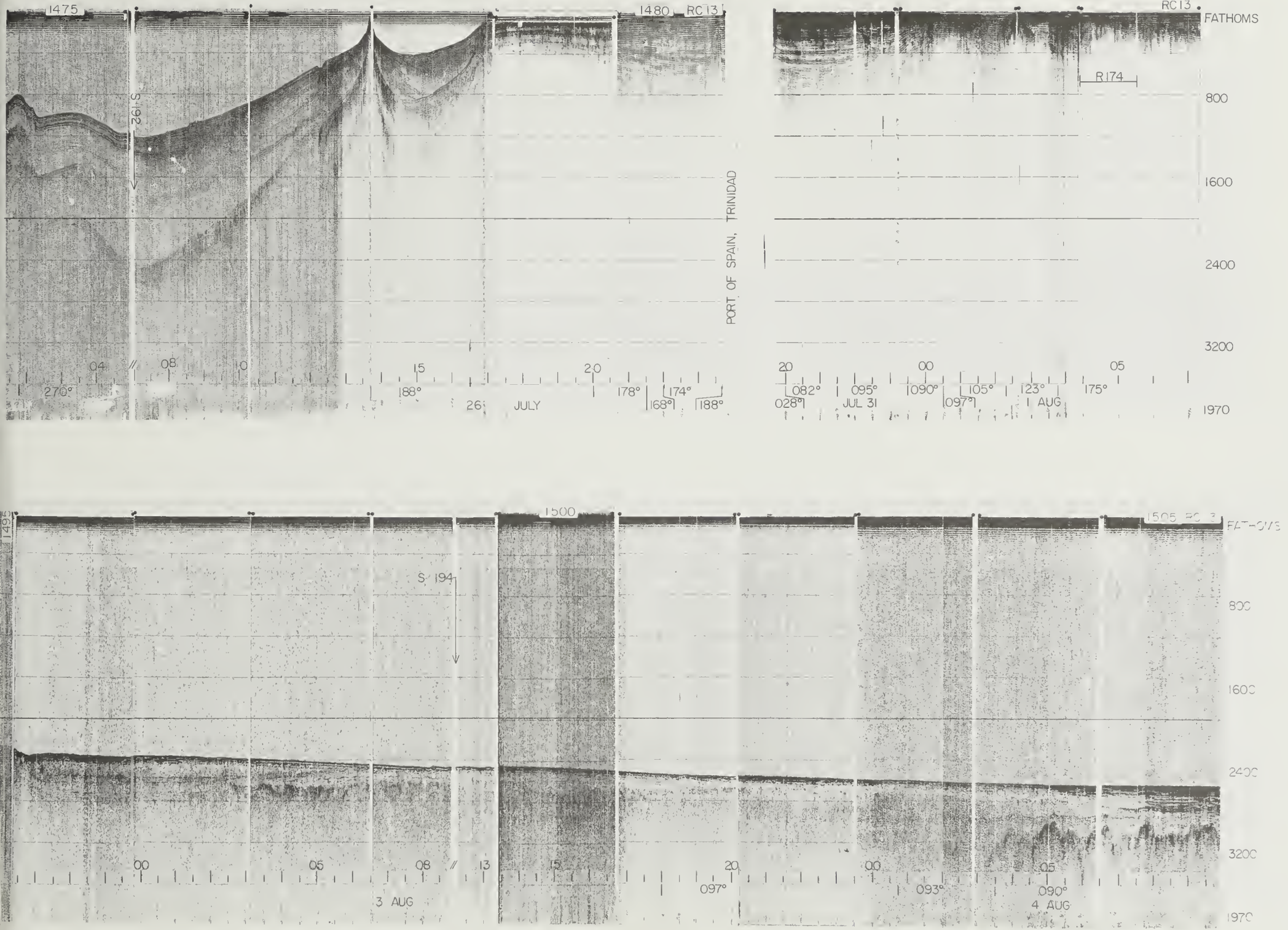

SECONDS
1445
RC13
1450
2
4
6
8
1970
174°
284°
21 JULY
288°
282°
270°
22
000°

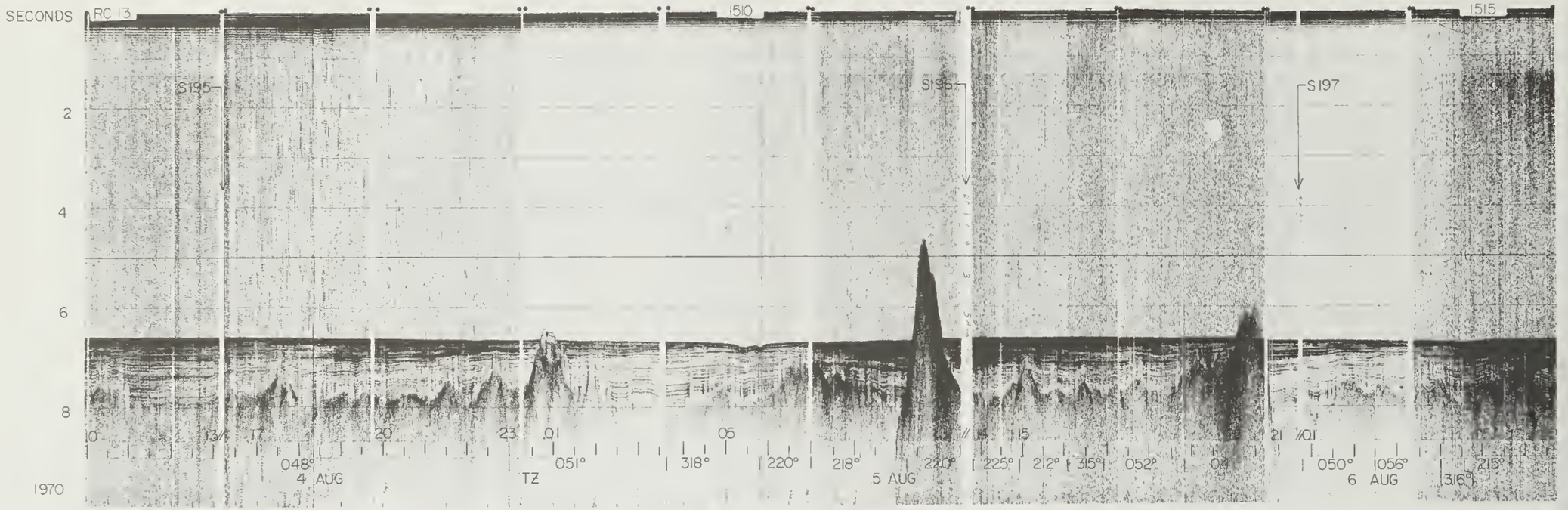

1435
1440
RC 13
FATHOMS
S 185
R 169
R 170
S 186
800
1600
2400
3200
1970
05
10
15
20
23
01
0.5
0.9
12
115°
195°
200°
185°
194°
188°
177°
165°
TZ+5→+4
20 JULY
21 JULY

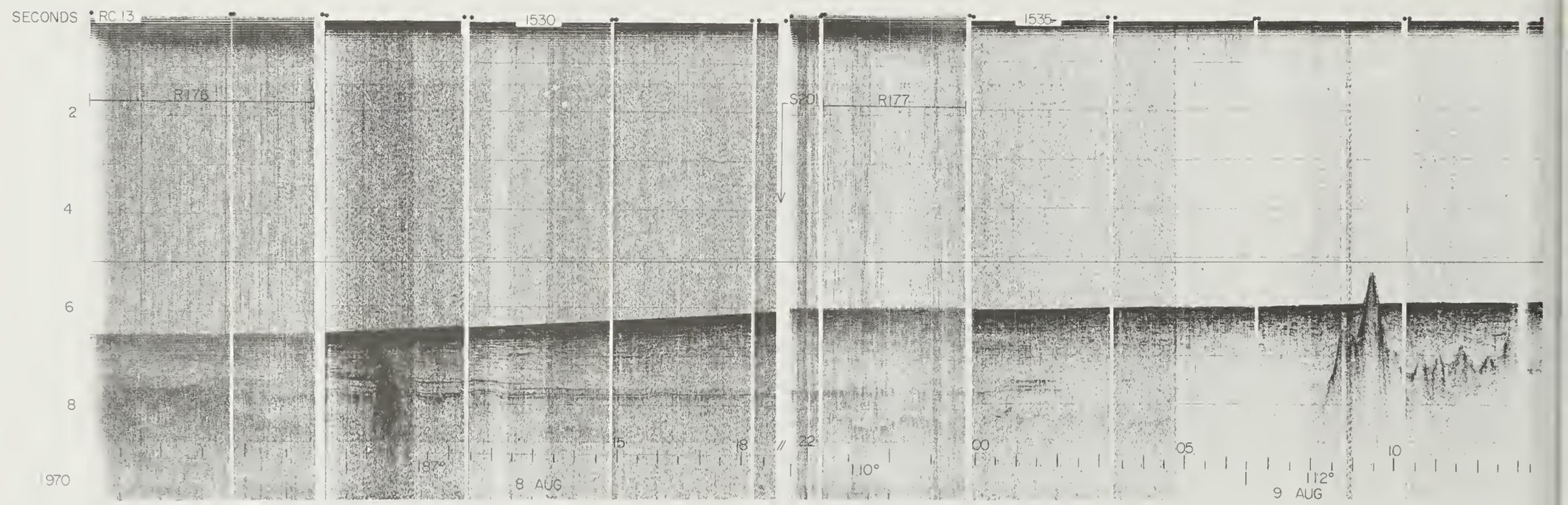

1455
1460
RC 13
FATHOMS
S 188
S 189
800
1600
2400
3200
1970
0.4
0.8
1.0
1.5
2.0
00
03
0.5
1.0
1.5
088°
093°
086°
092°
110°
108°
104°
098°
110°
097°
23 JULY
23 JULY
24 JULY

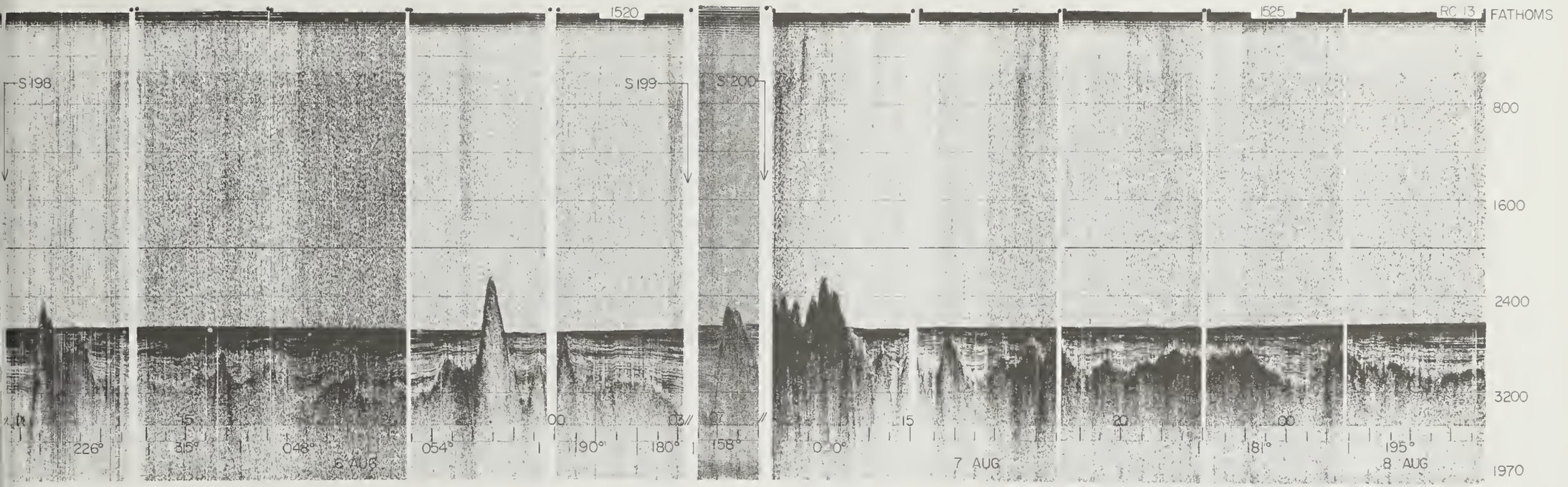

SECONDS
RC 13
1465
1470
S 190
R 171
S 191
R172
R 173
2
4
6
8
20 // 00
0.5
1.0
1.5 //
1.9
2.0
0.0
105°
120°
240°
231°
226°
122°
117°
25 JULY
25 JULY
1970

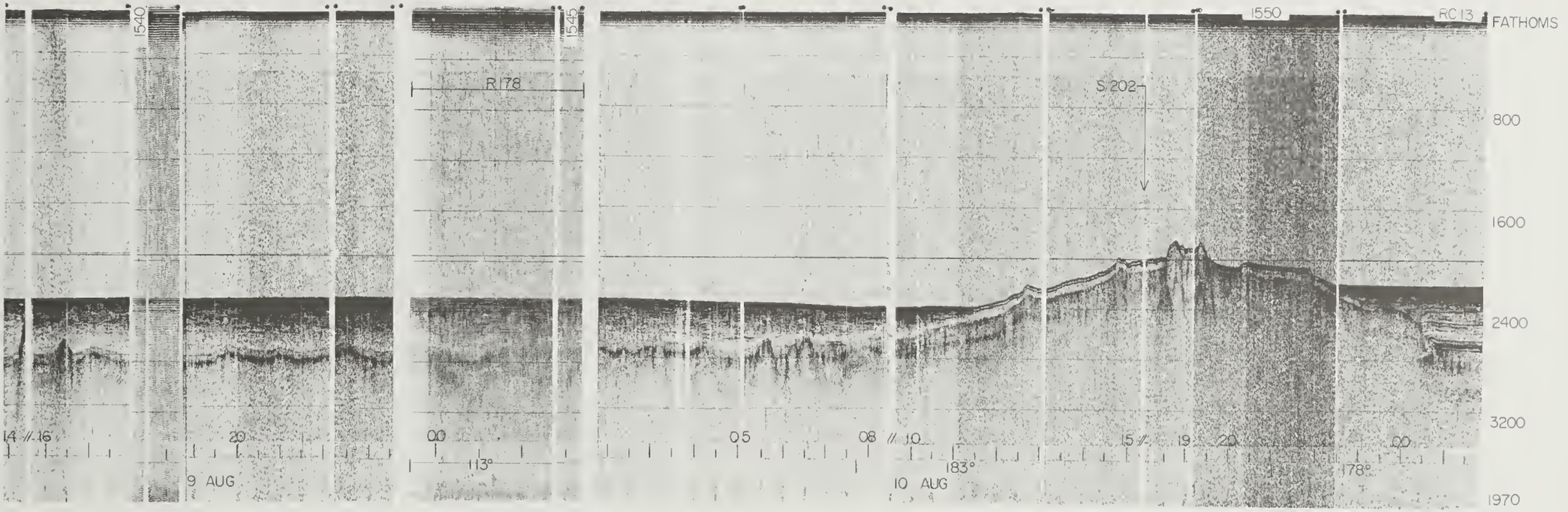

SECONDS
RC13 1485
1490
S 193
R 175
2
4
6
8
10
15
20
23 // 03
05
08//
12
15
20
085°
090°
093°
1 AUG
2 AUG
1970

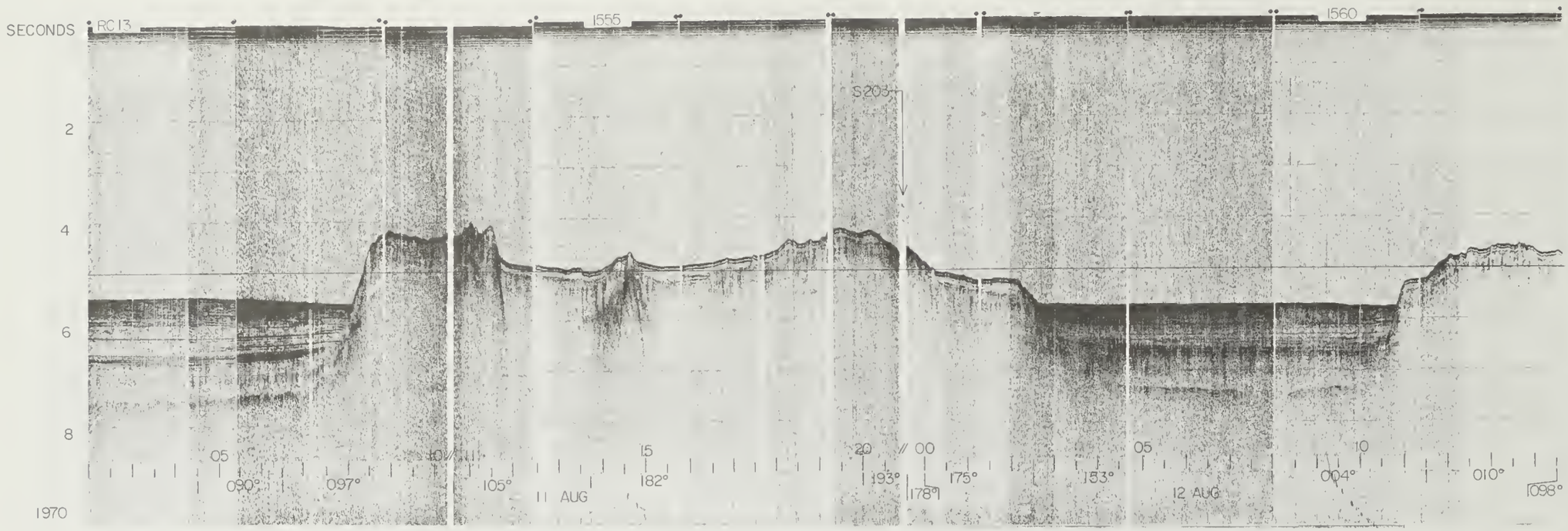

1475
1480
RC13
S 192
PORT OF SPAIN, TRINIDAD
04
08
10
15
20
270°
188°
26 JULY
178°
174°
168°
188°
RC13
FATHOMS
R174
800
1600
2400
3200
1970
20
00
05
082°
095°
090°
105°
123°
175°
028°
JUL 31
097°
1 AUG
1495
1500
1505
S 194
00
05
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13
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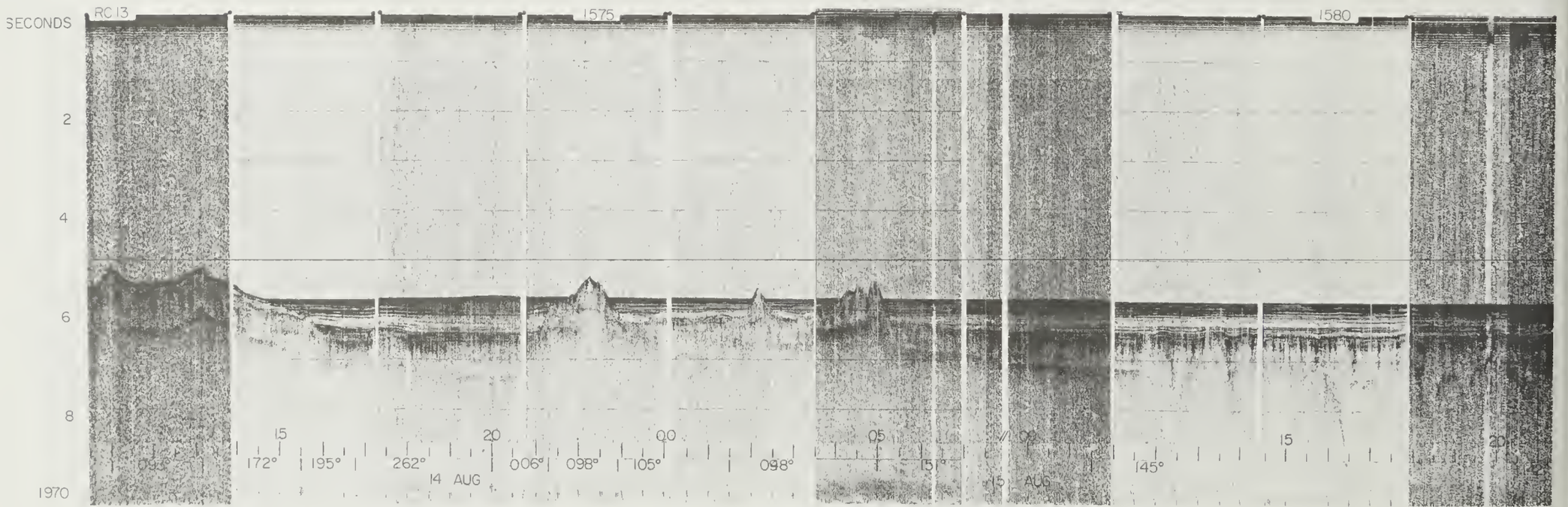

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4 AUG
051°
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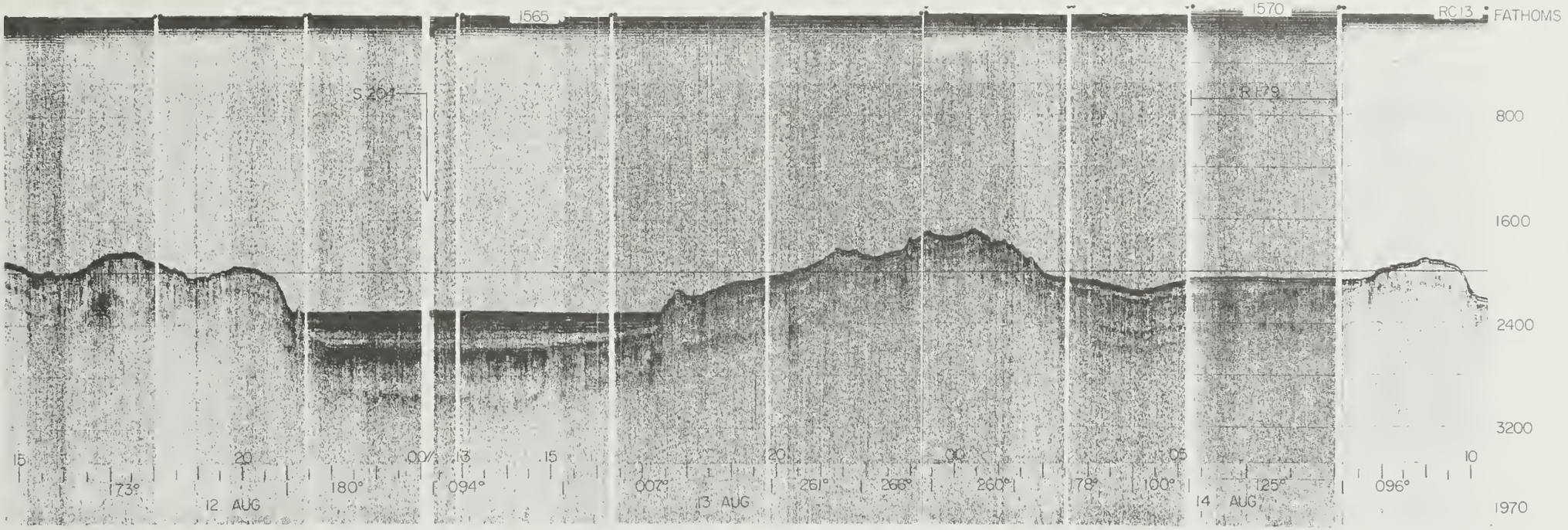

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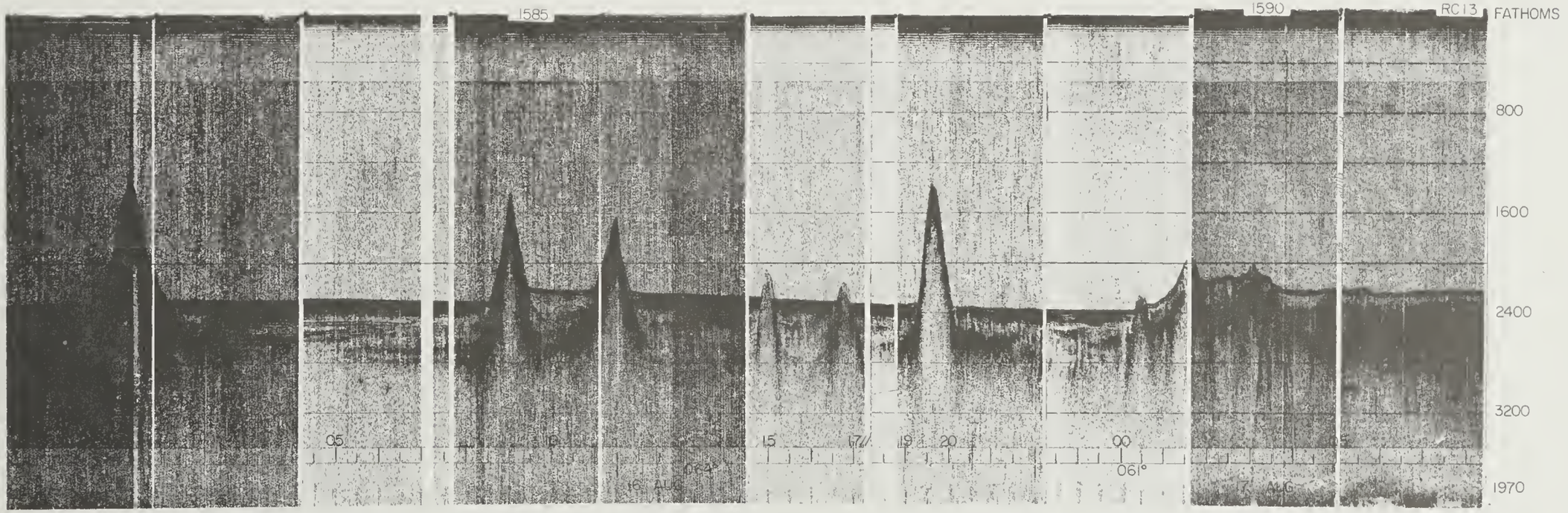

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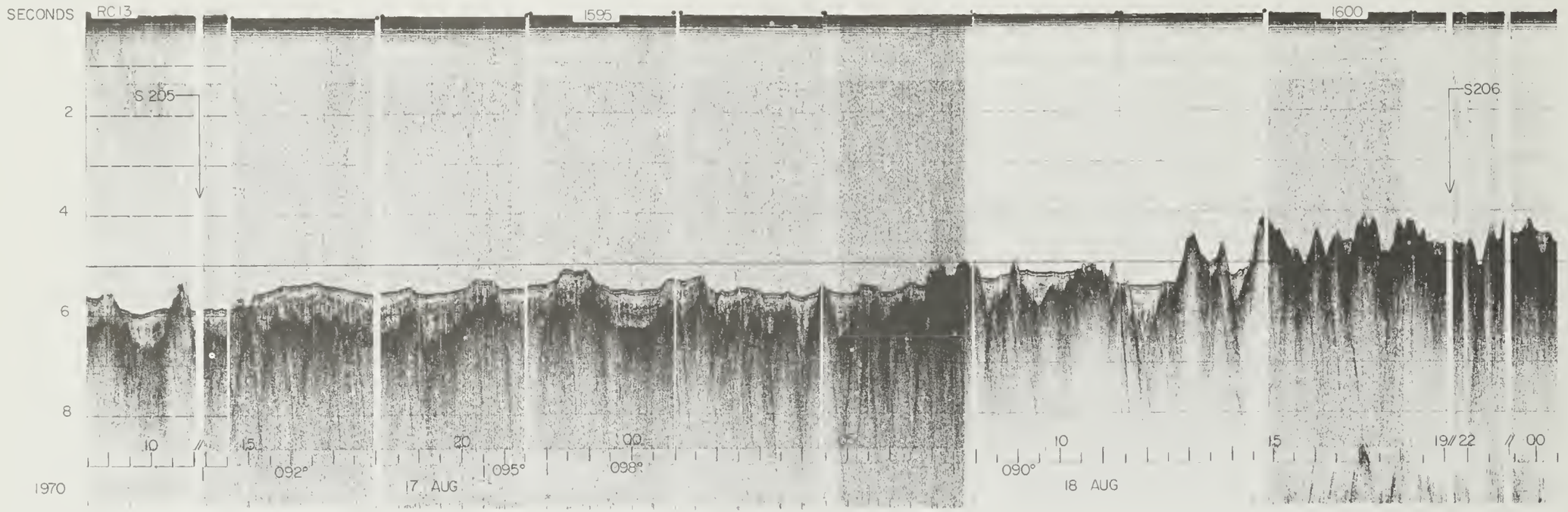

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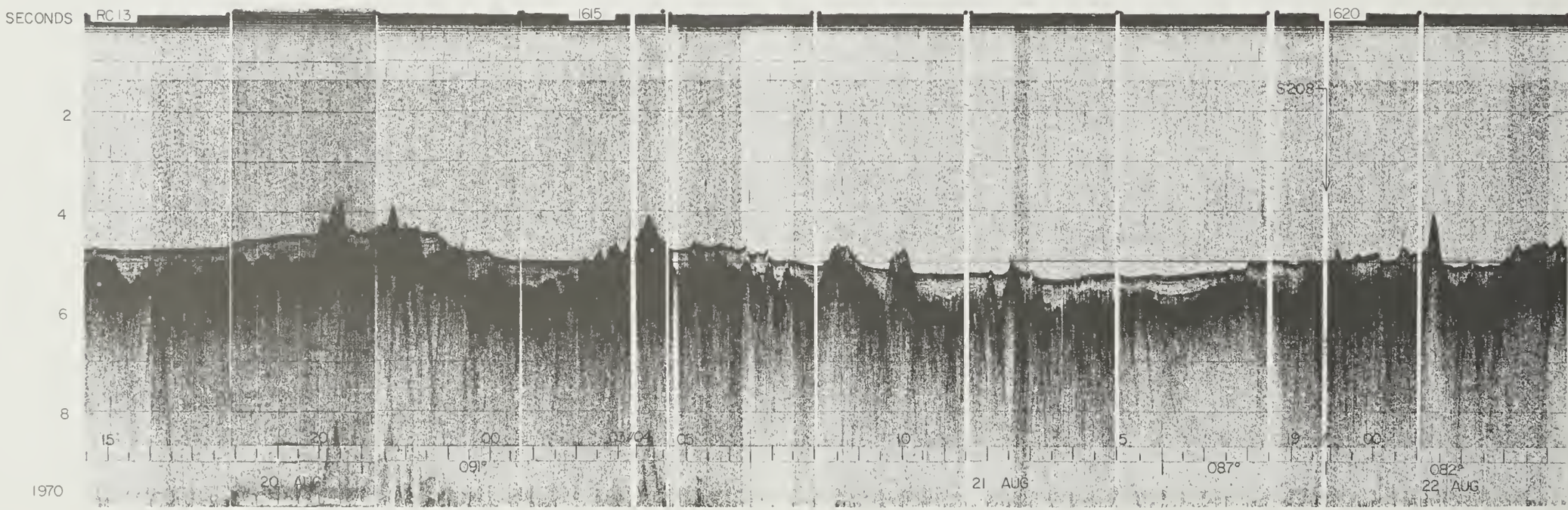

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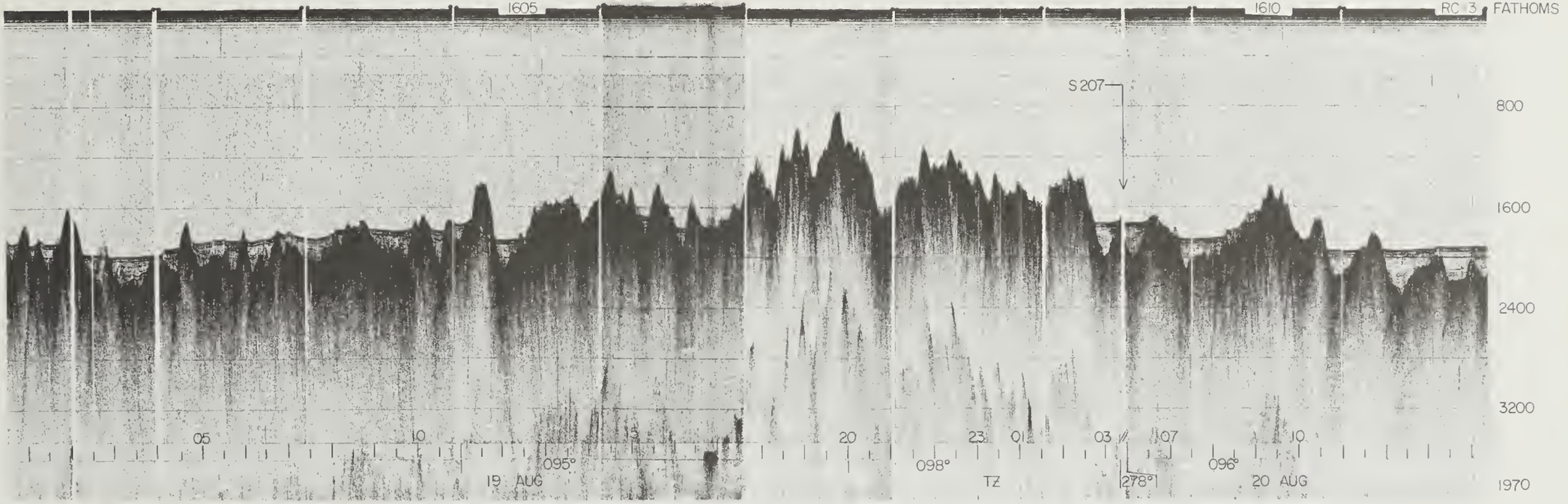

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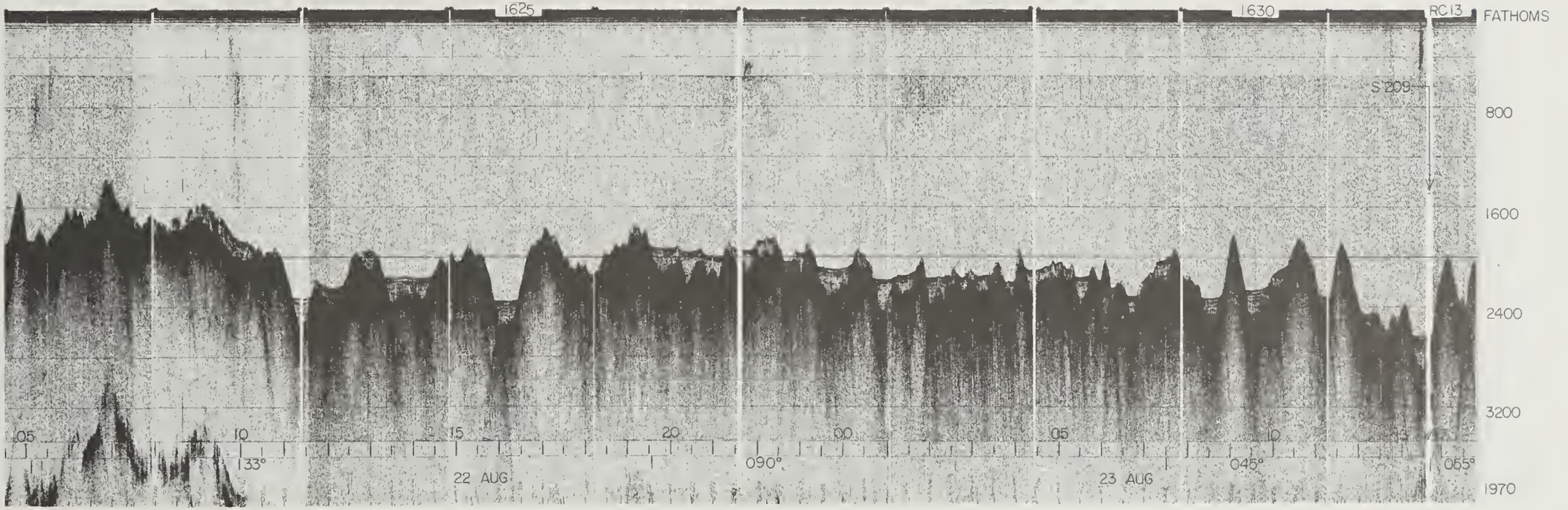

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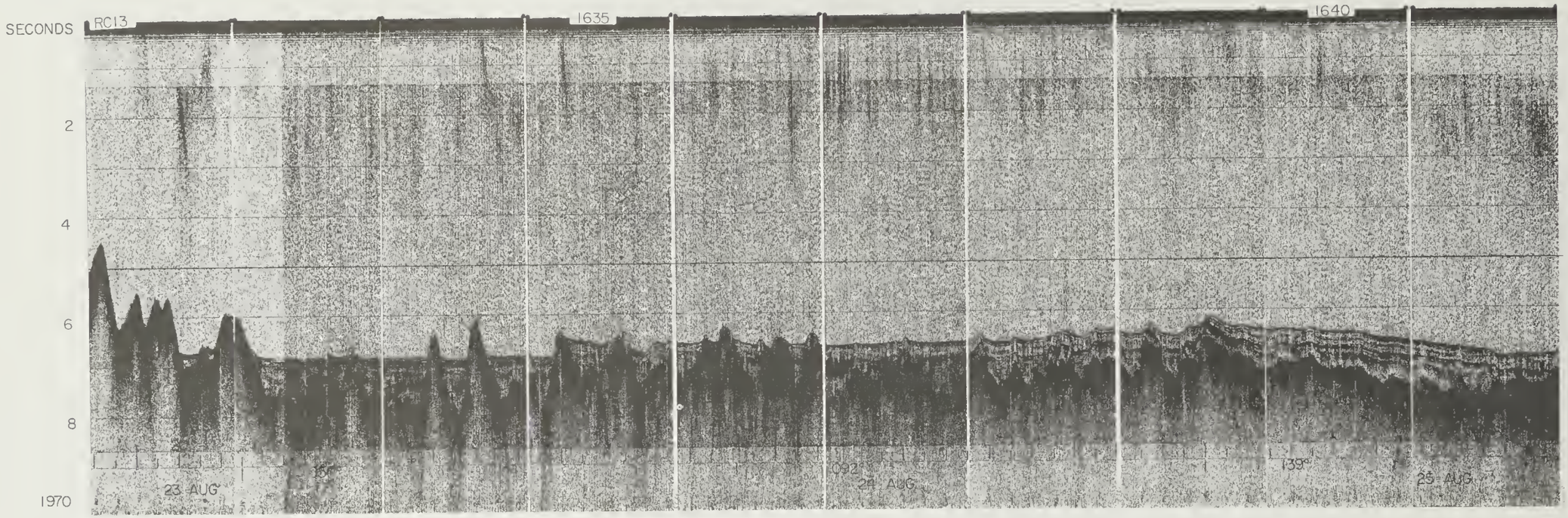

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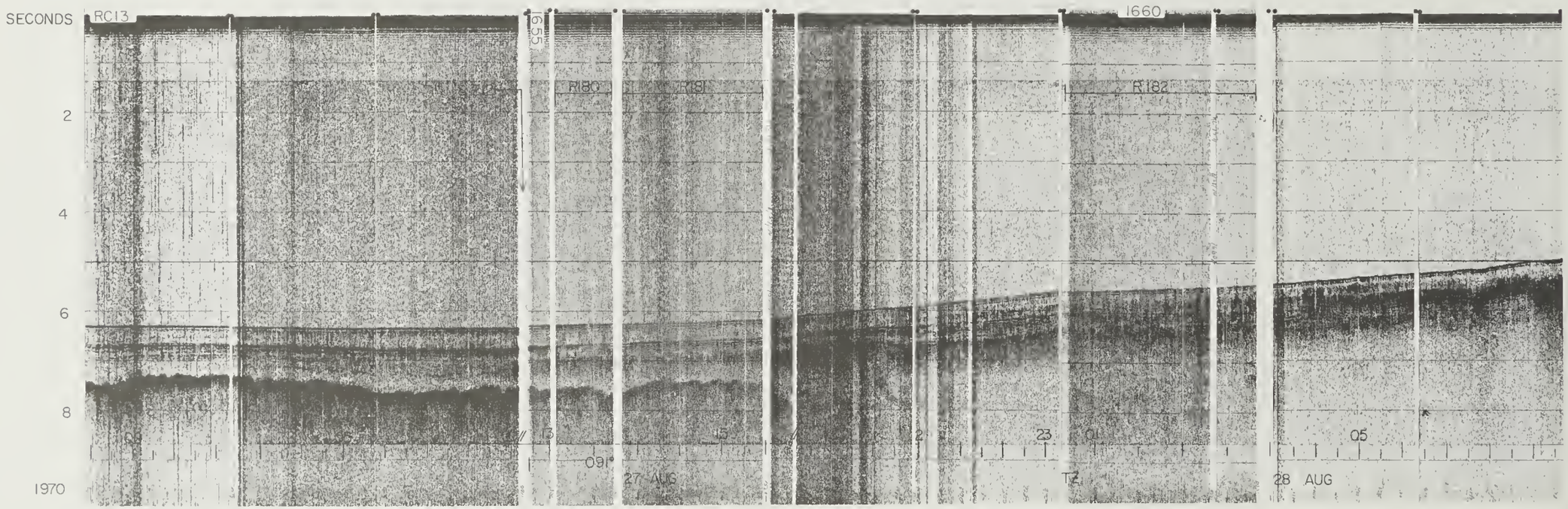

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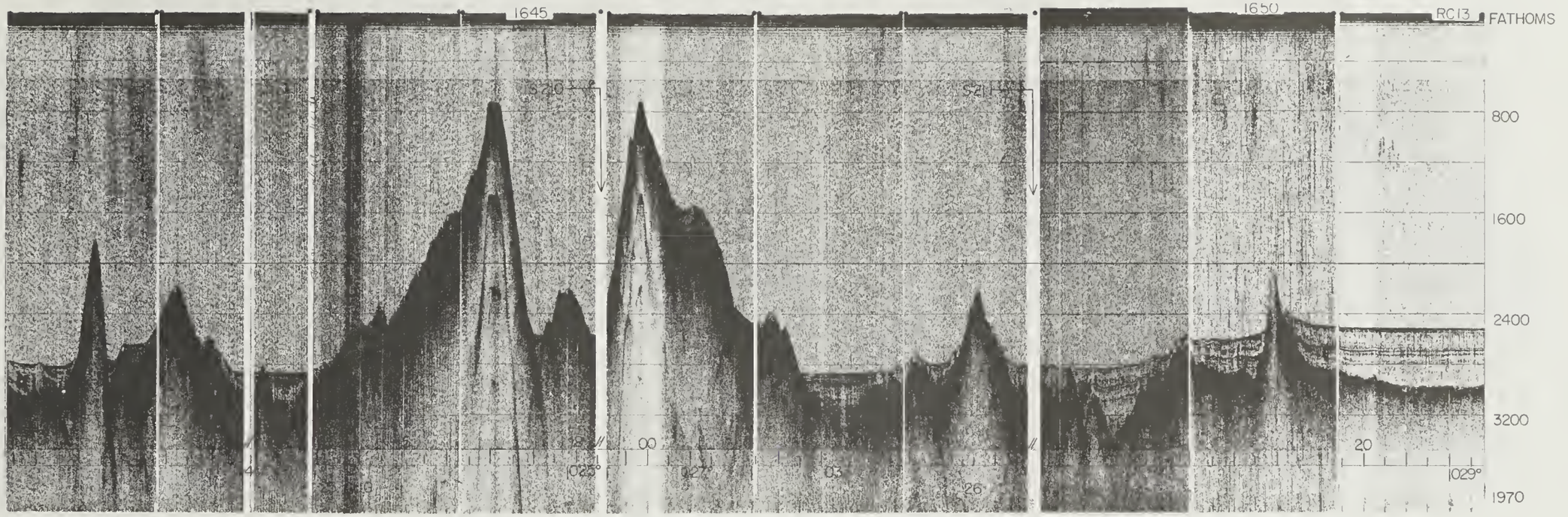

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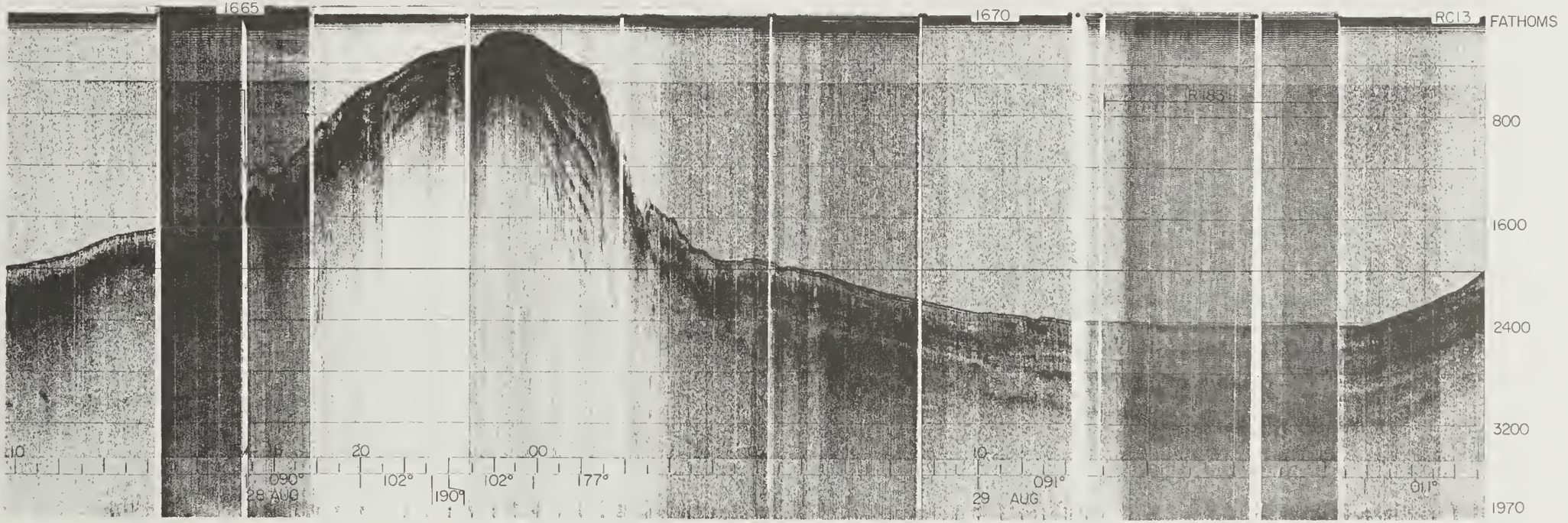

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20 AUG

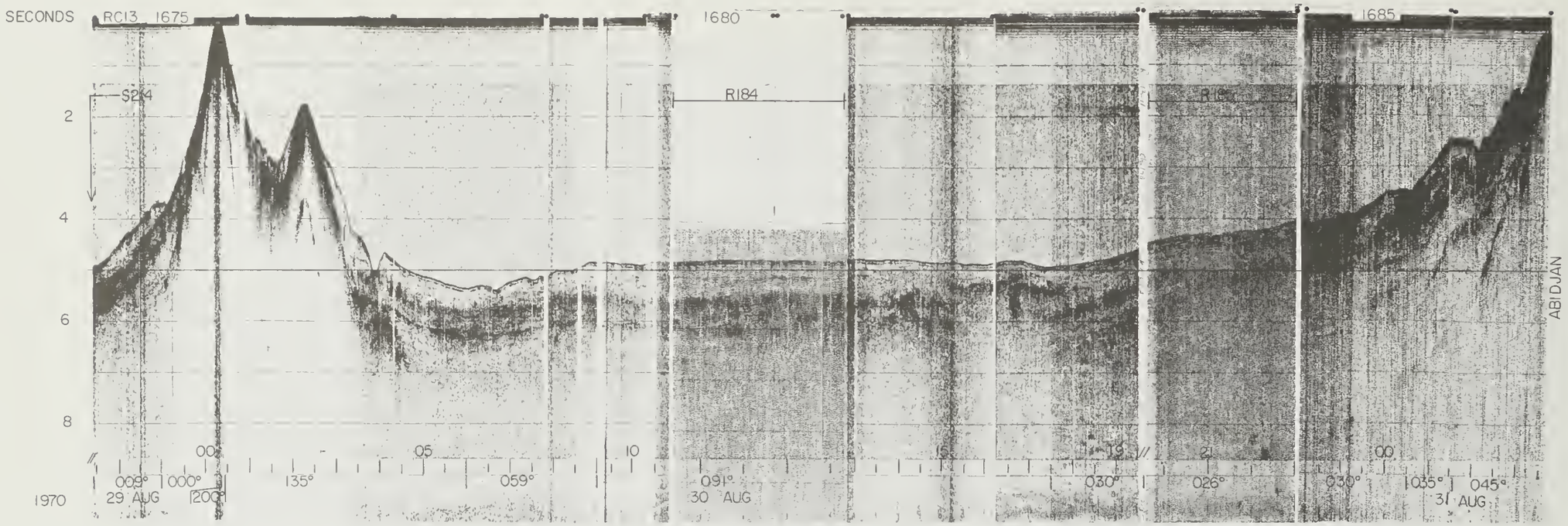

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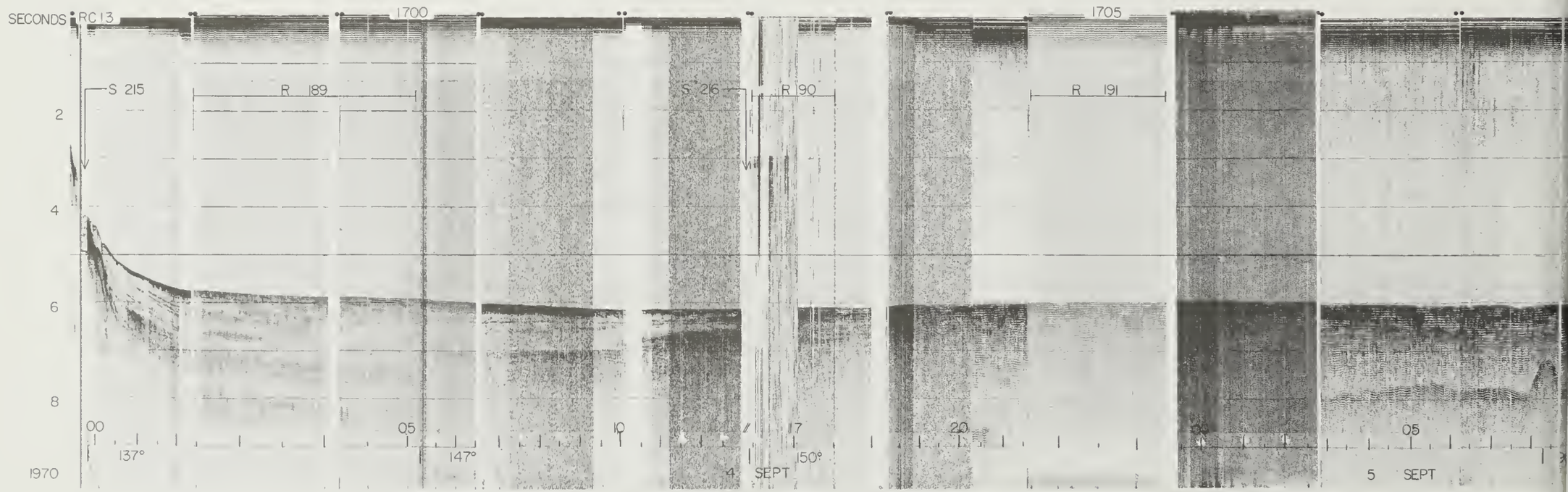

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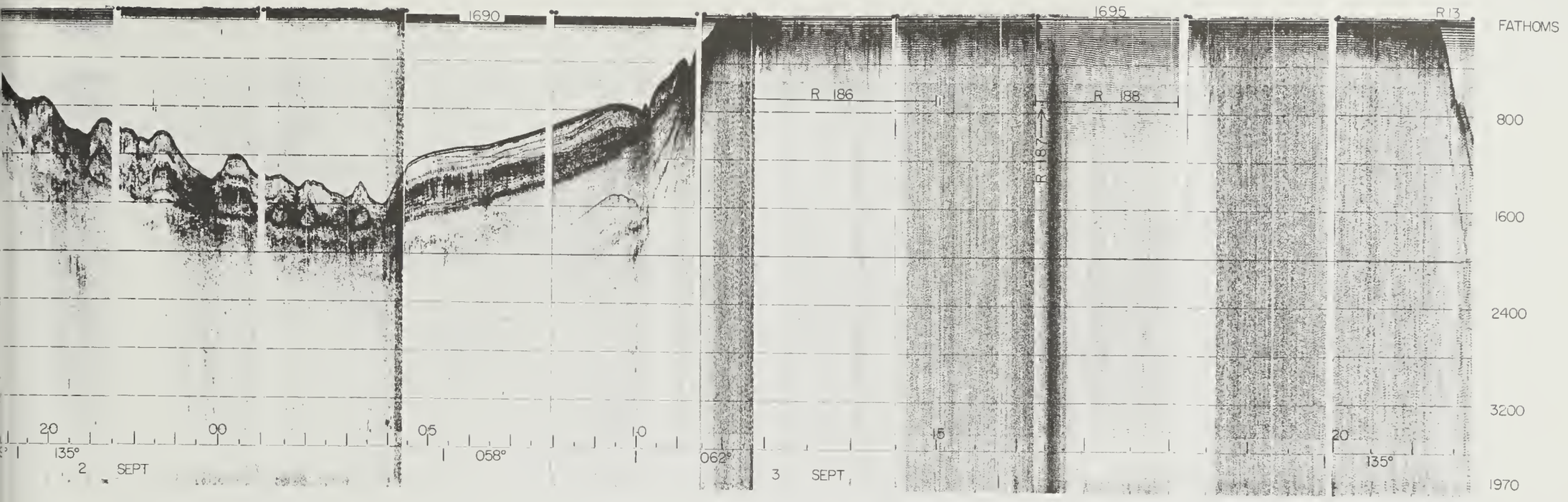

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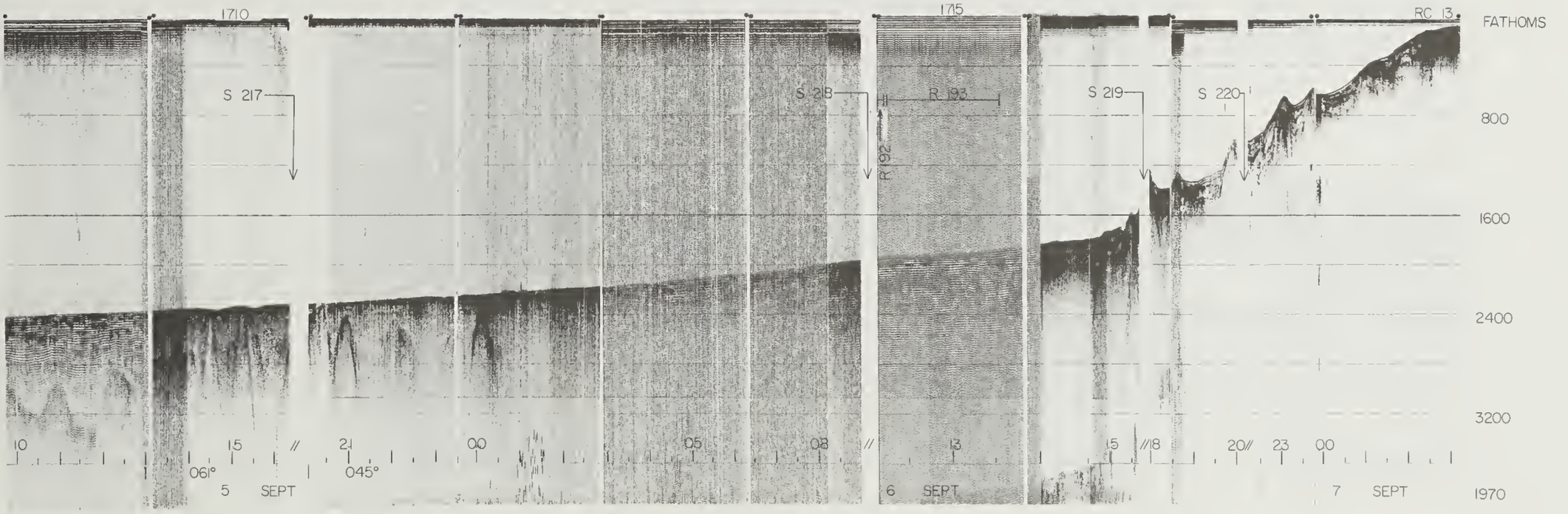

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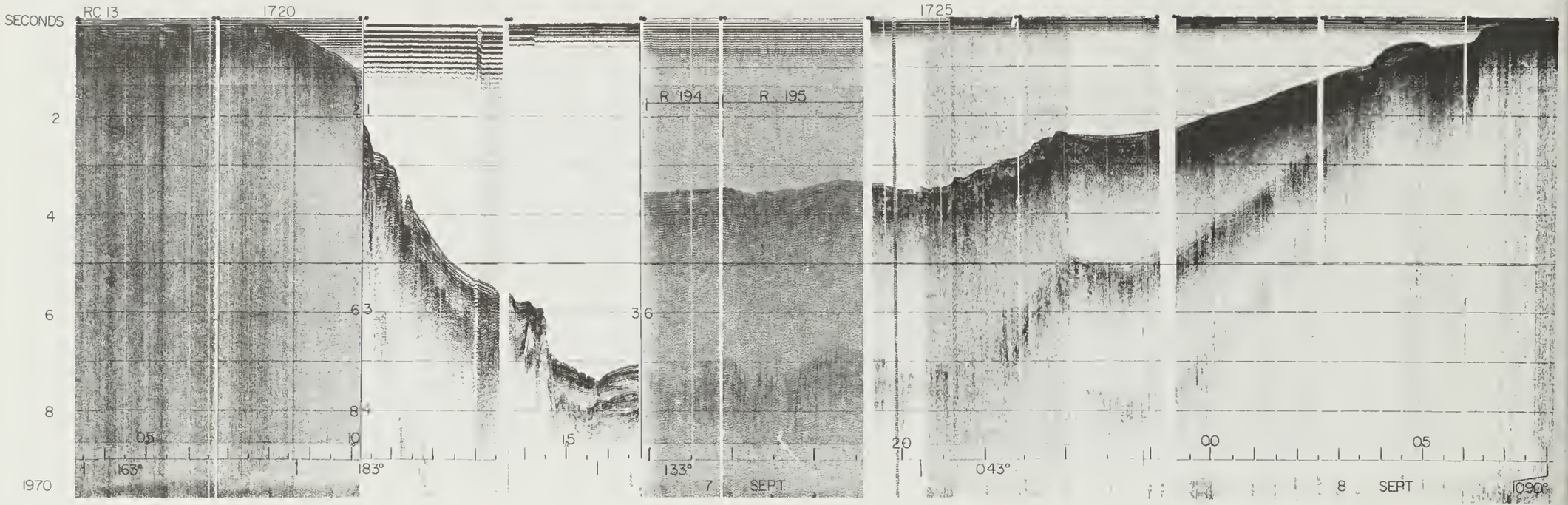

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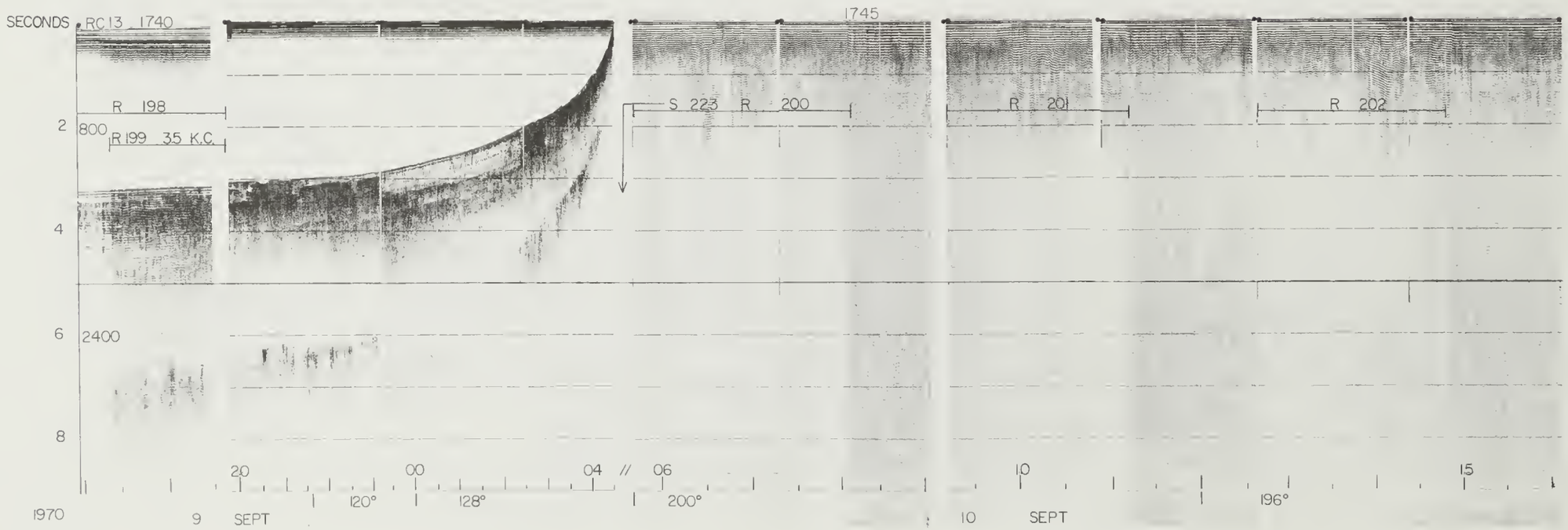

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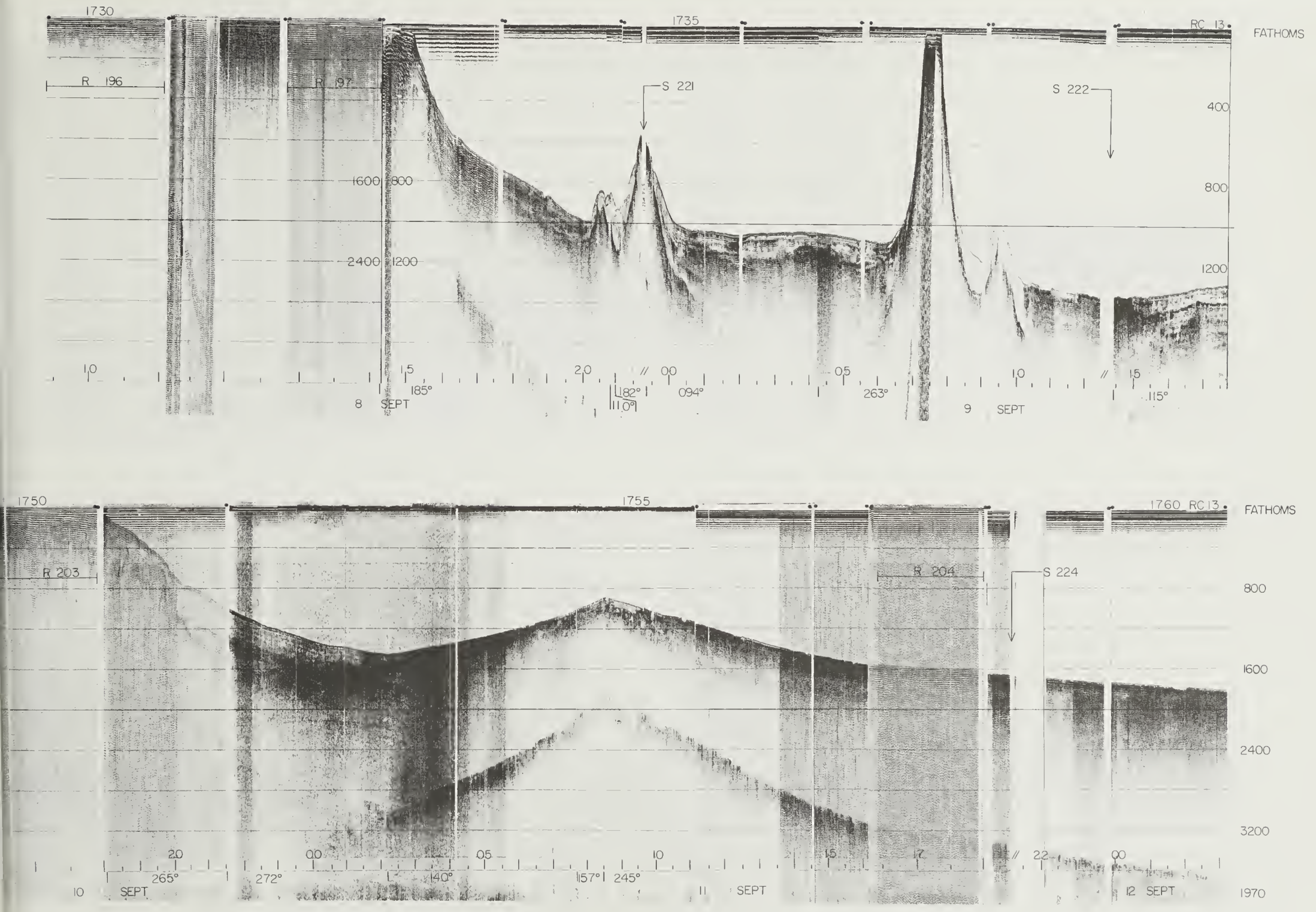

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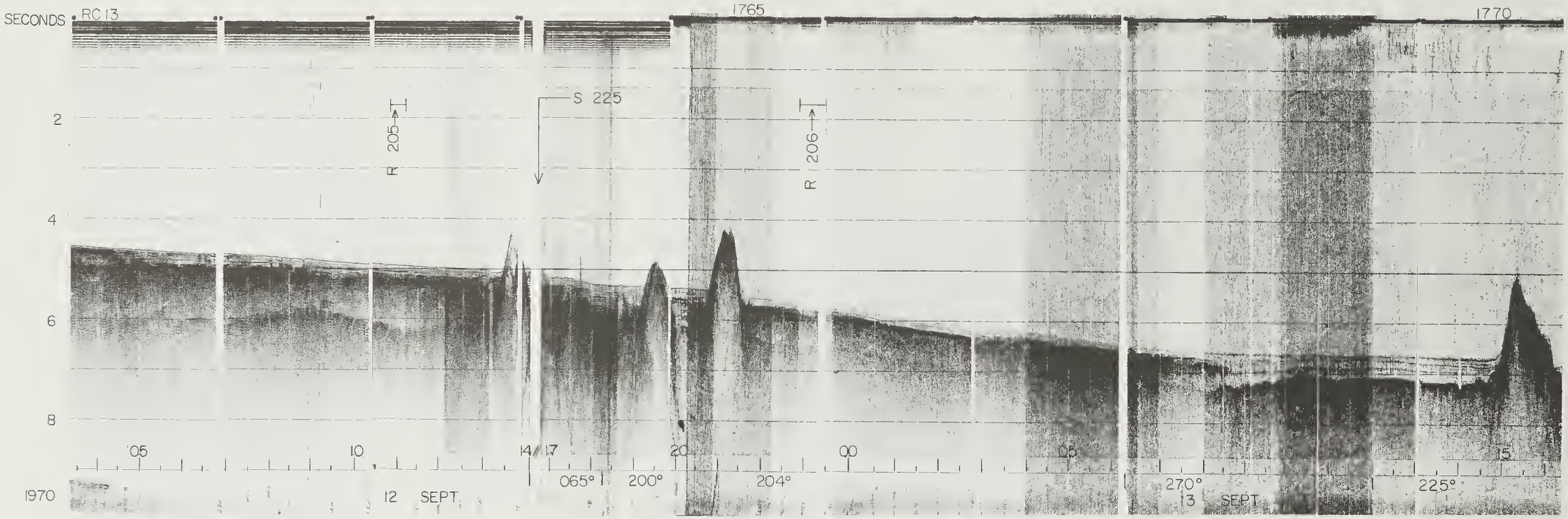

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R 13
R 186
R 187
R 188
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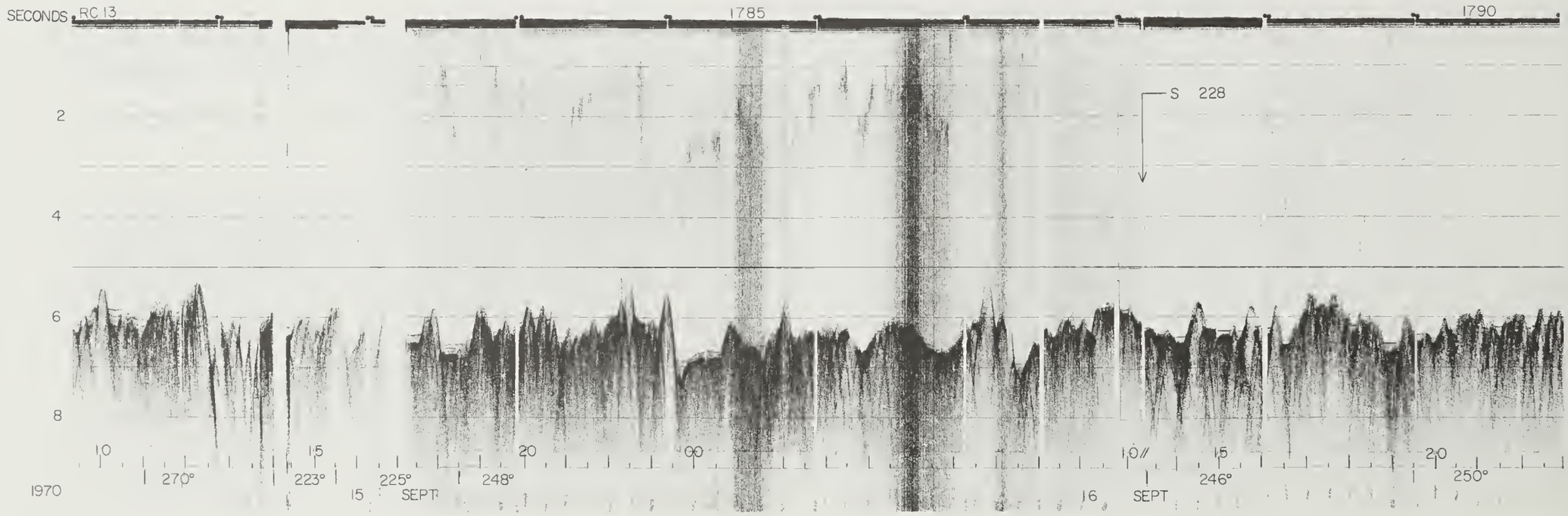

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S 219
S 220
R 193
R 192
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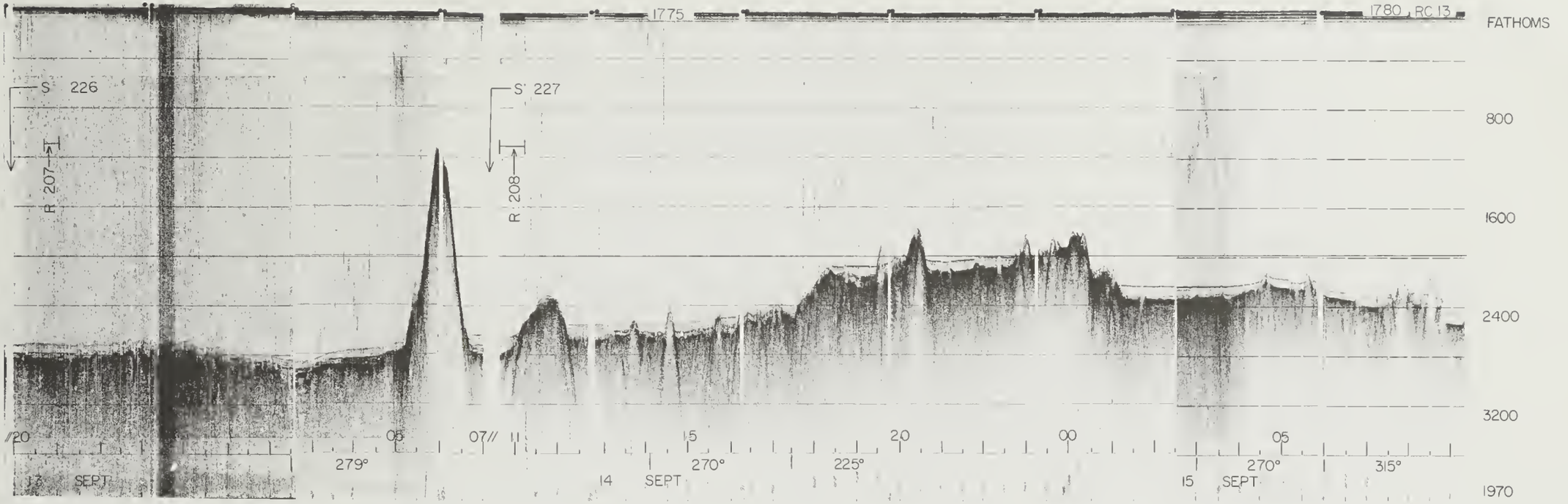

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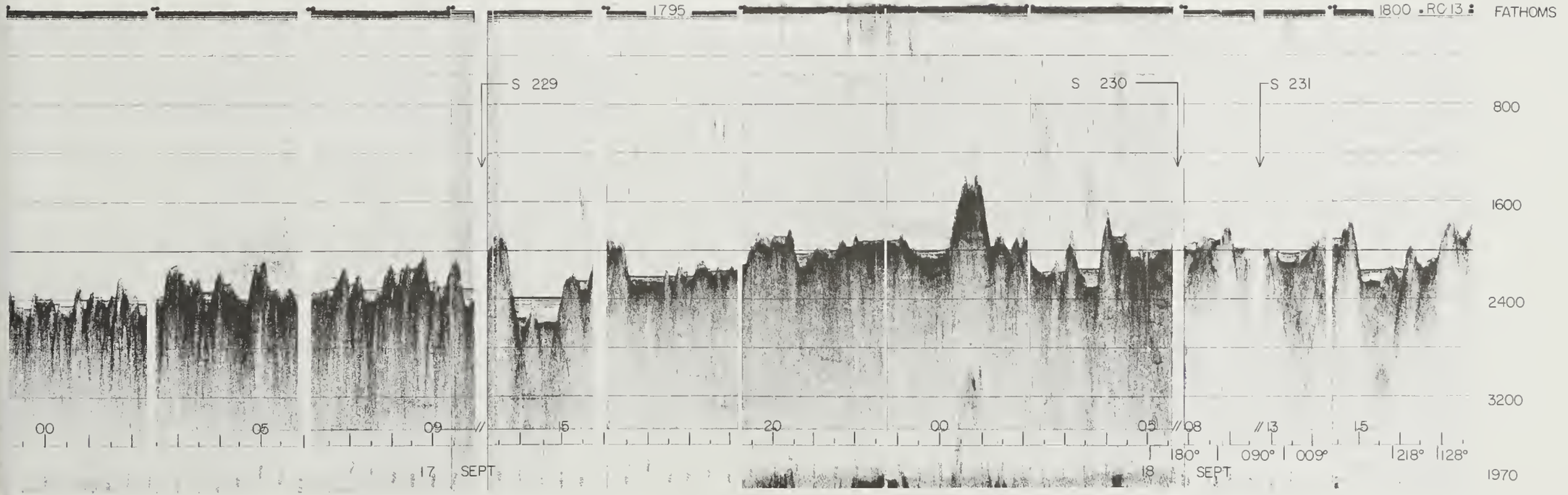

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R 199 35 K.C.
S 223 R 200
R 201
R 202
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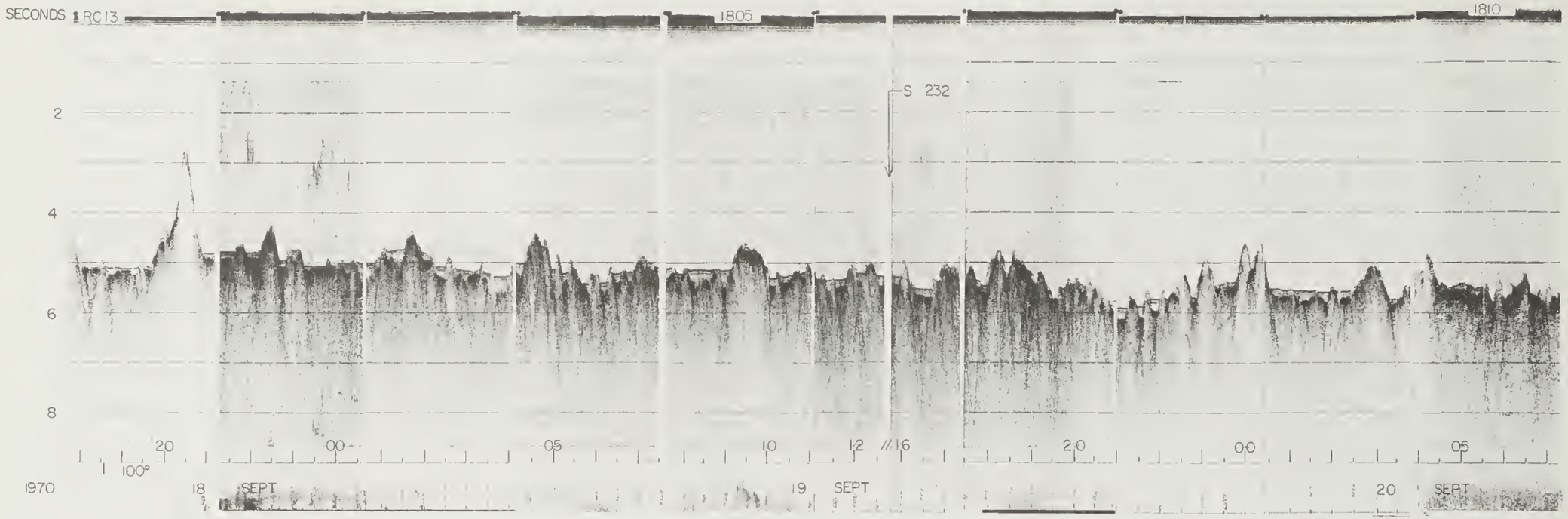

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1.0
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094°
263°
115°
11.0°
8 SEPT
9 SEPT
1750
1755
1760 RC 13
FATHOMS
R 203
R 204
S 224
800
1600
2400
3200
1970
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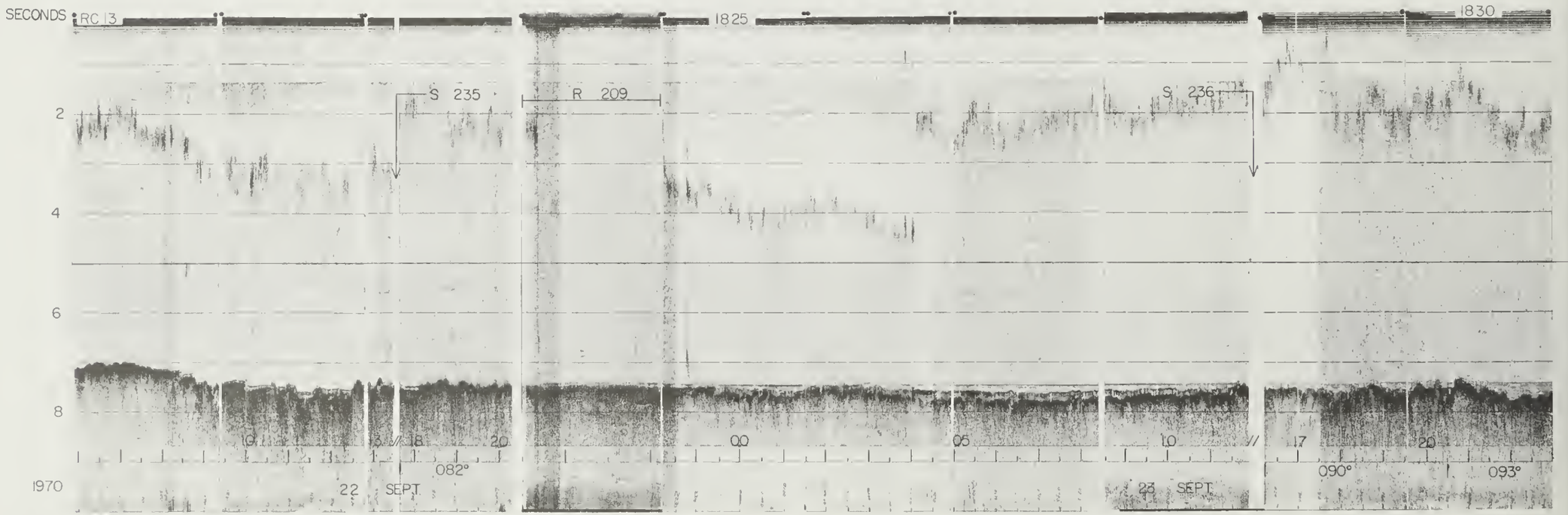

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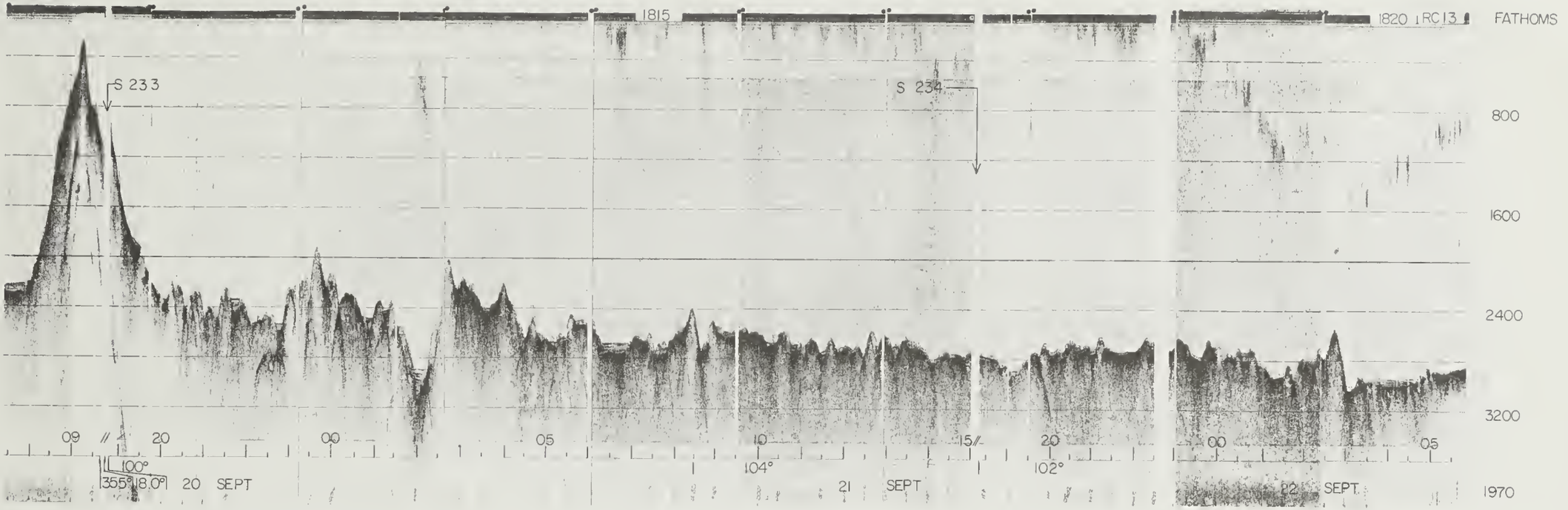

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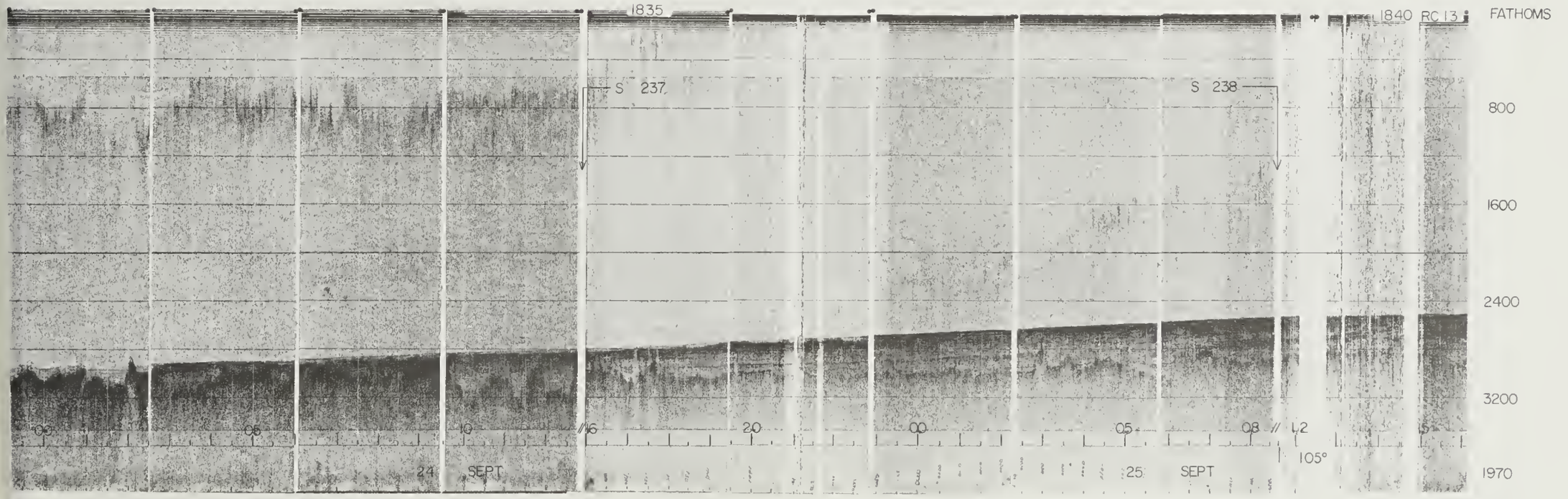

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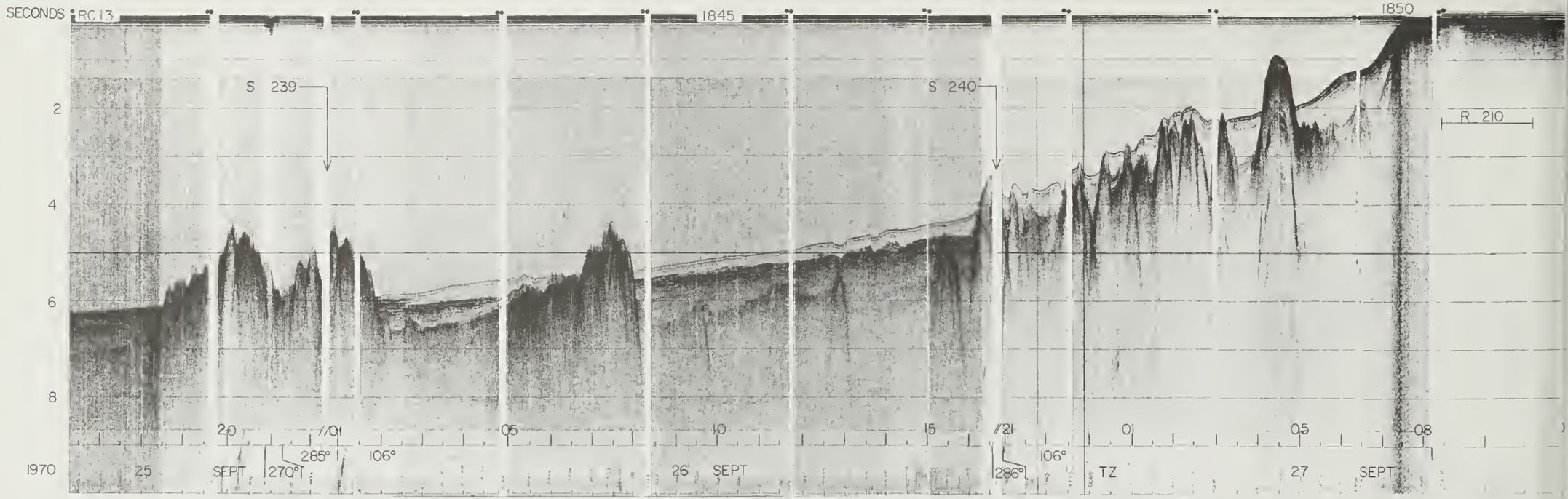

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S 230
S 231
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1600
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009°
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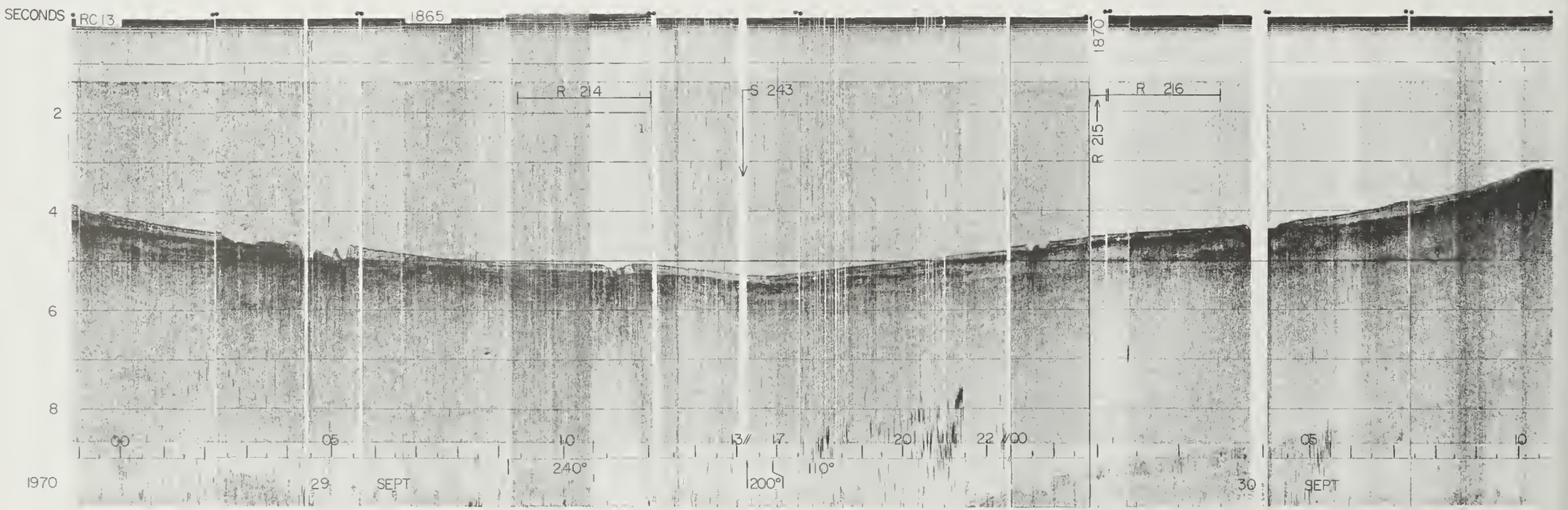

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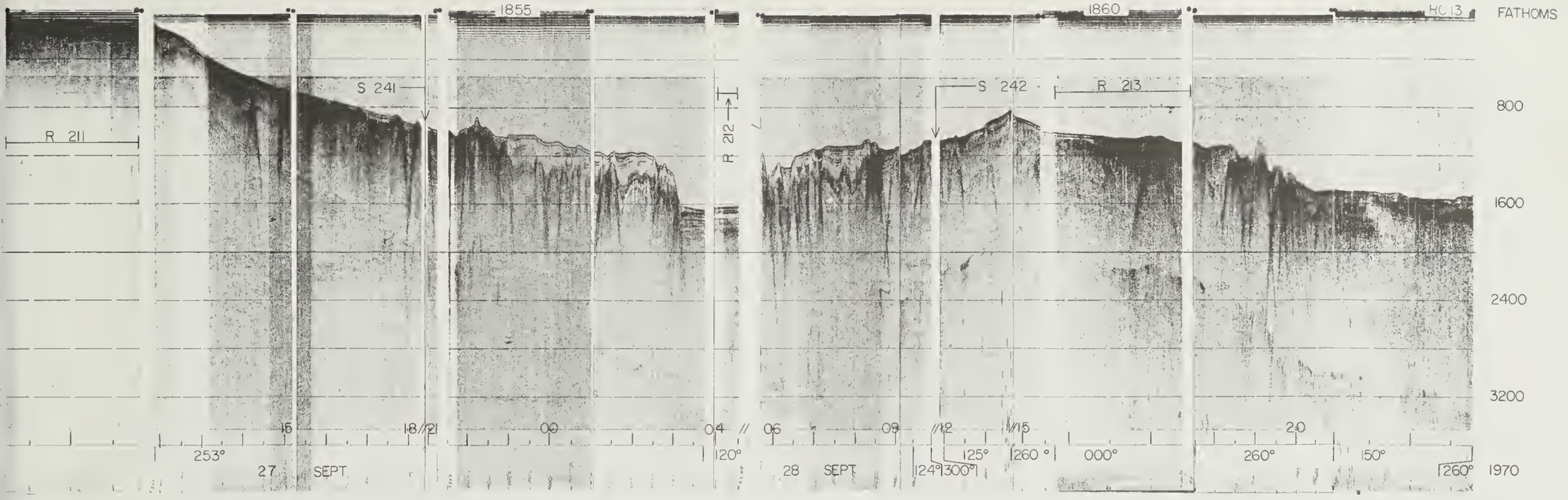

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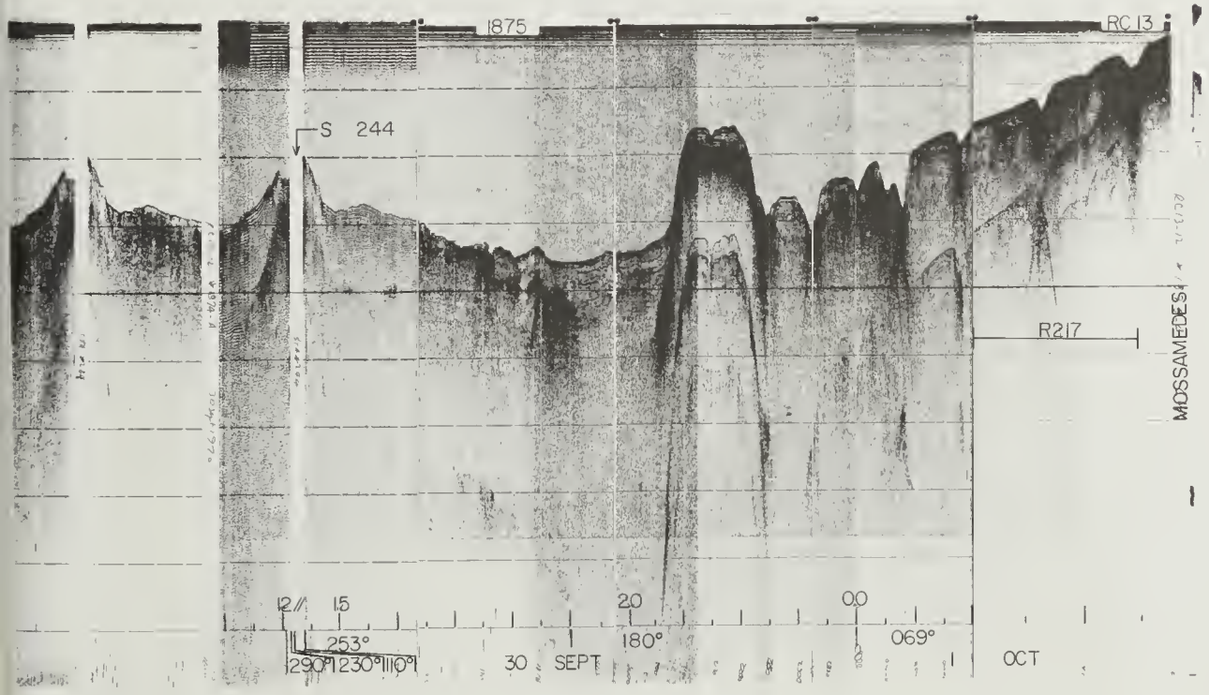

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3200
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05
100°
355°
18.0°
20 SEPT
104°
21 SEPT
102°
22 SEPT


1835
1840
RC13
FATHOMS
S 237
S 238
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2400
3200
1970
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08
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00
05
08
12
105°
24 SEPT
25 SEPT


SECONDS
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1845
1850
S 239
S 240
R 210
2
4
6
8
20
01
05
10
15
21
0
05
08
1970
25 SEPT
285°
270°
106°
26 SEPT
286°
106°
TZ
27 SEPT


SECONDS
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1870
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S 243
R 216
R 215
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10
1970
29 SEPT
240°
200°
110°
30 SEPT


1855
1860
RC 13
FATHOMS
S 241
S 242
R 211
R 212
R 213
800
1600
2400
3200
1970
16
18//21
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04 // 06
09
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//15
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27 SEPT.
28 SEPT.
124°
300°


1875
RC 13
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R217
MOSSAMEDES
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20
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253°
180°
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230°
110°
30 SEPT
OCT

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Marine Geophysical Data
North Atlantic
Navigation Chart

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Track charts for Lamont-Doherty Geological Observatory underway magnetic, gravity and depth data in the North Atlantic June 1961-January 1971 are given including the Norwegian Sea, Gulf of Mexico, Caribbean and Mediterranean Sea.

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LAMONT-DOHERTY SURVEY OF THE WORLD OCEAN

General Editor, Manik Talwani

Lamont-Doherty Geological Observatory of Columbia University
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FILE COPY

Underway Marine Geophysical Data in the North Atlantic June 1961 - January 1971

PART E: SEISMIC REFLECTION PROFILES

VEMA 17 Legs 12,13,14,15,16 and 17
VEMA 18 Legs 01,12,13,17,18 and 19
VEMA 19 Legs 01,02,03,12 and 13
VEMA 20 Legs 01,02,12 and 13
VEMA 21 Legs 01,03 and 14
VEMA 22 Legs 01,02,06 and 07
VEMA 23 Legs 01,02,03,04,05,06 and 07
VEMA 24 Legs 01,02 and 13
VEMA 25 Legs 01,02,03 and 04
VEMA 26 Legs 01,02,03,04,07,08,09 and 10

by

John Ewing, Maurice Ewing, Charles Windisch, and Thomas Aitken

April 1974

Technical Report No. 9-CU-9-74
ONR Contract N00014-67-A-0108-0004

and

Technical Report No. 3-CU-3-74
National Science Foundation Grant GA 27281

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General Editor, Manik Talwani

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PALISADES, NEW YORK 10964

UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC

June 1961 - January 1971

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VEMA 19 Legs 01,02,03,12 and 13
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INTRODUCTION

This six-part report describes the underway marine geophysical data acquired by the Lamont-Doherty Geological Observatory during the period 1961-1971 in the North Atlantic aboard the Research Vessels VEMA and ROBERT D. CONRAD. The development of the seismic reflection profiler, the surface ship gravimeter, and the proton precision magnetometer gave an enormous impetus to marine geophysical work. Under the vigorous leadership of Maurice Ewing, the past director of this observatory, these instruments, together with the precision depth recorder, were used nearly continuously on VEMA since 1961 and on ROBERT D. CONRAD since 1963 to help provide the framework for an understanding of the geophysics of the world oceans. The study of the data that were acquired played a basic role in the development of the theories of sea floor spreading, of plate tectonics, and of sediment accumulation and transport which have revolutionized geological thinking.

This report presents the data obtained along about 350,000 n. miles of track. Copies of the seismic reflection profiler records, digitized gravity values, total magnetic intensity values, and soundings are available from the Marine Geology and Geophysics Group, Environmental Data Service - NGSDC, Washington, D. C. 20235.

ACKNOWLEDGMENTS

In addition to contracts Nonr 266(48), Nonr 266(65), Nonr 266(79), NObsr 85077, N00014-67-A-0108-0004, N00024-67-C-1186 and N00024-69-C-1184 with the Office of Naval Research,

the acquisition of data described in this report was supported by grants GA 444, GA 550, GA 580, GA 728, GA 774, GA 1299, GA 1415, GA 1434, GA 1615, GA 10728, GA 17644, GA 17761, GA 19030, GA 27281, GP 4896, GP 5392 and GP 5536 with the National Science Foundation, and grant SSF-8 with the New York State Science and Technology Foundation.

CRUISE INDEX

VEMA

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
1712	Buenos Aires, Argentina	26 Jun 61	Dakar, Senegal	18 Jul 61	4247.1	M. Talwani
1713	Dakar, Senegal	19 Jul 61	Halifax, Nova Scotia	06 Aug 61	3168.4	M. Talwani
1714*	Halifax, Nova Scotia	11 Aug 61	Halifax, Nova Scotia	15 Aug 61	0593.5	C. Drake
1715*	Halifax, Nova Scotia	18 Aug 61	Argentia, Newfoundland	25 Aug 61	1157.9	C. Drake
1716*	Argentia, Newfoundland	25 Aug 61	Halifax, Nova Scotia	17 Sep 61	3819.3	C. Drake
1717	Halifax, Nova Scotia	23 Sep 61	New York, New York	29 Sep 61	1090.3	J. Worzel
1801*	New York, New York	01 Dec 61	St. George, Bermuda	05 Dec 61	0800.8	J. Ewing
1802	St. George, Bermuda	06 Dec 61	San Juan, Puerto Rico	24 Dec 61	3604.3	J. Ewing
1803	San Juan, Puerto Rico	27 Dec 61	Recife, Brazil	19 Jan 62	4018.7	M. Langseth
1817	Cristobal, Panama C.Z.	28 Oct 62	Nassau, Bahamas	11 Nov 62	3057.3	C. Drake
1818	Nassau, Bahamas	14 Nov 62	St. George, Bermuda	25 Nov 62	1963.5	C. Drake
1819	St. George, Bermuda	25 Nov 62	New York, New York	07 Dec 62	2213.6	C. Drake
1901* **	New York, New York	21 Feb 63	St. George, Bermuda	26 Feb 63	0778.7	G. Bryan
1902*	St. George, Bermuda	28 Feb 63	St. Thomas, Virgin Is.	13 Mar 63	2136.1	G. Bryan
1903	St. Thomas, Virgin Is.	15 Mar 63	Cristobal, Panama C.Z.	25 Mar 63	1965.4	M. Talwani
1912	Cape Town, S. Africa	20 Sep 63	Abidjan, Ivory Coast	24 Oct 63	5333.0	M. Ewing
1913	Abidjan, Ivory Coast	15 Nov 63	New York, New York	11 Dec 63	5226.9	C. Drake
2001*	New York, New York	13 Feb 64	San Juan, Puerto Rico	24 Feb 63	2324.8	C. Windisch
2002	San Juan, Puerto Rico	02 Mar 64	Cristobal, Panama C.Z.	16 Mar 64	2960.0	M. Talwani
2012	Recife, Brazil	11 Nov 64	St. George, Bermuda	03 Dec 64	4126.3	C. Drake
2013	St. George, Bermuda	05 Dec 64	New York, New York	10 Dec 64	0841.2	C. Drake
2101	New York, New York	11 Feb 65	Miami, Florida	25 Feb 65	2303.2	J. Worzel
2103	Miami, Florida	28 Feb 65	Cristobal, Panama C.Z.	12 Mar 65	2290.3	J. Worzel
2114	Cristobal, Panama C.Z.	14 Nov 65	New York, New York	10 Dec 65	5005.7	J. Ewing
2201	New York, New York	10 Jan 66	San Juan, Puerto Rico	27 Jan 66	3044.3	C. Windisch
2202	San Juan, Puerto Rico	30 Jan 66	Recife, Brazil	16 Feb 66	3600.4	M. Talwani
2206	Cape Town, S. Africa	26 Apr 66	Dakar, Senegal	23 May 66	4922.1	M. Ewing
2207	Dakar, Senegal	25 May 66	New York, New York	13 Jun 66	3865.7	T. Aitken
2301	New York, New York	27 Jul 66	Halifax, Nova Scotia	05 Aug 66	1711.2	C. Windisch
2302	Halifax, Nova Scotia	08 Aug 66	Reykjavik, Iceland	25 Aug 66	3520.5	C. Windisch
2303	Reykjavik, Iceland	27 Aug 66	Reykjavik, Iceland	15 Sep 66	4212.0	M. Talwani
2304	Reykjavik, Iceland	17 Sep 66	Glasgow, Scotland	11 Oct 66	5180.7	C. Windisch
2305	Glasgow, Scotland	15 Oct 66	Las Palmas, Canary Is.	03 Nov 66	3963.5	T. Aitken
2306	Las Palmas, Canary Is.	06 Nov 66	St. George, Bermuda	05 Dec 66	5711.7	J. Ewing
2307	St. George, Bermuda	08 Dec 66	New York, New York	15 Dec 66	1326.9	J. Ewing
2401	New York, New York	16 Jan 67	Miami, Florida	30 Jan 67	2717.4	J. Worzel
2402	Miami, Florida	31 Jan 67	Cristobal, Panama C.Z.	19 Feb 67	3904.2	J. Worzel
2413	Rio De Janeiro, Brazil	17 Nov 67	Miami, Florida	15 Dec 67	5664.9	R. Gerard
2501	Miami, Florida	05 Jan 68	Bridgetown, Barbados	05 Feb 68	5569.6	M. Langseth

* No Gravity
** No Magnetics

CRUISE INDEX (Continued)

VEMA (Continued)

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
2502	Bridgetown, Barbados	08 Feb 68	Paramaribo, Surinam	08 Mar 68	5197.9	D. Hayes
2503	Paramaribo, Surinam	11 Mar 68	New York, New York	02 Apr 68	3963.6	W. Pitman
2504	New York, New York	05 Apr 68	New York, New York	10 Apr 68	0977.5	S. Eittreim
2601*	New York, New York	24 Jul 68	St. George, Bermuda	16 Aug 68	4747.3	D. Epp
2602*	St. George, Bermuda	24 Aug 68	St. George, Bermuda	21 Sep 68	5559.3	T. Aitken
2603*	St. George, Bermuda	26 Sep 68	Dakar, Senegal	21 Oct 68	4799.6	T. Aitken
2604	Dakar, Senegal	26 Oct 68	Rio De Janeiro, Brazil	25 Nov 68	6237.3	M. Talwani
2607	Recife, Brazil	03 Feb 69	San Juan, Puerto Rico	28 Feb 69	5285.1	D. Hayes
2608	San Juan, Puerto Rico	05 Mar 69	Miami, Florida	05 Apr 69	5914.1	J. Worzel
2609	Miami, Florida	11 Apr 69	St. George, Bermuda	09 May 69	5209.6	T. Aitken
2610	St. George, Bermuda	12 May 69	Staten Island, N.Y.	18 May 69	1085.8	J. Ewing
2701	New York, New York	29 May 69	Halifax, Nova Scotia	15 Jun 69	2923.1	T. Aitken
2702	Halifax, Nova Scotia	20 Jun 69	Reykjavik, Iceland	16 Jul 69	4503.2	P. Rabinowitz
2703	Reykjavik, Iceland	19 Jul 69	Tromsø, Norway	06 Aug 69	3355.1	P. Rabinowitz
2704	Tromsø, Norway	10 Aug 69	Bergen, Norway	08 Sep 69	5436.0	M. Talwani
2705	Bergen, Norway	12 Sep 69	Bergen, Norway	19 Sep 69	1440.1	M. Talwani
2706	Bergen, Norway	20 Sep 69	Brest, France	16 Oct 69	4397.9	H. Poppe
2707	Brest, France	19 Oct 69	Lisbon, Portugal	18 Nov 69	5146.2	J. Worzel
2708	Lisbon, Portugal	21 Nov 69	Funchal, Madeira	02 Dec 69	1825.0	P. Fox
2709	Funchal, Madeira	03 Dec 69	Recife, Brazil	30 Dec 69	5180.3	J. Bonnin
2712**	Cape Town, S. Africa	13 Feb 70	Abidjan, Ivory Coast	12 Mar 70	5172.2	G. Bryan
2713	Abidjan, Ivory Coast	15 Mar 70	St. Vincent, C.Verde Is.	10 Apr 70	5211.5	W. Pitman
2714	St. Vincent, C.Verde Is.	13 Apr 70	New York, New York	10 May 70	5573.4	W. Pitman
2801	New York, New York	25 Jun 70	Reykjavik, Iceland	16 Jul 70	3825.2	C. Windisch
2802	Reykjavik, Iceland	18 Jul 70	Aalesund, Norway	03 Aug 70	2985.6	C. Windisch
2803	Aalesund, Norway	06 Aug 70	Trondheim, Norway	04 Sep 70	5760.6	M. Talwani
2804	Trondheim, Norway	10 Sep 70	Cork, Ireland	08 Oct 70	5114.7	J. Jones
2805	Cork, Ireland	11 Oct 70	St. George, Bermuda	02 Nov 70	4240.0	K. Hunkins
2806	St. George, Bermuda	06 Nov 70	St. George, Bermuda	21 Nov 70	2406.4	S. Lieber
2807	St. George, Bermuda	24 Nov 70	Kingston, Jamaica	23 Dec 70	5227.8	V. Renard
2808	Kingston, Jamaica	28 Dec 70	Cristobal, Panama C.Z.	08 Jan 71	1596.9	T. Aitken & M. Truchan

* No Gravity
** No Magnetics

CRUISE INDEX (Continued)

ROBERT D. CONRAD

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
0801	San Juan, Puerto Rico	26 Nov 63	Cape Town, S. Africa	29 Dec 63	6569.7	R. Wall
0807	Cristobal, Panama C.Z.	21 Apr 64	San Juan, Puerto Rico	02 May 64	1974.1	J. Ewing
0812	San Juan, Puerto Rico	05 Aug 64	New York, New York	22 Aug 64	2964.9	C. Fray
0901	New York, New York	17 Oct 64	Galveston, Texas	10 Nov 64	4379.8	J. Heirtzler
0902	Galveston, Texas	12 Nov 64	Kingston, Jamaica	08 Dec 64	5348.1	M. Ewing
0903	Kingston, Jamaica	10 Dec 64	Colon, Panama C.Z.	16 Jan 65	6762.6	M. Talwani
9B11	Port Said, Egypt	14 Jul 65	Naples, Italy	26 Jul 65	2302.9	M. Ewing
0912	Naples, Italy	29 Jul 65	Plymouth, England	23 Aug 65	4749.8	M. Ewing
0913	Plymouth, England	27 Aug 65	New York, New York	21 Sep 65	5514.8	R. Houtz
1001	New York, New York	01 Dec 65	Kingston, Jamaica	24 Dec 65	4196.9	J. Heirtzler
1003	Kingston, Jamaica	28 Dec 65	Cristobal, Panama C.Z.	25 Jan 66	5707.1	R. Wall
1012	Cristobal, Panama C.Z.	13 Sep 66	New York, New York	15 Oct 66	6329.4	R. Leyden
1101*	New York, New York	01 Dec 66	Recife, Brazil	22 Dec 66	4257.3	D. Hayes
1112	Cristobal, Panama C.Z.	21 Oct 67	New York, New York	12 Nov 67	3543.1	S. Eittreim & W. Ryan
1201	New York, New York	03 Jan 68	Cristobal, Panama C.Z.	04 Feb 68	5534.6	C. Windisch
1309	Cristobal, Panama C.Z.	20 Jun 70	Cartagena, Colombia	23 Jun 70	0417.1	W. Ludwig
1310	Cartagena, Colombia	26 Jun 70	Port-of-Spain, Trinidad	26 Jul 70	4546.3	W. Ludwig
1311	Port-of-Spain, Trinidad	31 Jul 70	Abidjan, Ivory Coast	31 Aug 70	5461.6	R. Markl
1312	Abidjan, Ivory Coast	02 Sep 70	Mossamedes, Angola	01 Oct 70	5131.5	R. Leyden

* No Gravity

SEISMIC REFLECTION PROFILING INSTRUMENTATION

Continuous seismic reflection profiling was initiated during VEMA Cruise 17. The first generation of equipment and techniques was described by Ewing and Tirey (1961). The acoustic pulses were generated by firing small explosive charges (usually 1/2# TNT) every 2-3 minutes, and the reflections were received by a single hydrophone, whose cable was payed out for each shot to achieve a satisfactory signal/noise ratio. Normally the charges were fired at a depth of about 10 meters and produced a signal that was prolonged by oscillations of the explosion gas bubble. When optimum resolution was required, the charges were floated at approximately 0.5 meters depth to eliminate this effect. Careful examination of the echo patterns will usually indicate to the practiced reader which method of shooting was employed.

The explosive technique was discontinued after cruises VEMA 20 and CONRAD 8, following the development of a pneumatic sound source (Ewing and Zaunere, 1964). The lower power of the air gun was, to a large extent, offset by greater data density (pulse interval approximately 10 sec), and in most deep sea regions this technique produced a record with better detail than had been possible with explosive sources. However recording very thick sediment sections with the air gun requires reducing the ship speed substantially below normal cruising speed in order to improve signal/noise ratio, and, with a few exceptions, this was not done. The standard air gun used for most of these measurements produces a broadband sound pressure level of about +124 db with the principal spectral peak near 18-20 Hz.

The single hydrophone, cable-slacking technique was discontinued as soon as towed hydrophone array development had met with some degree of success (Windisch and Ewing, 1967). The transition to towed arrays occurred at Singapore during VEMA Cruise 19 and at the beginning of CONRAD Cruise 7. Hydrophone array development has continued throughout the period covered by this report. Variable-reluctance or moving-coil hydrophones were used in the early arrays; a conversion to bimorph, or "bender," ceramic units was made approximately at the same time that the air gun sound source was developed. For the most part, array length (active) has been 50 or 100 feet, with an operating sensitivity of -80 to -70 db re. 1v/μbar. At normal cruising speed the optimum signal/noise ratio was found to be in the octave between 60 and 120 Hz, and most of the records presented were made using filter pass-bands in this range.

The shipboard seismic recording equipment has consisted of solid state preamplifiers made at LDGO, Kronhite band pass filters, and modified Times Facsimile Corp. variable density drum recorders. Standard practice has been to split the seismic input into four channels, which permits recording a variety of frequency pass-bands. The channel reproduced in this report was selected for optimum overall data content. Modifications of the recording equipment have tended to be in the direction of circumventing the relatively low dynamic range of the dry electro-sensitive recording paper by the utilization of non-linear circuits in the print amplifiers. Hence, the later records are usually superior to the earlier ones in displaying weakly-reflecting interfaces without overprinting the more prominent reflectors.

References

Ewing, J.I. and G.B. Tirey (1961) Seismic profiler; Jour. Geophys. Res., v. 66, no. 9, p. 2917-2927.

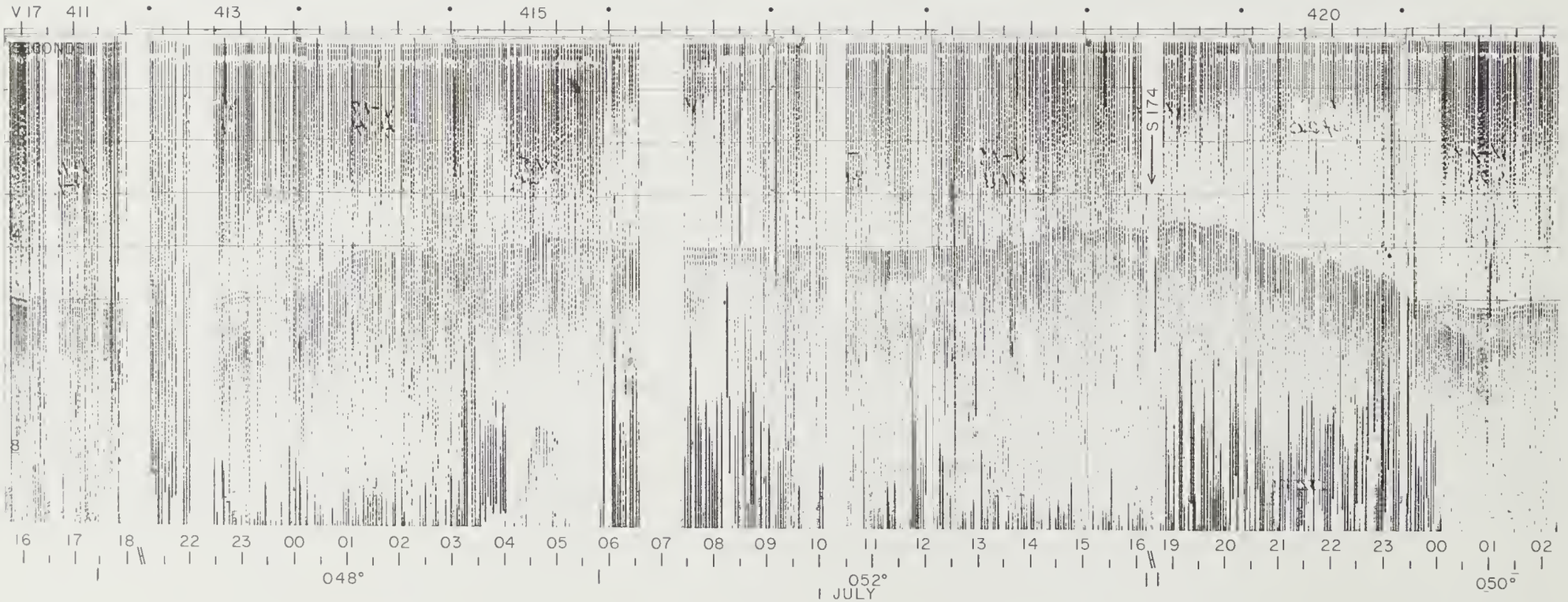
Ewing, J.I. and R. Zaunere (1964) Seismic profiling with a pneumatic sound source; Jour. Geophys. Res., v. 69, no. 22, p. 4913-4915.

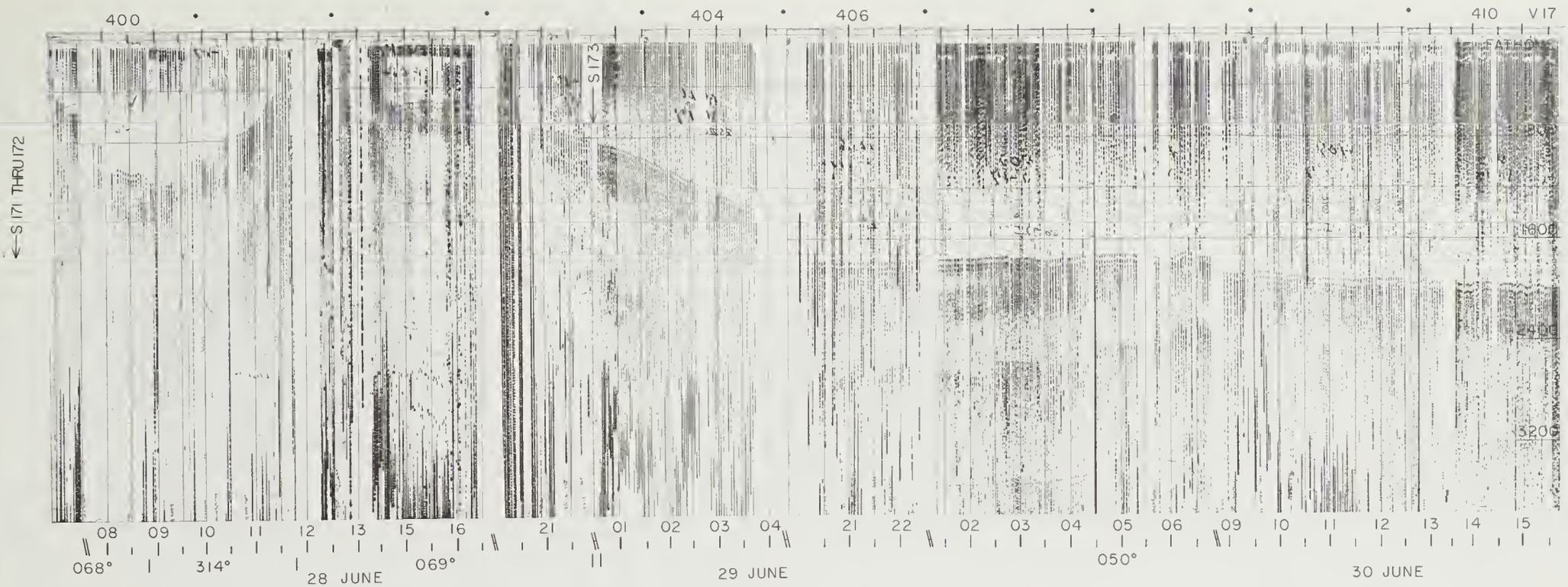
Windisch, C.C. and J.I. Ewing (1967) Some towed line hydrophone arrays for seismic profiling; Tech. Rept. no. 2, CU-2-67 Nonr 266(79), Tech. Rept. no. 9, CU-9-67 NObsr 85077, Tech. Rept. no. 1, CU-1-67, NAVSHIPS N000-24-67-C1186.

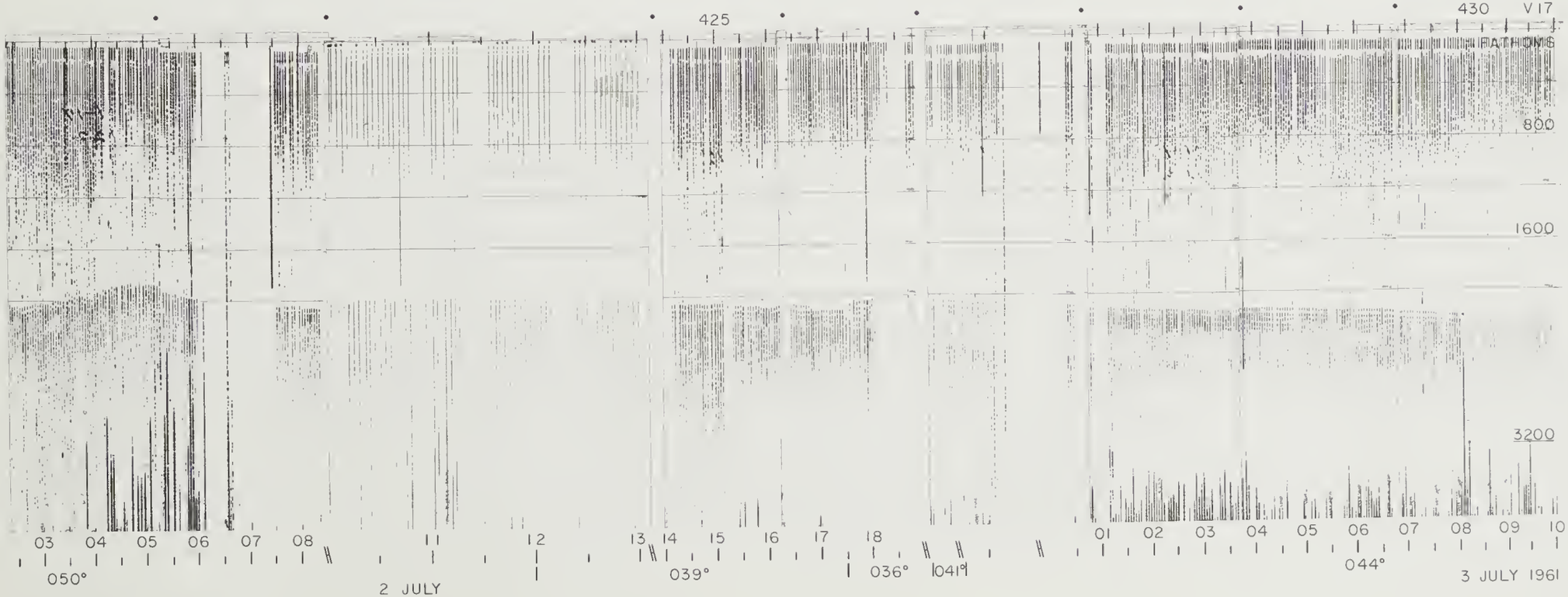
DESCRIPTION OF PROFILER RECORD FORMAT

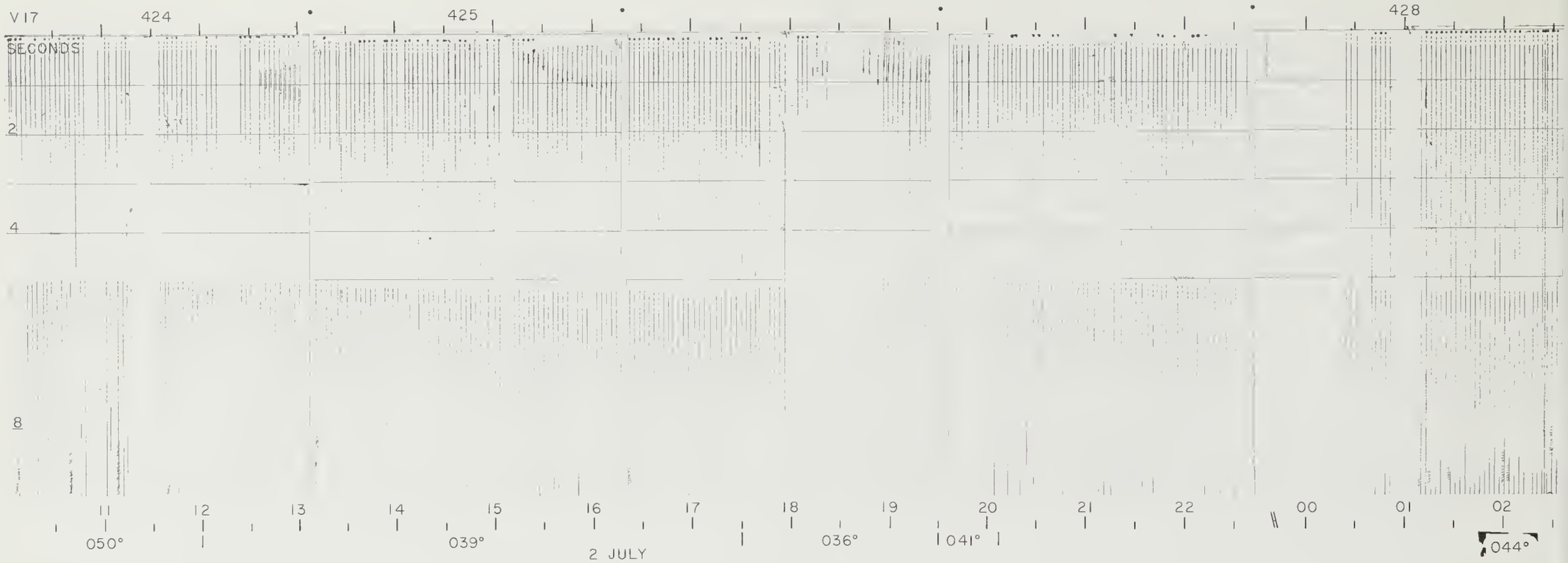
The profiler records are laid out across two facing pages so that the records start from the top left hand corner of the left page, go across the two pages to the top right hand corner of the right page. From there the record continues to the bottom left hand corner of the left page and then again across the two pages to the bottom right hand corner of the right page. The profiler record numbers are annotated at the top for every fifth record or so. Station numbers are annotated with an S and an arrow. Sonobuoy runs are indicated with an R. The left hand side of the left page is marked in seconds (two-way reflection time) and the right hand side of the right page is marked in nominal fathoms (assuming a speed of sound of 800 fathoms per second). The longer lines along the bottom of the page indicate hour marks and the shorter lines, half-hour marks. The course steered (which is in general slightly different from the adjusted course given in the navigation listings in Part A of this report) is also annotated next to vertical lines indicating changes of course. Dates and time zone changes are indicated at the bottom. The profiler records are plots with respect to time and therefore the vertical exaggeration is only constant as long as the ship's speed is constant. A further exception to this occurs when sonobuoys are shot and the profiler stylus traverses usually at twice the normal speed. Thus the time scale for the duration of the sonobuoy runs is multiplied by a factor of two and consequently the vertical exaggeration is reduced by the same factor. Two diagonal lines // at the bottom of the record indicate an interruption in the record.

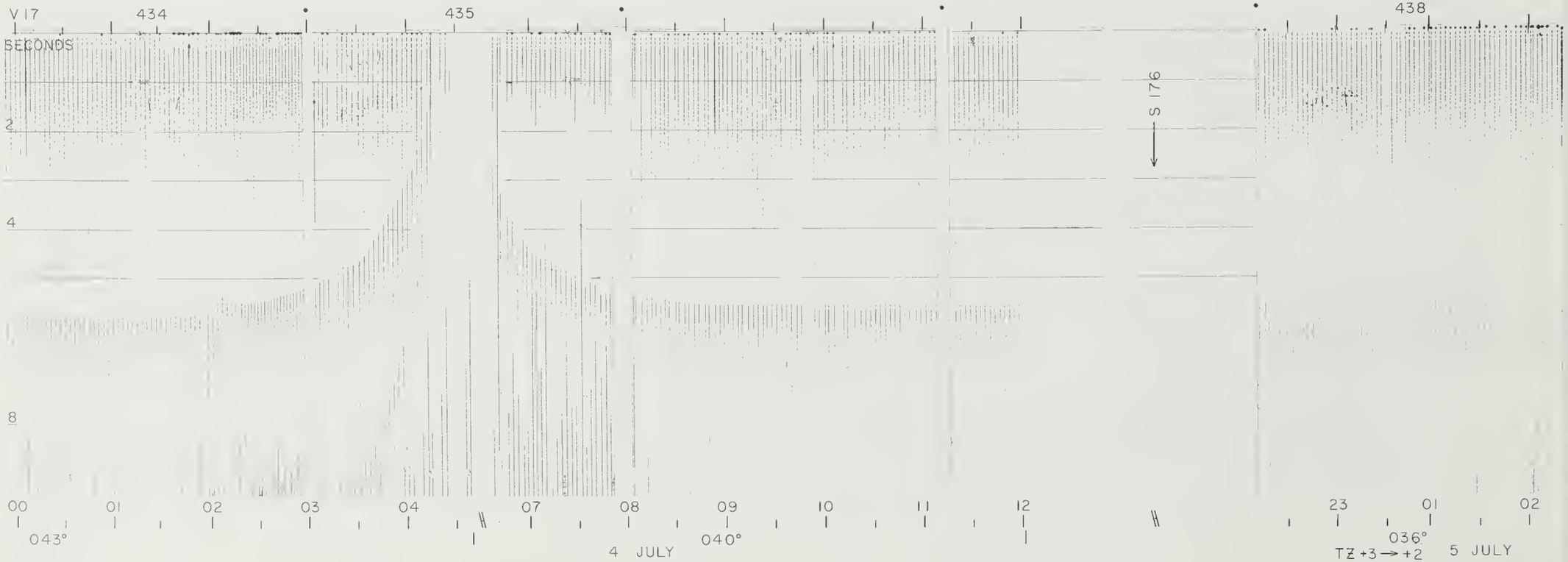
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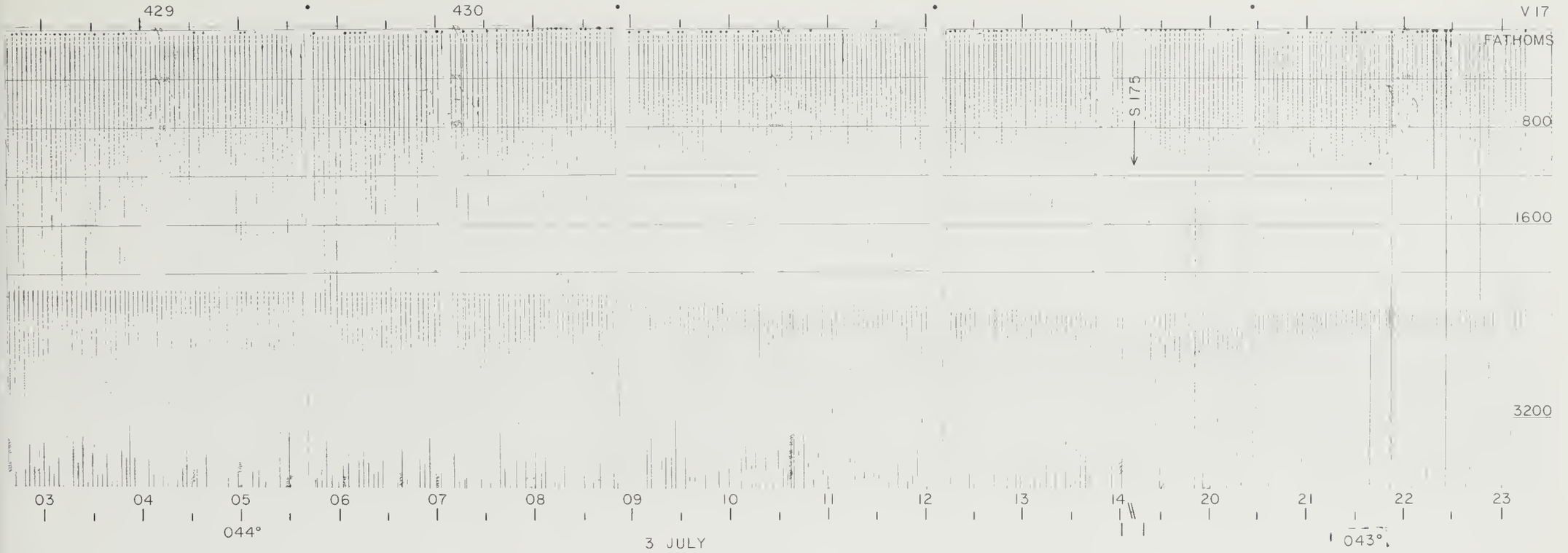


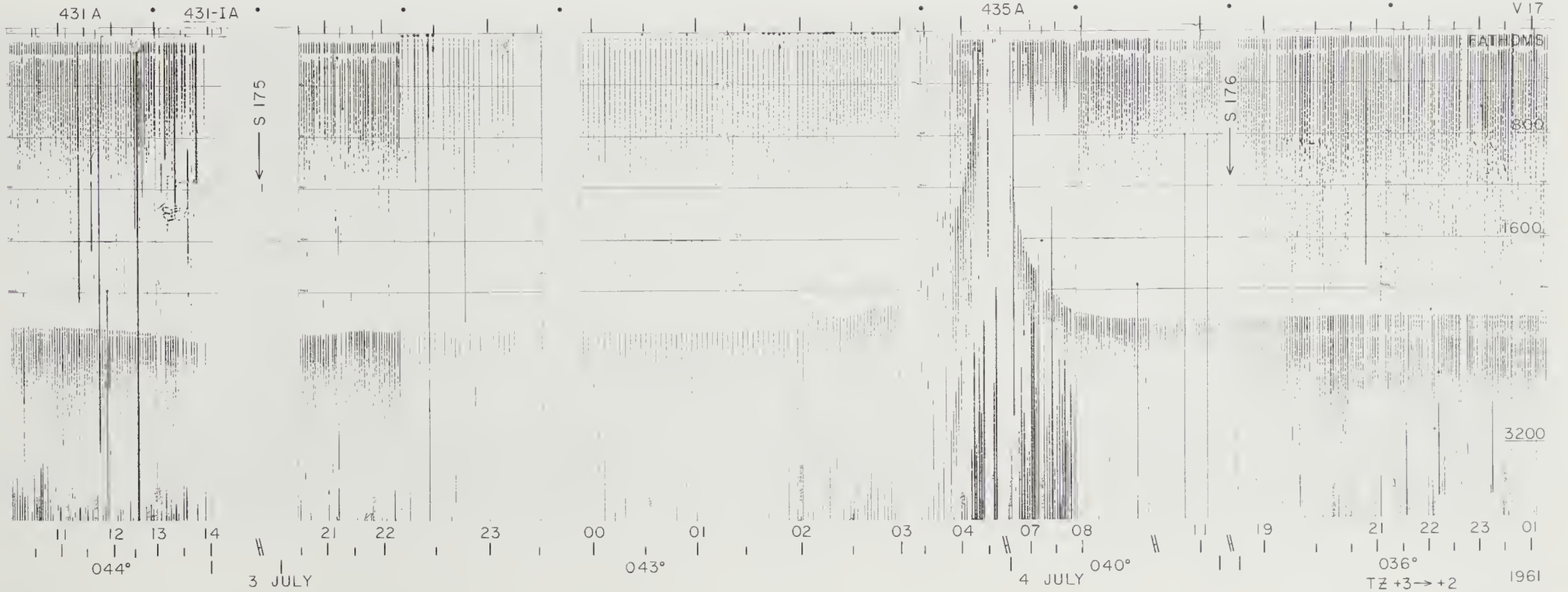

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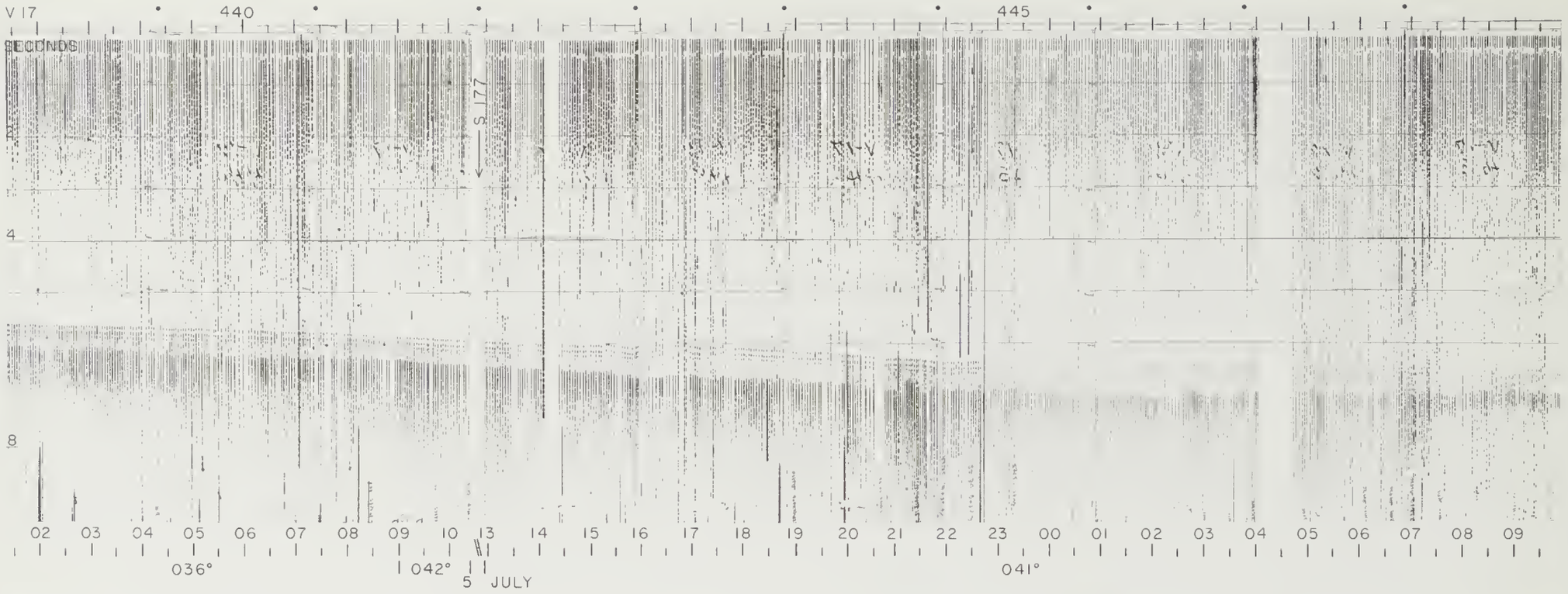

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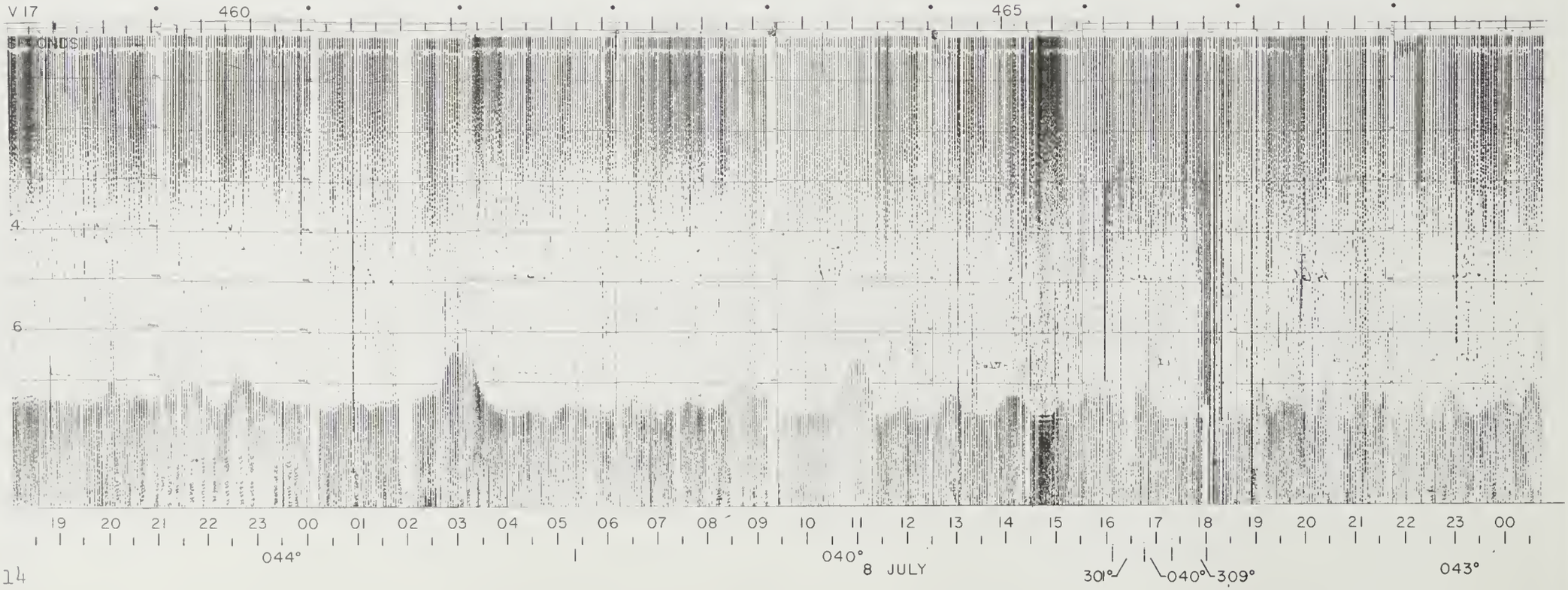

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044°
2 JULY

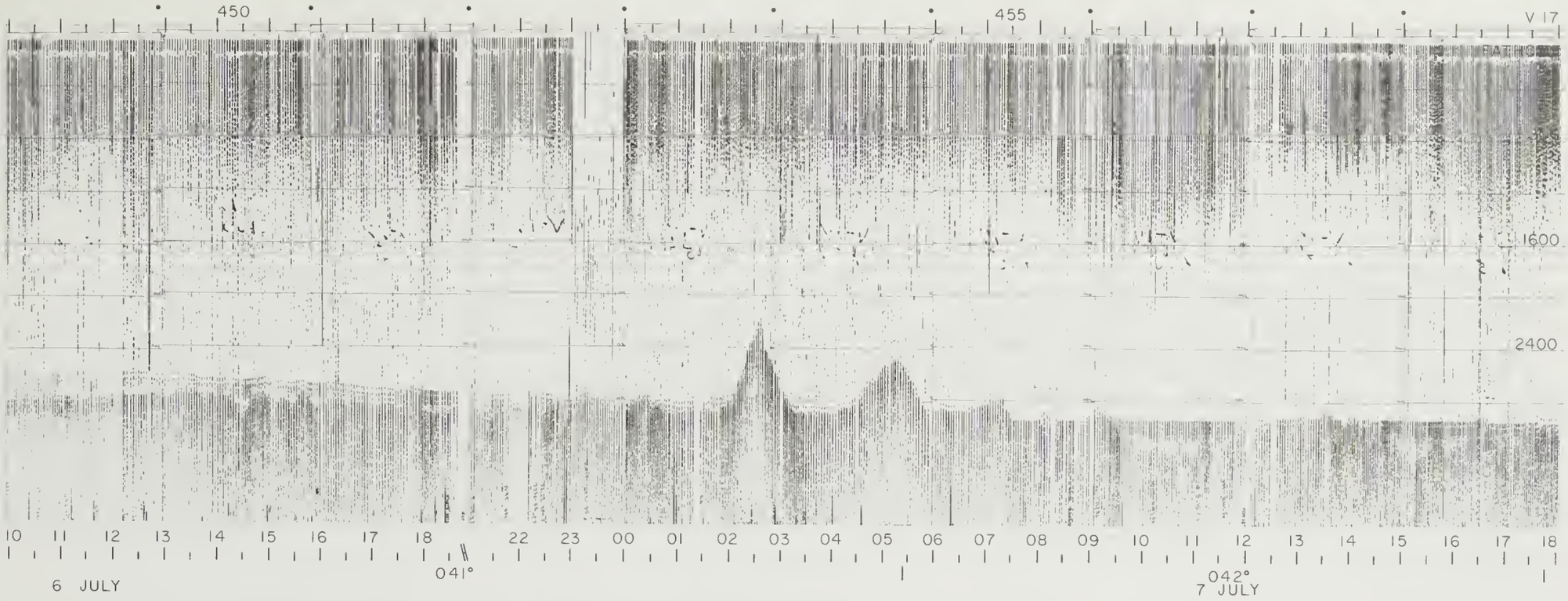

V17
434
435
438
SECONDS
S 176
2
4
8
00
01
02
03
04
07
08
09
10
11
12
23
01
02
043°
040°
036°
4 JULY
TZ +3 → +2
5 JULY

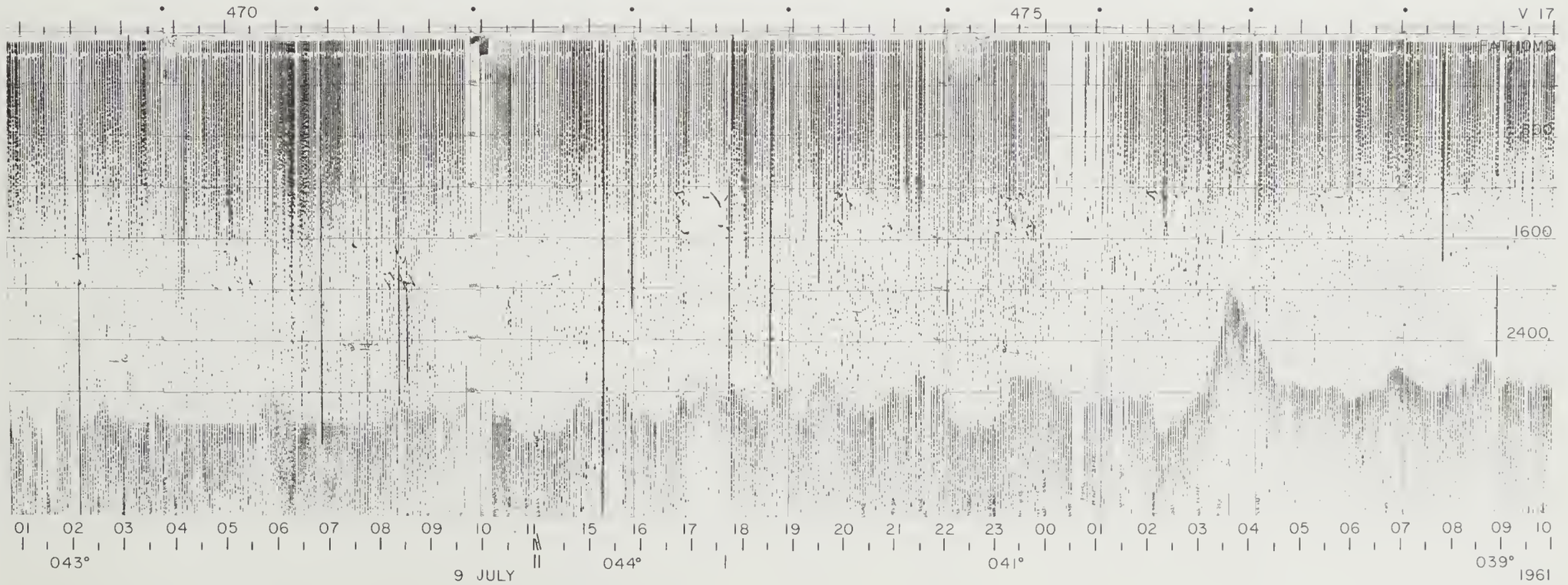

429
430
V 17
FATHOMS
S 175
800
1600
3200
03
04
05
06
07
08
09
10
11
12
13
14
20
21
22
23
044°
3 JULY
043°

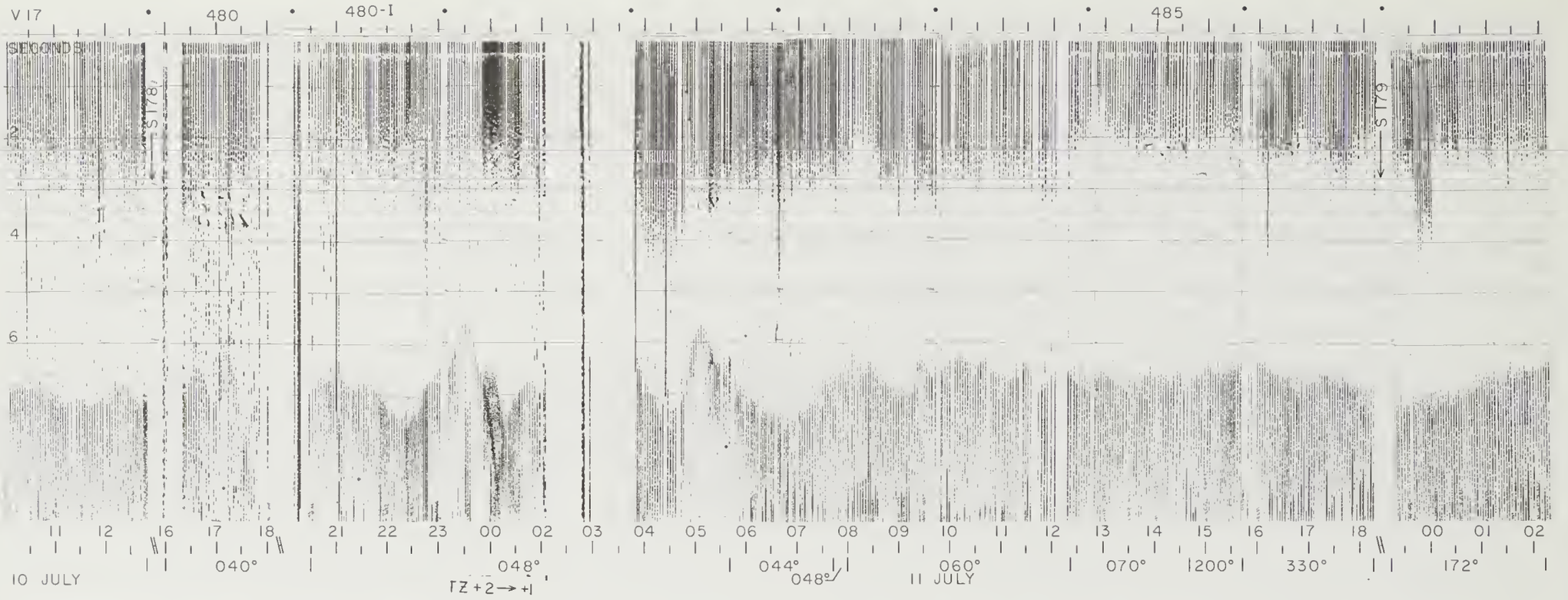

431 A
431-IA
S 175
435 A
V 17
FATHOMS
S 176
800
1600
3200
11
12
13
14
21
22
23
00
01
02
03
04
07
08
11
19
21
22
23
01
044°
3 JULY
043°
040°
4 JULY
036°
TZ +3 → +2
1961

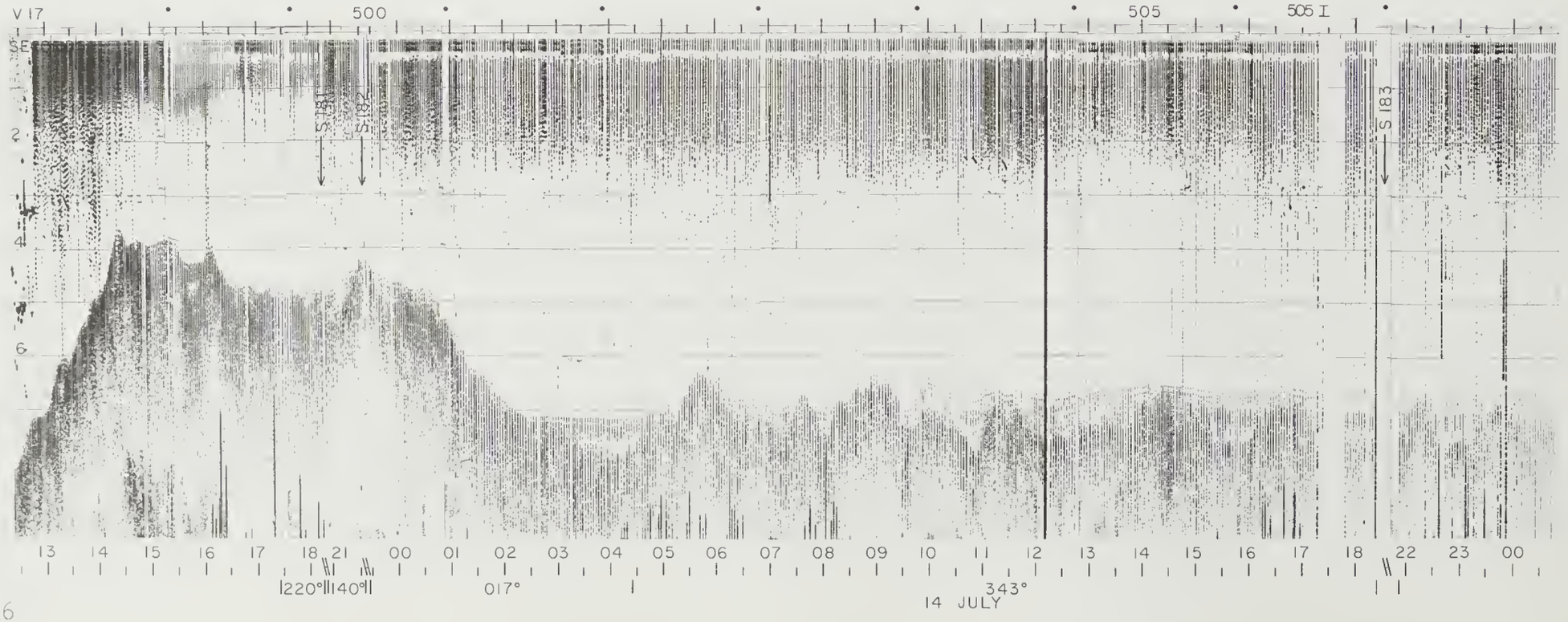

V 17
440
445
SECONDS
S 177
4
8
02 03 04 05 06 07 08 09 10 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
036°
042°
5 JULY
041°

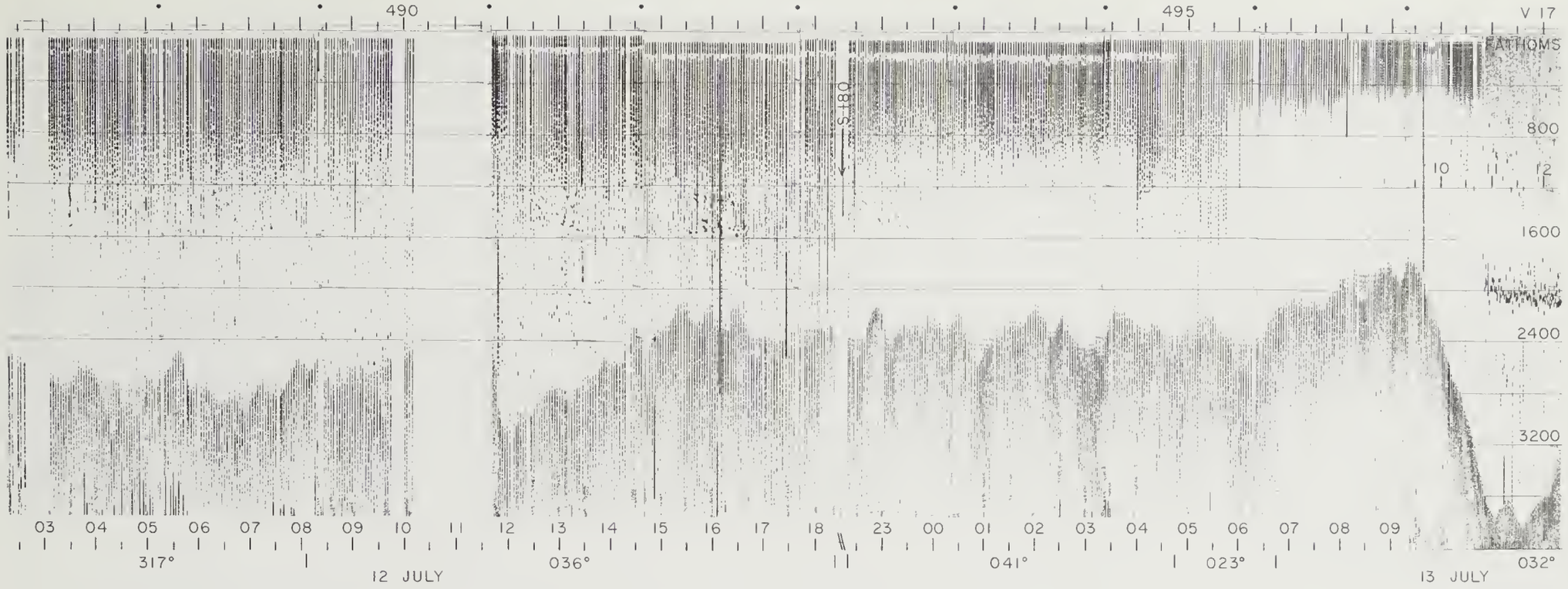

V 17
460
465
SECONDS
4
6
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00
044°
040°
8 JULY
301°
040°
309°
043°

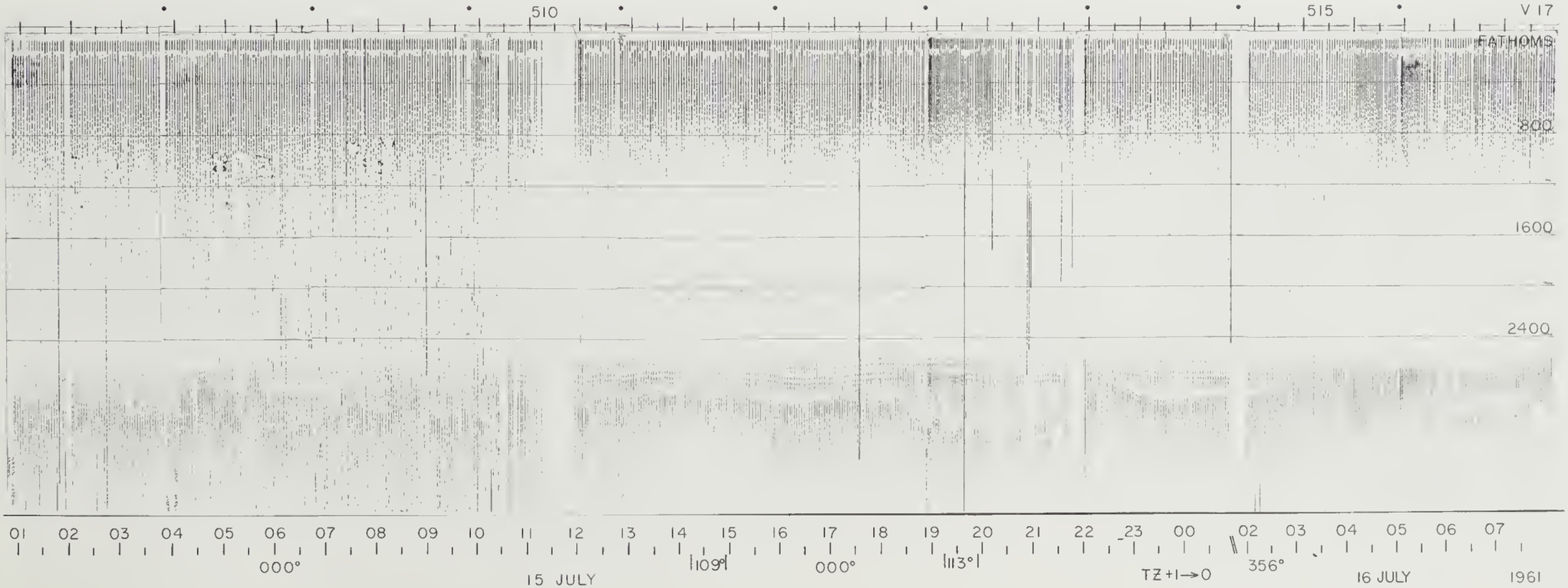

450
455
V 17
1600
2400
10 11 12 13 14 15 16 17 18 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
041°
042°
6 JULY
7 JULY

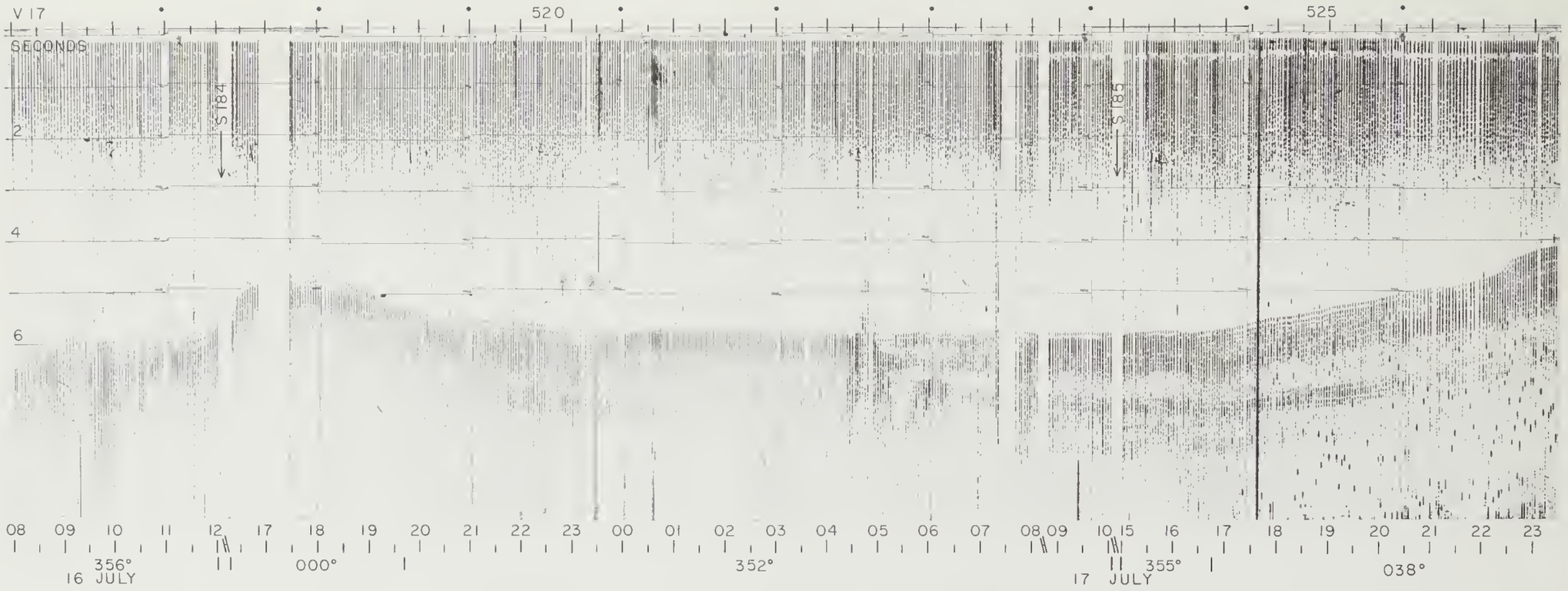

470
475
V 17
1600
2400
01 02 03 04 05 06 07 08 09 10 11 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10
043°
044°
041°
039°
9 JULY
1961

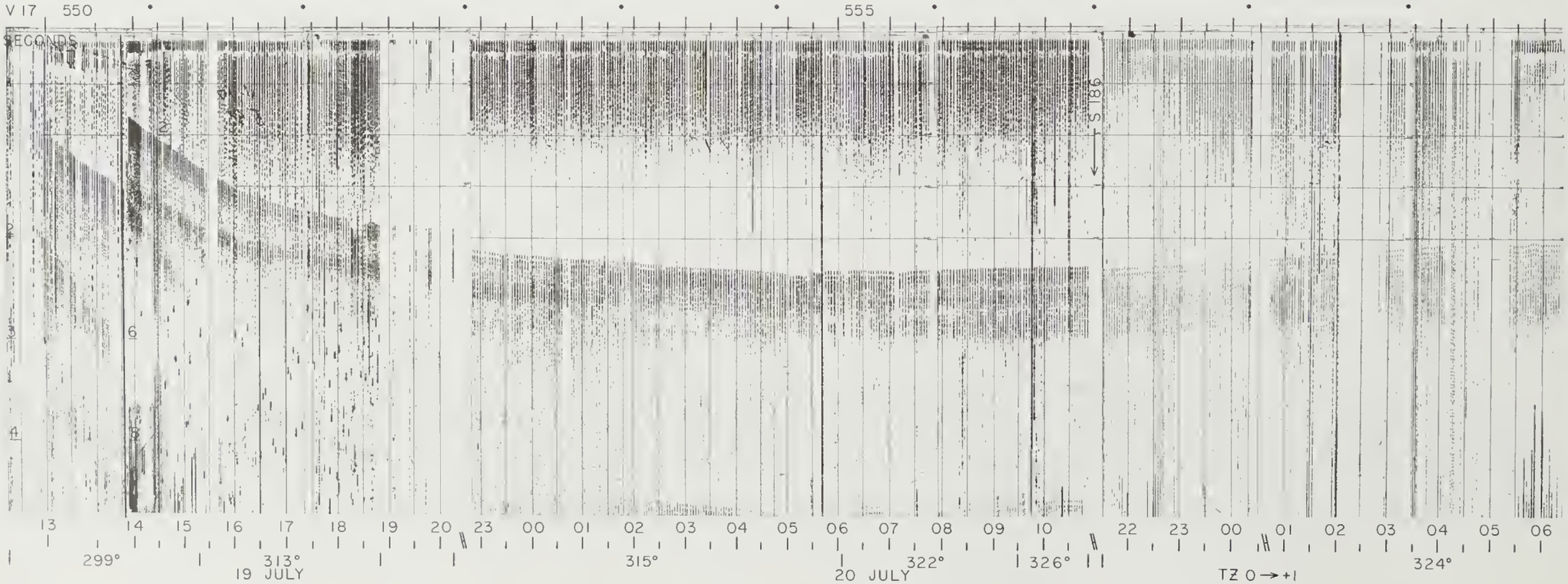

V 17
480
480-I
485
SECONDS
S 178
S 179
4
6
11 12 16 17 18 21 22 23 00 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 00 01 02
040°
048°
044°
060°
070°
200°
330°
172°
10 JULY
11 JULY
TZ + 2 → +1

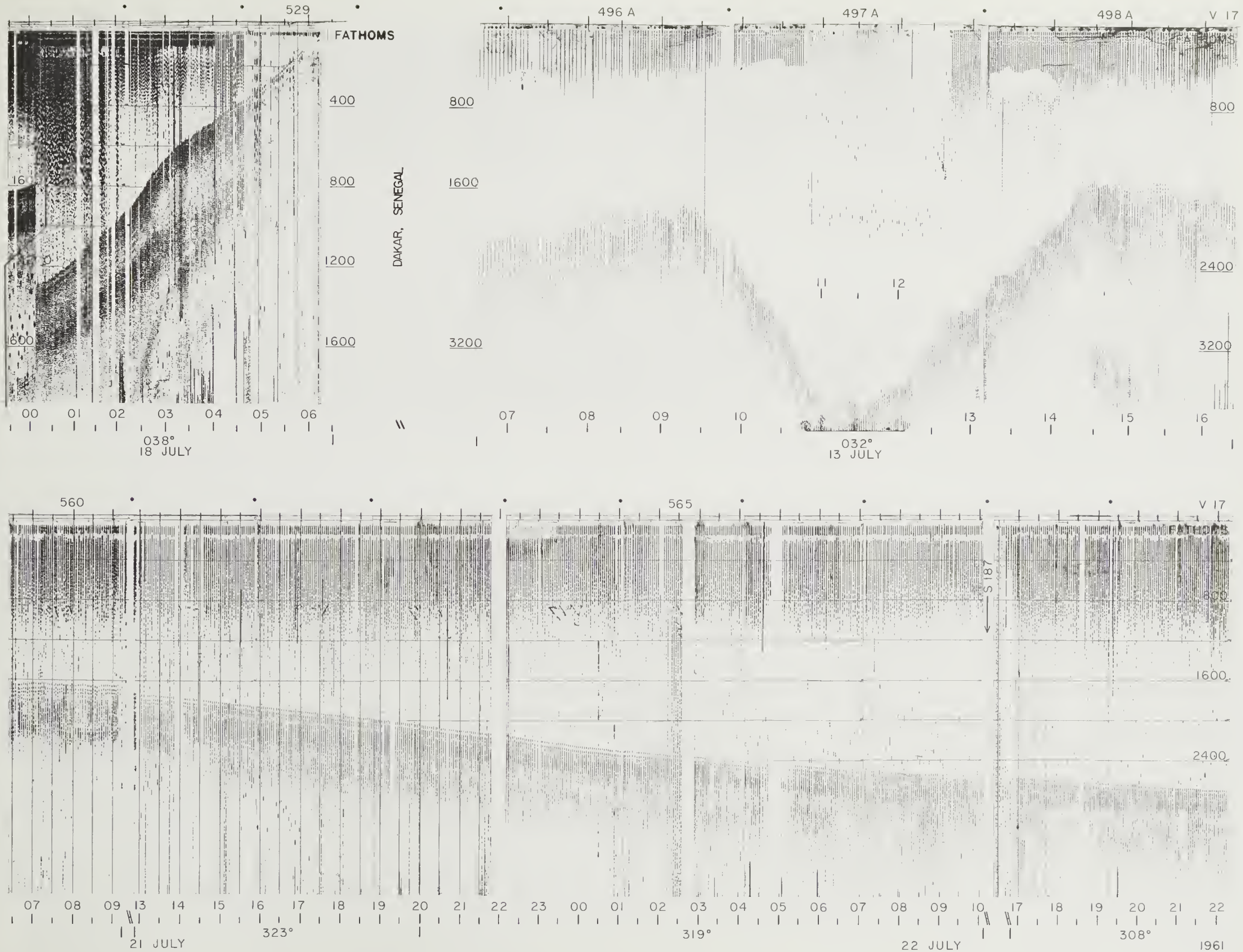

V 17
500
505
505 I
SECONDS
S 181
S 182
S 183
2
4
6
13 14 15 16 17 18 21 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 22 23 00
220°
140°
017°
343°
14 JULY

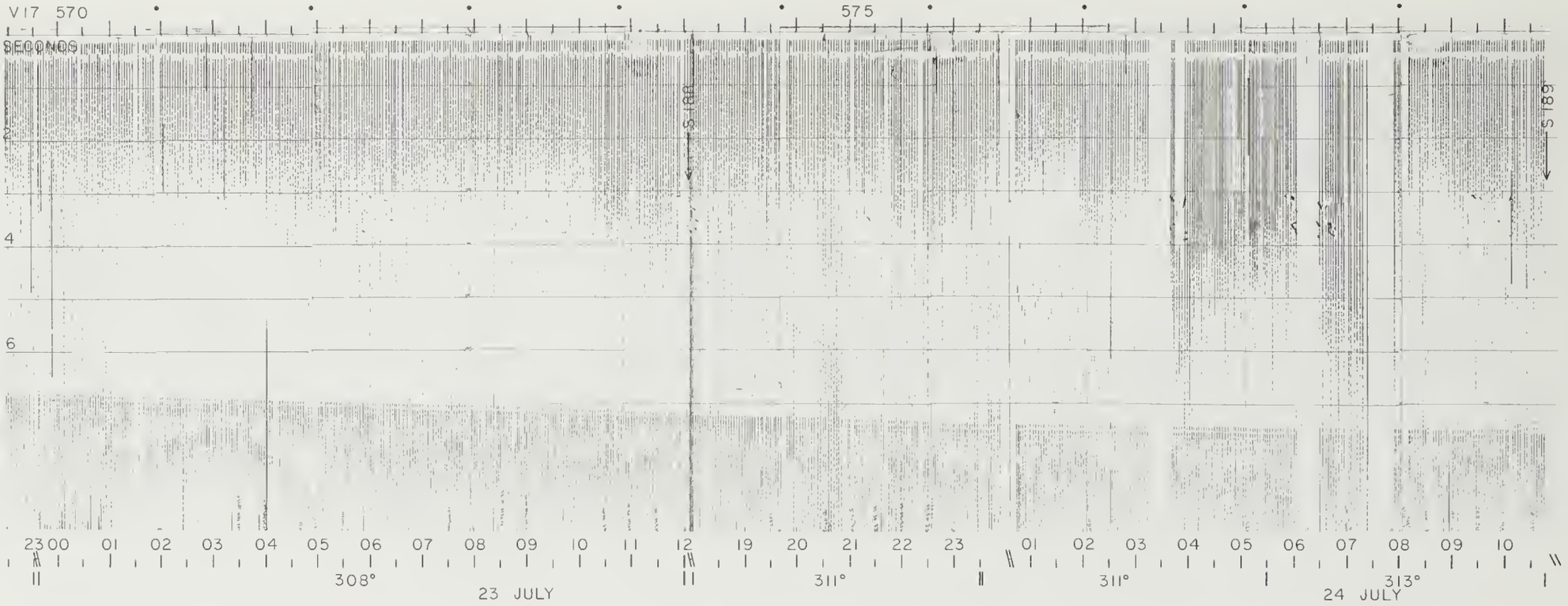

490
495
V 17
FATHOMS
800
1600
2400
3200
10
11
12
03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 23 00 01 02 03 04 05 06 07 08 09
317°
036°
041°
023°
032°
12 JULY
13 JULY

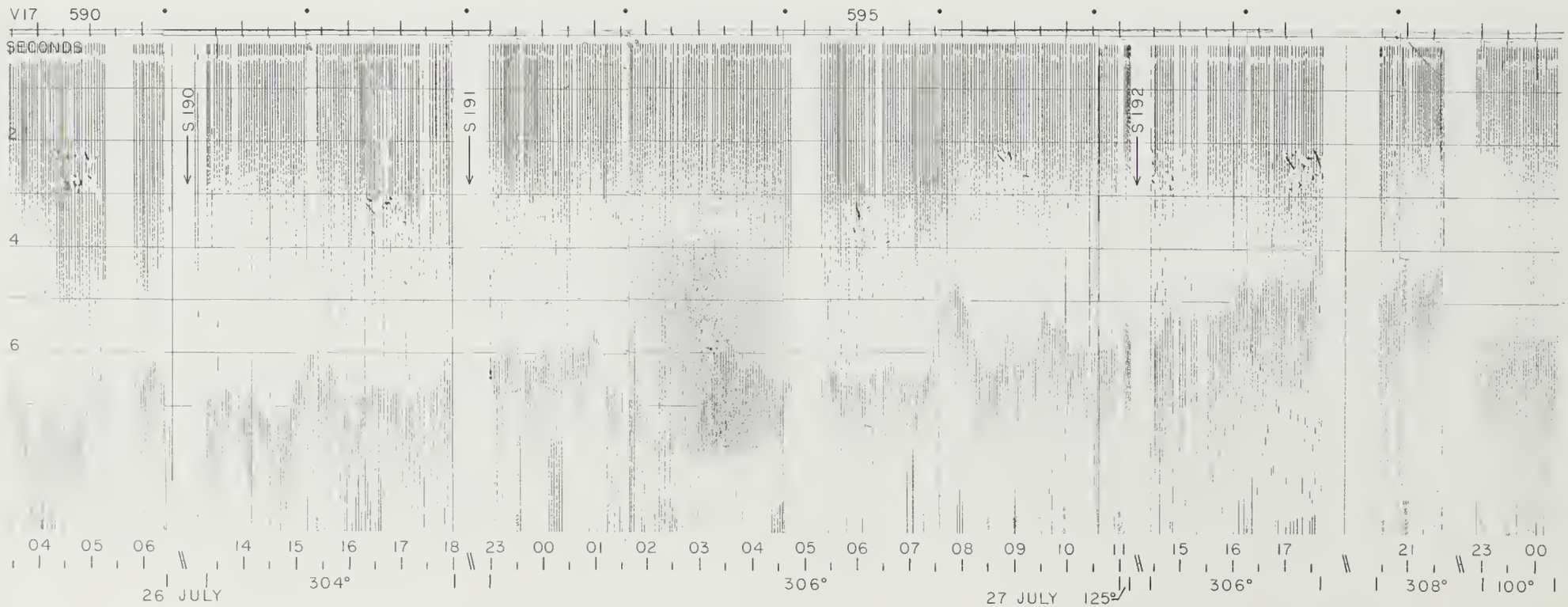

510
515
V 17
FATHOMS
800
1600
2400
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 02 03 04 05 06 07
000°
109°
000°
113°
356°
TZ+1→0
15 JULY
16 JULY
1961

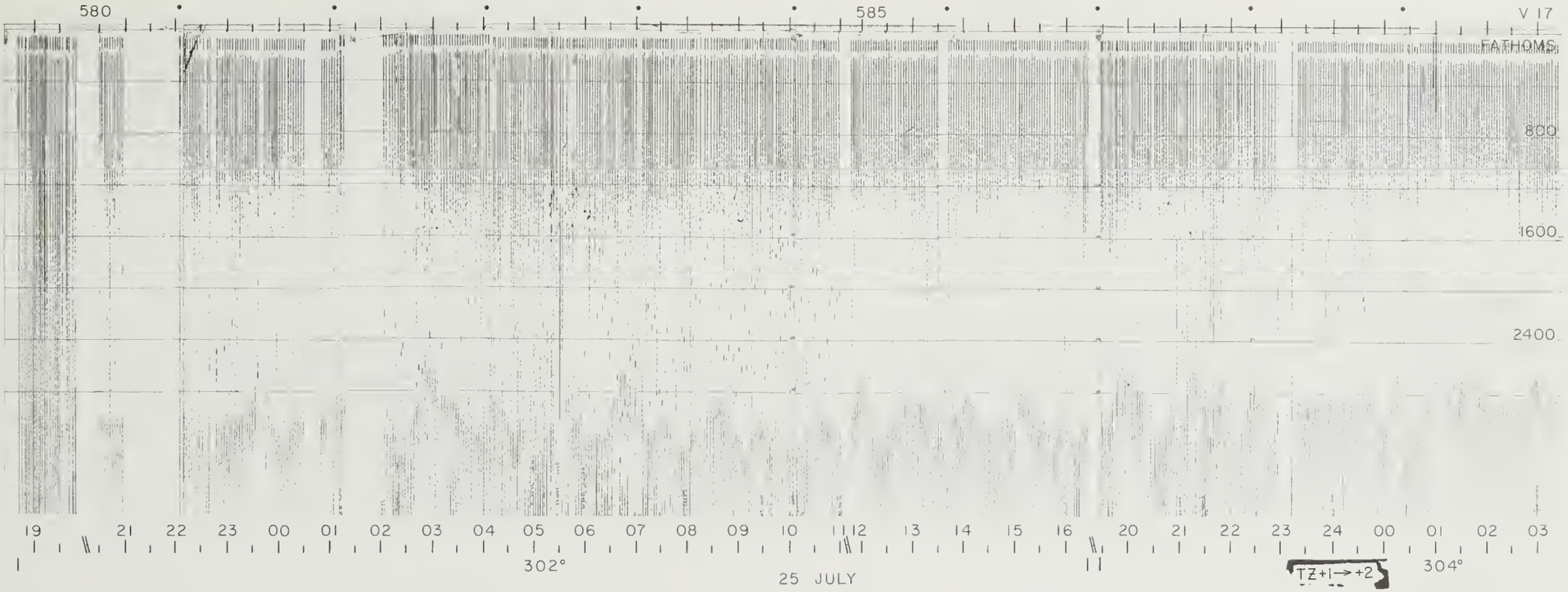

V 17
520
525
SECONDS
2
4
6
S 184
S 185
08 09 10 11 12 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 15 16 17 18 19 20 21 22 23
356°
000°
352°
355°
038°
16 JULY
17 JULY

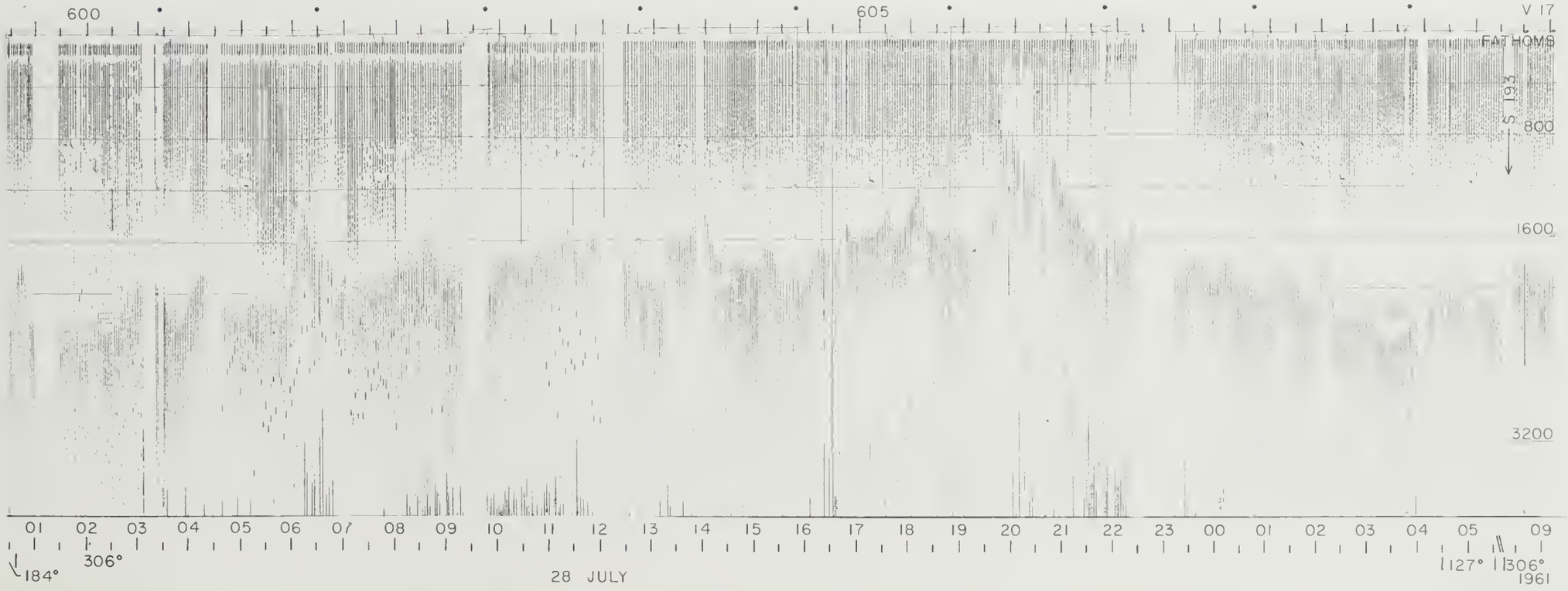

V 17
550
555
SECONDS
4
6
S 186
13 14 15 16 17 18 19 20 23 00 01 02 03 04 05 06 07 08 09 10 22 23 00 01 02 03 04 05 06
299°
313°
315°
322°
326°
324°
19 JULY
20 JULY
TZ 0 → +1

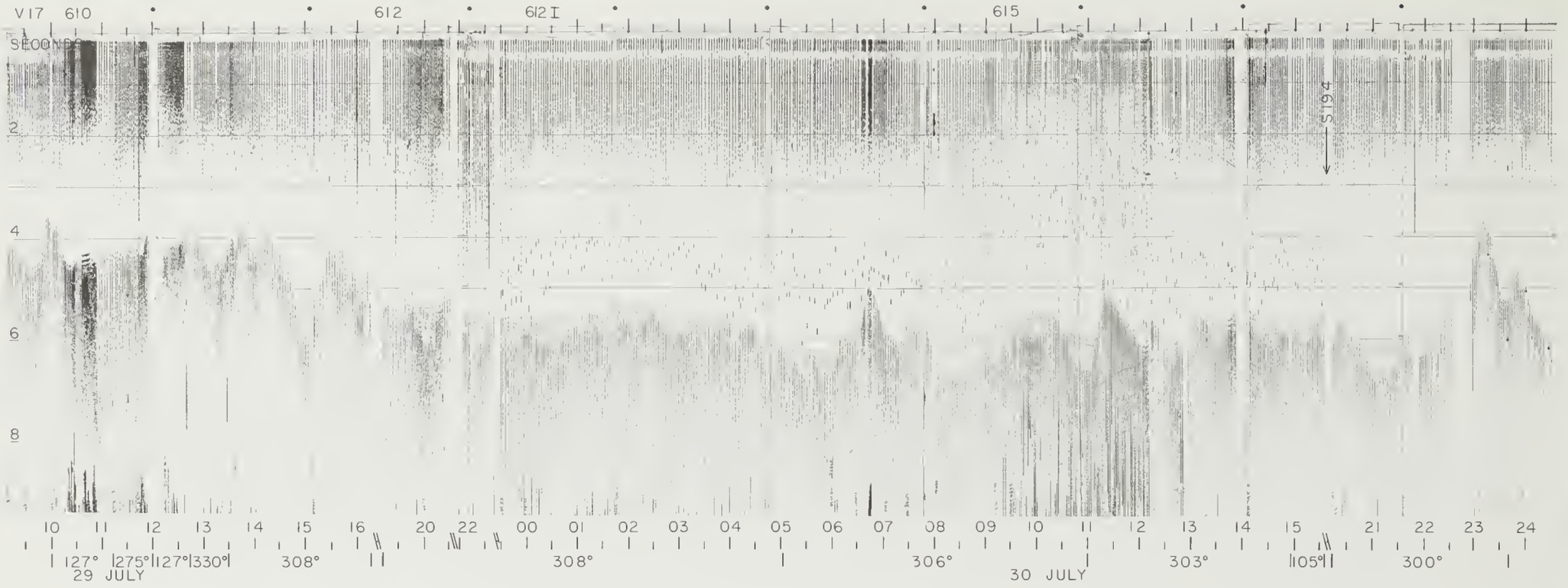

529
FATHOMS
400
800
1200
1600
16
600
00 01 02 03 04 05 06
038°
18 JULY
DAKAR, SENEGAL
496 A
497 A
498 A
V 17
FATHOMS
800
1600
3200
2400
11 12
07 08 09 10 13 14 15 16
032°
13 JULY
560
565
V 17
S 187
1600
2400
07 08 09 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 17 18 19 20 21 22
21 JULY
323°
319°
22 JULY
308°
1961

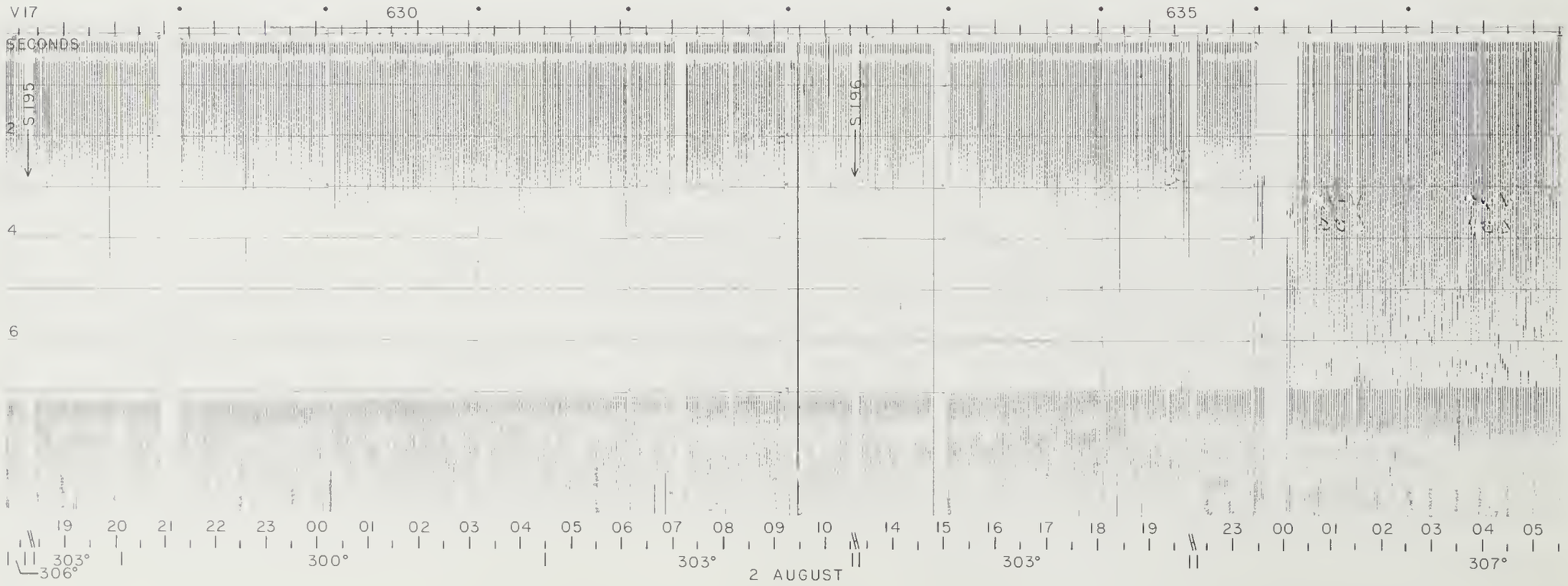

V17 570
575
SECONDS
2
4
6
S 188
S 189
23 00 01 02 03 04 05 06 07 08 09 10 11 12 19 20 21 22 23 01 02 03 04 05 06 07 08 09 10
308°
311°
311°
313°
23 JULY
24 JULY

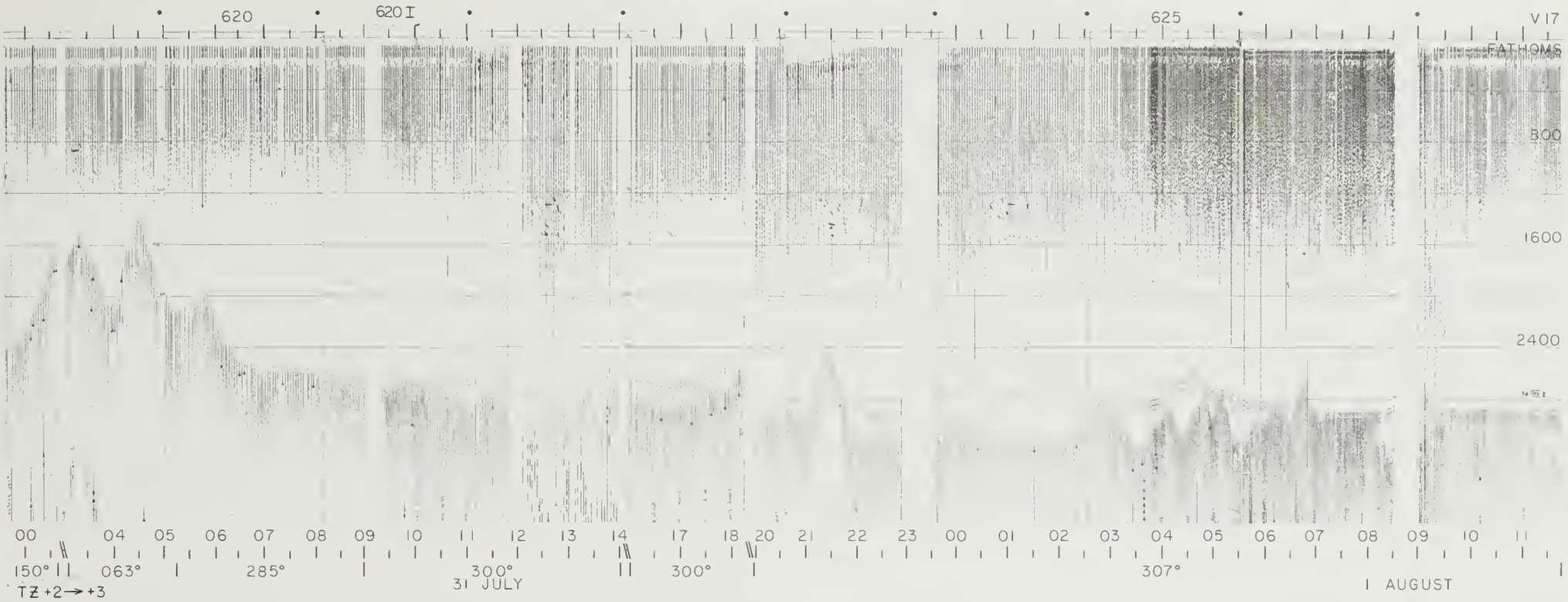

V17 590
595
SECONDS
2
4
6
S 190
S 191
S 192
04 05 06 14 15 16 17 18 23 00 01 02 03 04 05 06 07 08 09 10 11 15 16 17 21 23 00
26 JULY
304°
306°
27 JULY 125°
306°
308°
100°

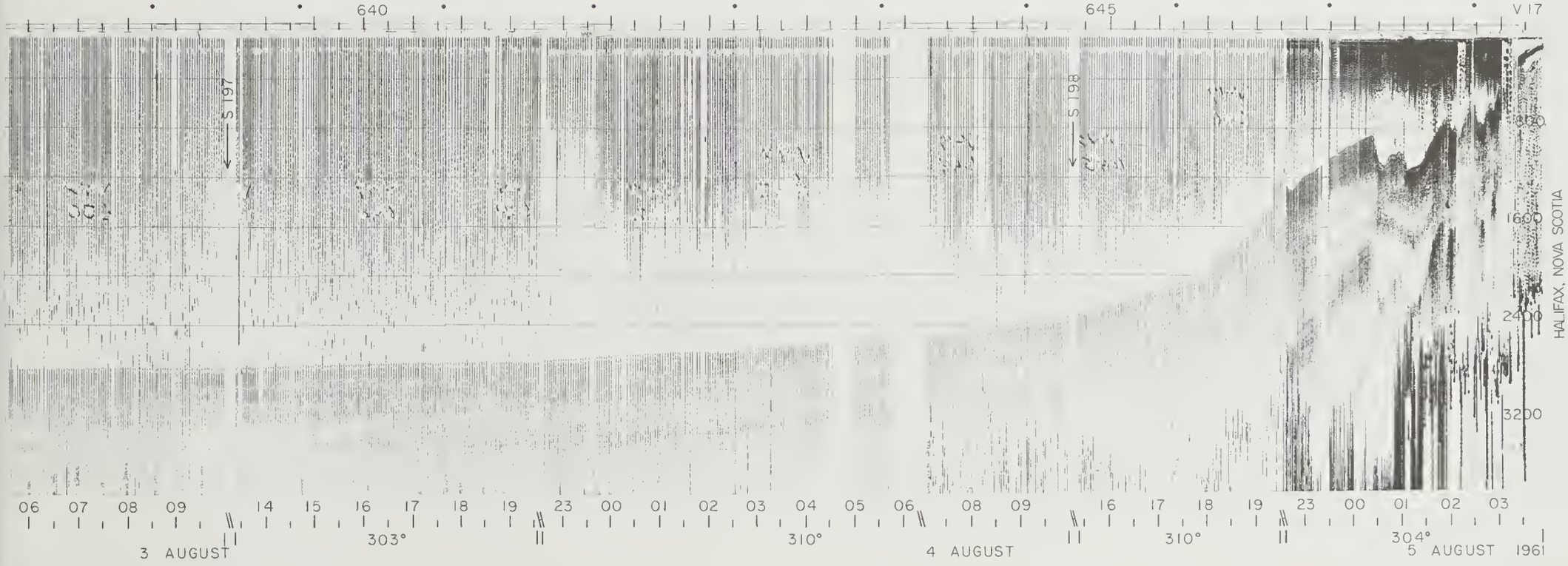

580
585
V 17
FATHOMS
800
1600
2400
19 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 20 21 22 23 24 00 01 02 03
302°
25 JULY
TZ+1→+2
304°

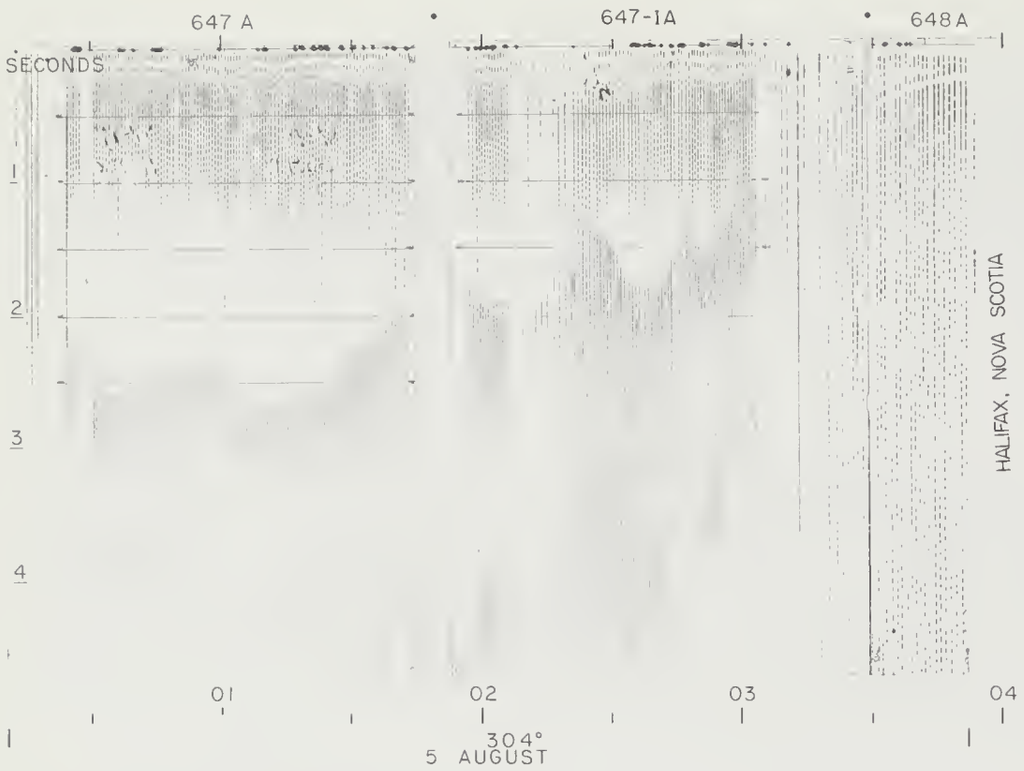

600
605
V 17
FATHOMS
S 193
800
1600
3200
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 09
184°
306°
28 JULY
127°
306°
1961

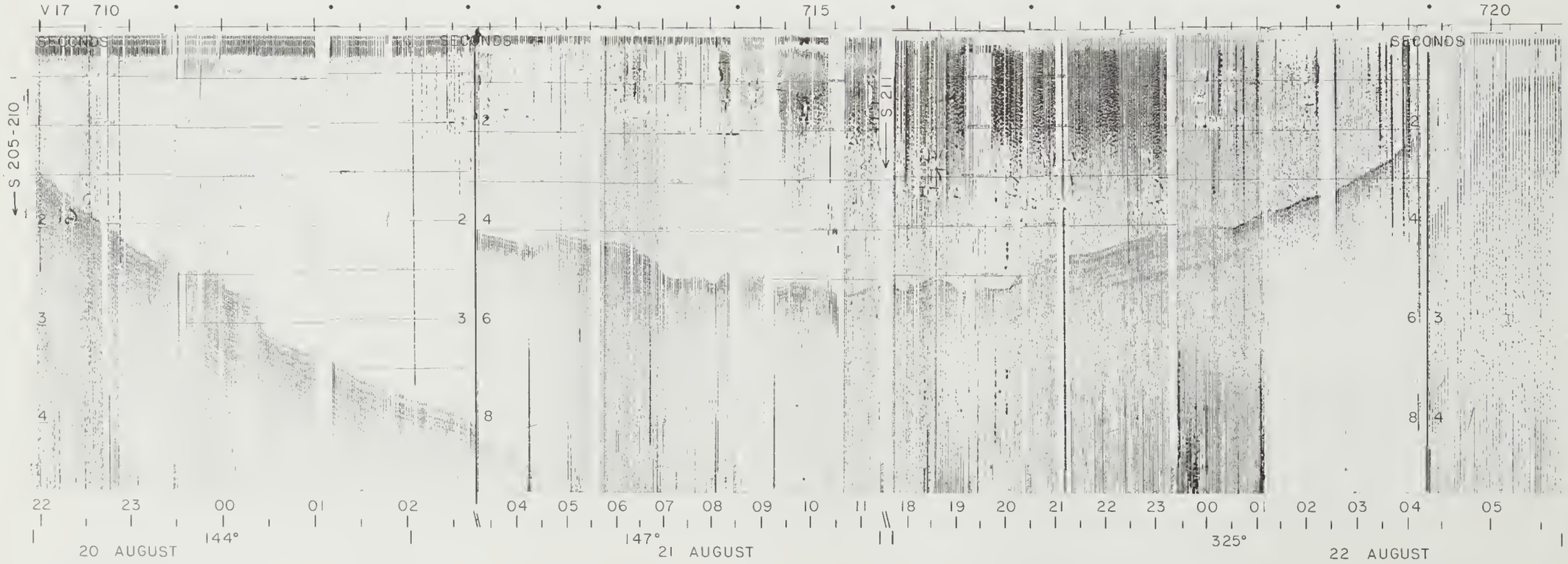

V17 610
612
612 I
615
SECONDS
2
4
6
8
S194
10 11 12 13 14 15 16 20 22 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 21 22 23 24
127° 275° 127° 330° 308° 308° 306° 303° 105° 300°
29 JULY
30 JULY

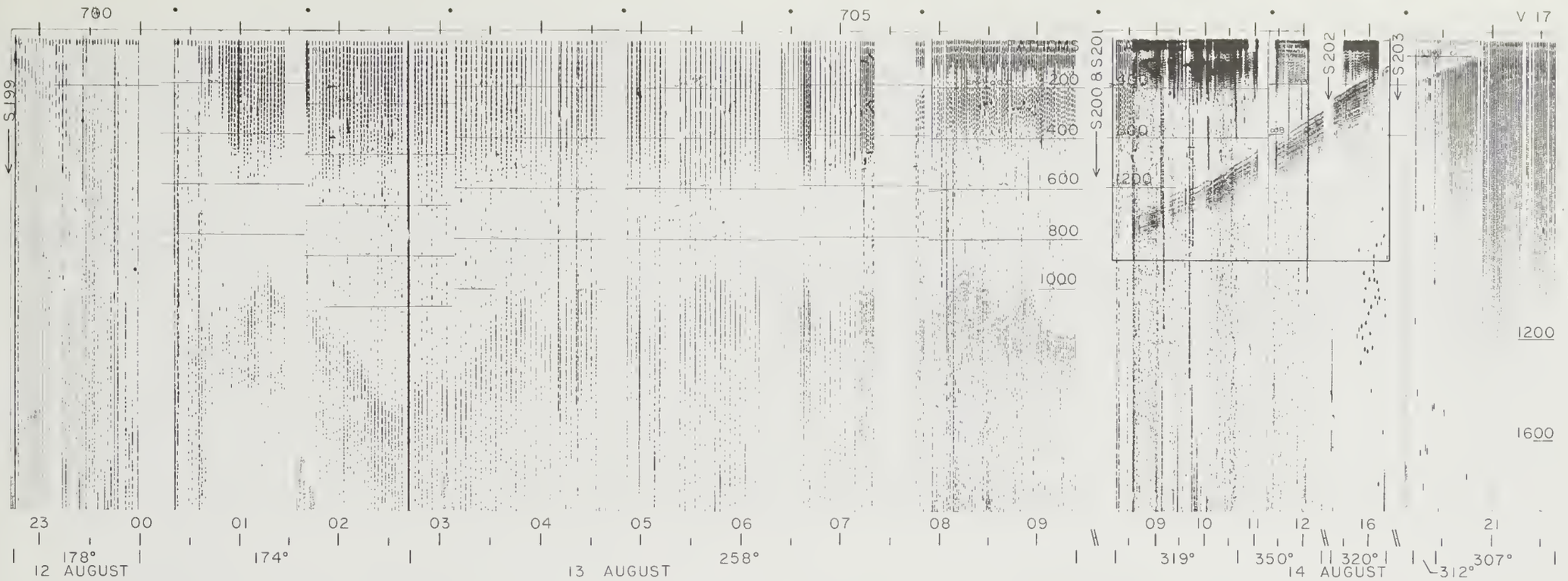

V17
630
635
SECONDS
2
4
6
S195
S196
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 14 15 16 17 18 19 23 00 01 02 03 04 05
303° 306° 300° 303° 303° 307°
2 AUGUST

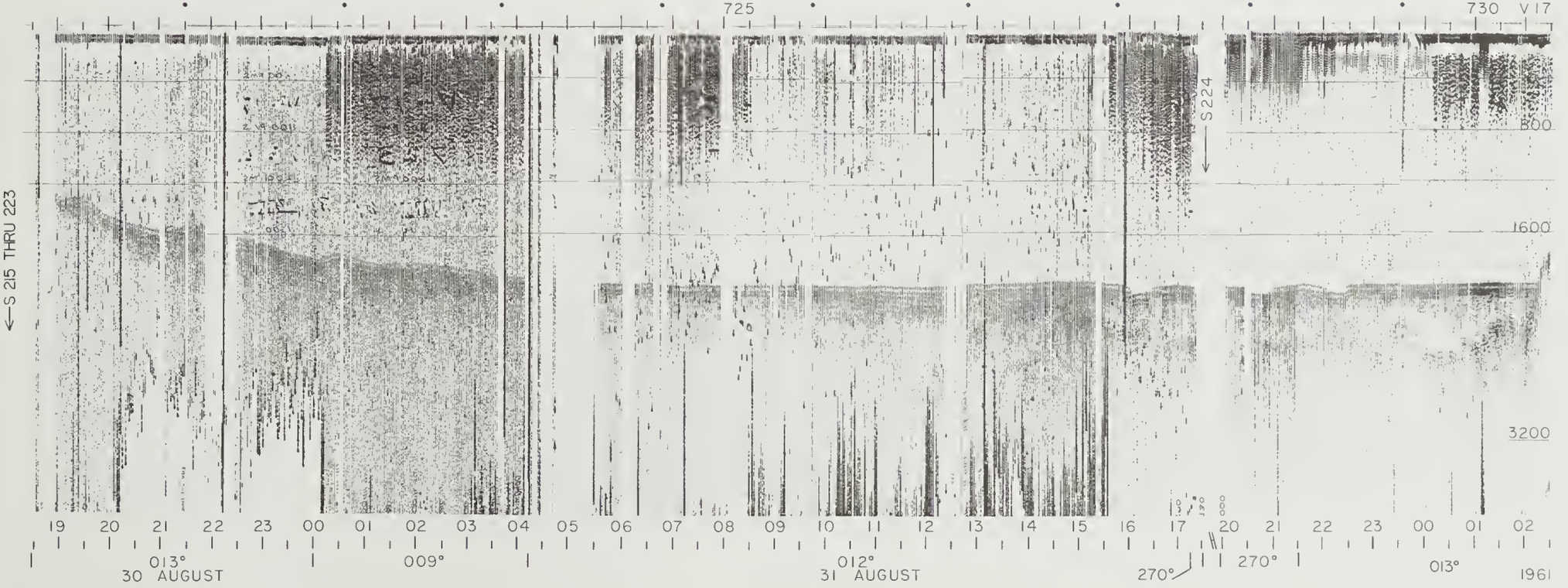

620
620 I
625
V 17
FATHOMS
800
1600
2400
00 04 05 06 07 08 09 10 11 12 13 14 17 18 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11
150° 063° 285° 300° 300° 307°
TZ +2→+3
31 JULY
1 AUGUST

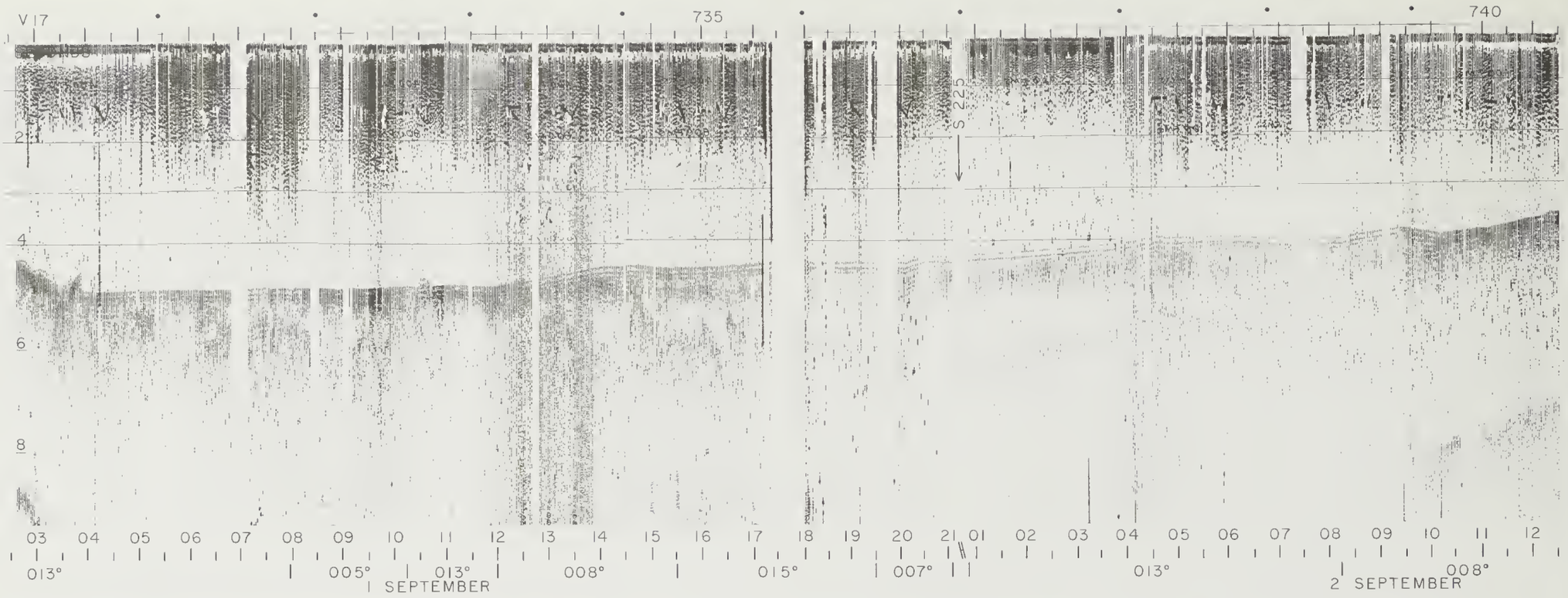

640
645
V 17
S 197
S 198
800
1600
2400
3200
HALIFAX, NOVA SCOTIA
06 07 08 09 14 15 16 17 18 19 23 00 01 02 03 04 05 06 08 09 16 17 18 19 23 00 01 02 03
303° 310° 310° 304°
3 AUGUST
4 AUGUST
5 AUGUST 1961

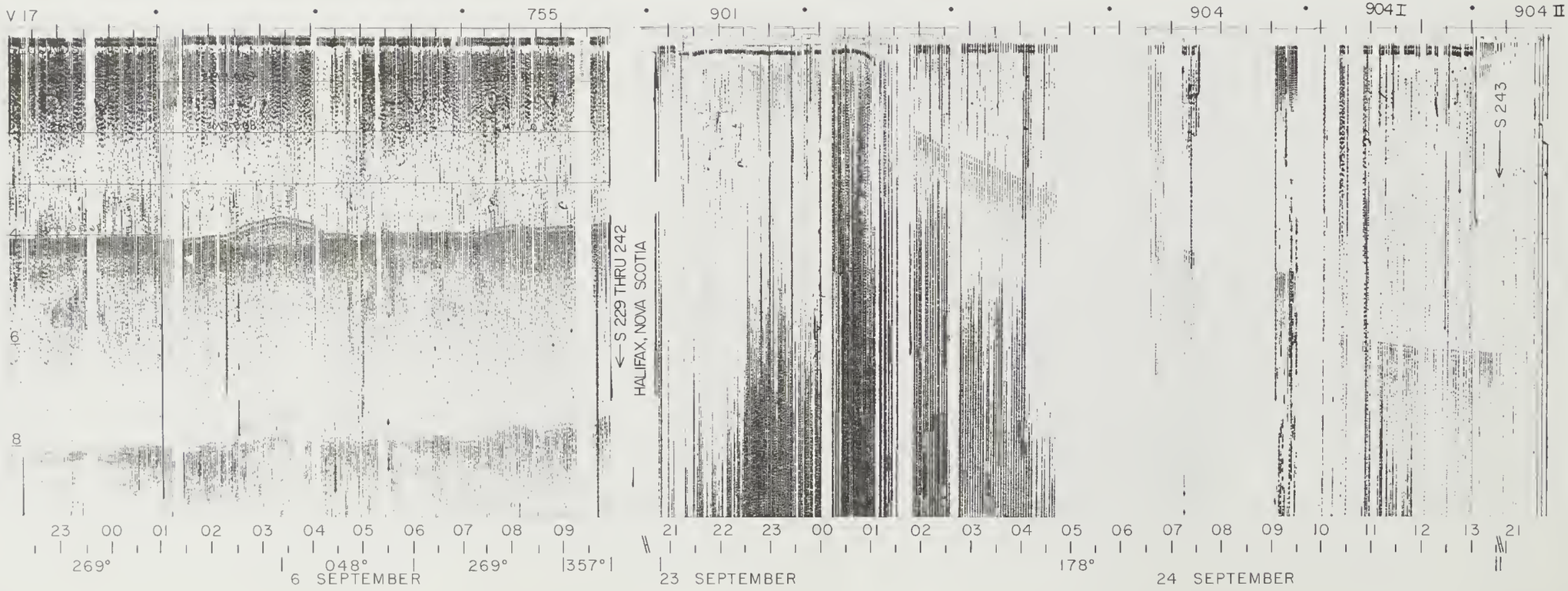

647 A
647-1A
648A
SECONDS
1
2
3
4
01
02
03
04
304°
5 AUGUST
HALIFAX, NOVA SCOTIA

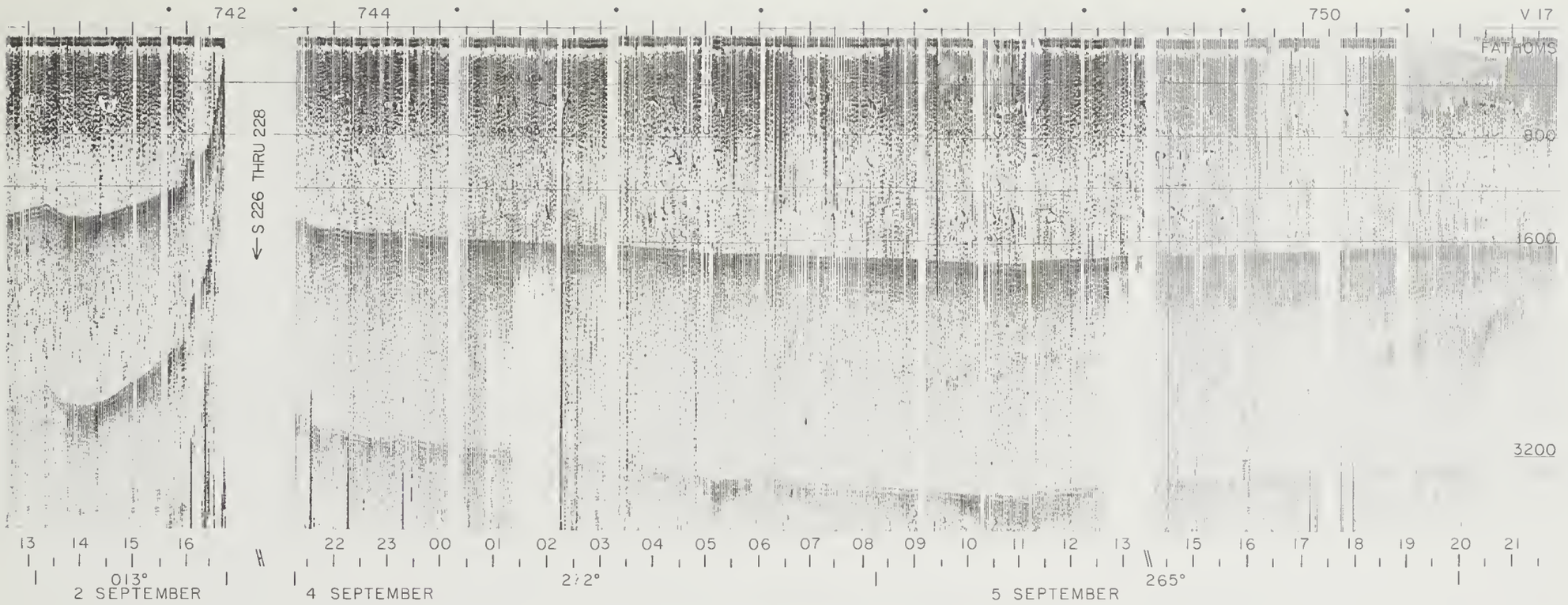

V17 710
715
720
SECONDS
S 205-210
S 211
S 212 THRU 214
ARGENTINA, NEWFOUNDLAND
22 23 00 01 02 04 05 06 07 08 09 10 11 18 19 20 21 22 23 00 01 02 03 04 05
144°
147°
325°
20 AUGUST
21 AUGUST
22 AUGUST

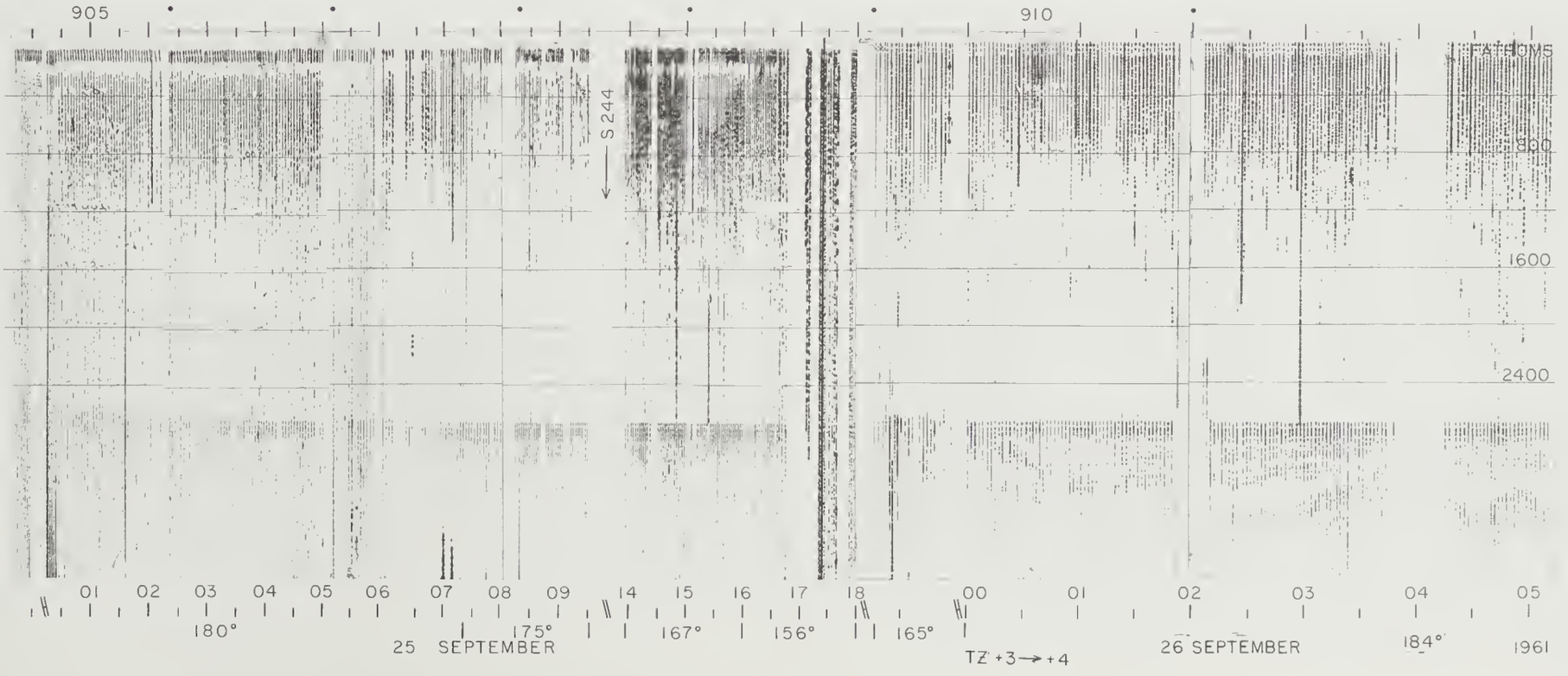

700
705
V 17
S 199
S 200 & S 201
S 202
S 203
S 204
HALIFAX, NOVA SCOTIA
200
400
600
800
1000
1200
1600
23 00 01 02 03 04 05 06 07 08 09
09 10 11 12 16 21
178°
174°
258°
319°
350°
320°
307°
312°
12 AUGUST
13 AUGUST
14 AUGUST

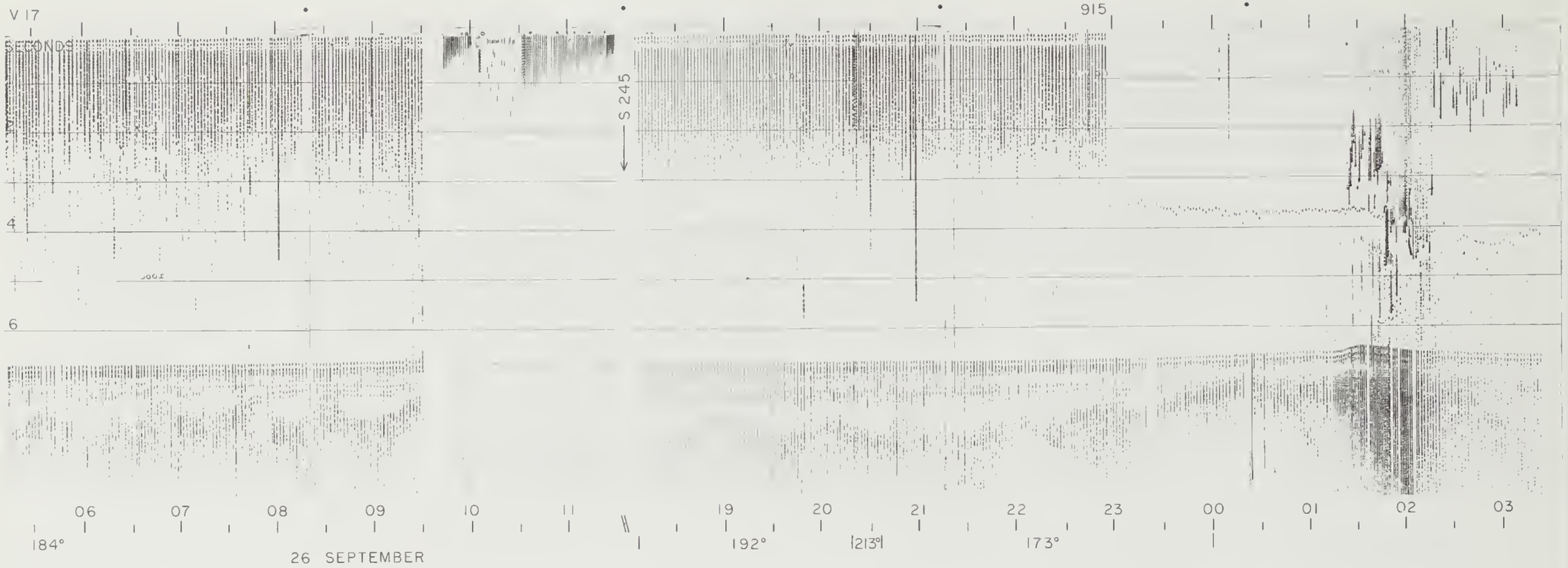

725
730
V 17
S 215 THRU 223
S 224
800
1600
3200
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 20 21 22 23 00 01 02
013°
009°
012°
270°
270°
013°
30 AUGUST
31 AUGUST
1961

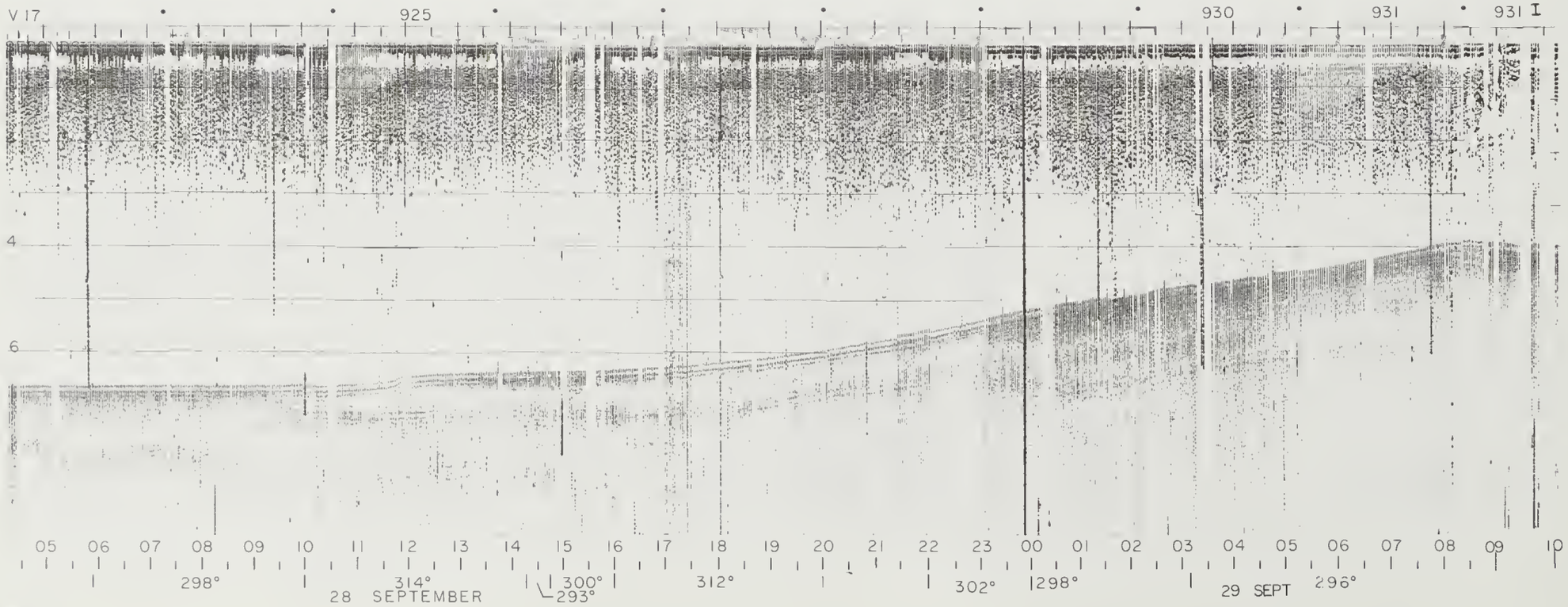

V 17
735
740
S 225
2
4
6
8
03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 01 02 03 04 05 06 07 08 09 10 11 12
013° 005° 013° 008° 015° 007° 013° 008°
1 SEPTEMBER
2 SEPTEMBER

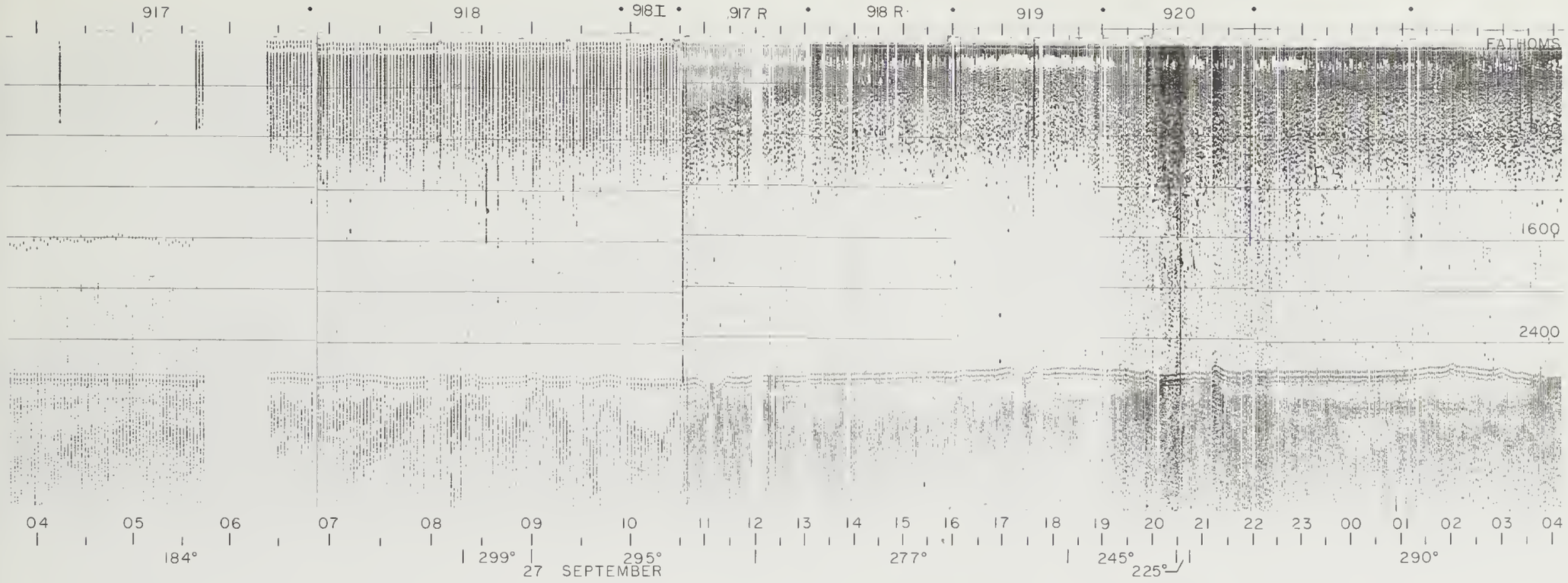

V 17
755
901
904
904 I
904 II
S 243
← S 229 THRU 242
HALIFAX, NOVA SCOTIA
4
6
8
23 00 01 02 03 04 05 06 07 08 09
21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 21
269° 048° 269° 357°
178°
6 SEPTEMBER
23 SEPTEMBER
24 SEPTEMBER

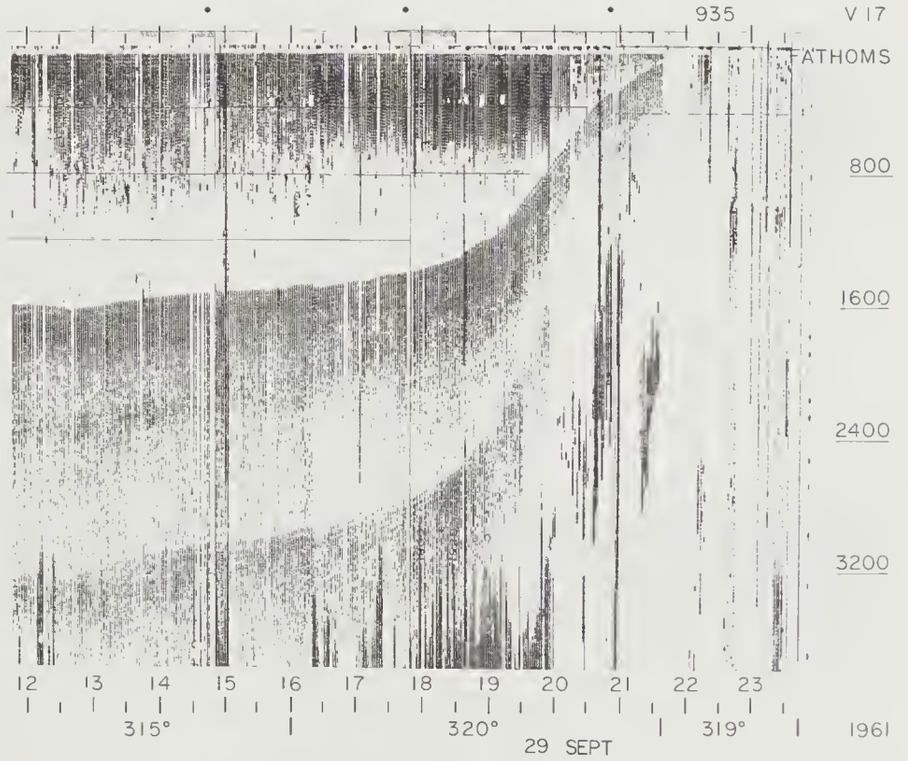

742
744
750
V 17
FATHOMS
800
1600
3200
← S 226 THRU 228
13 14 15 16
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 15 16 17 18 19 20 21
013°
2 SEPTEMBER
4 SEPTEMBER
272°
265°
5 SEPTEMBER

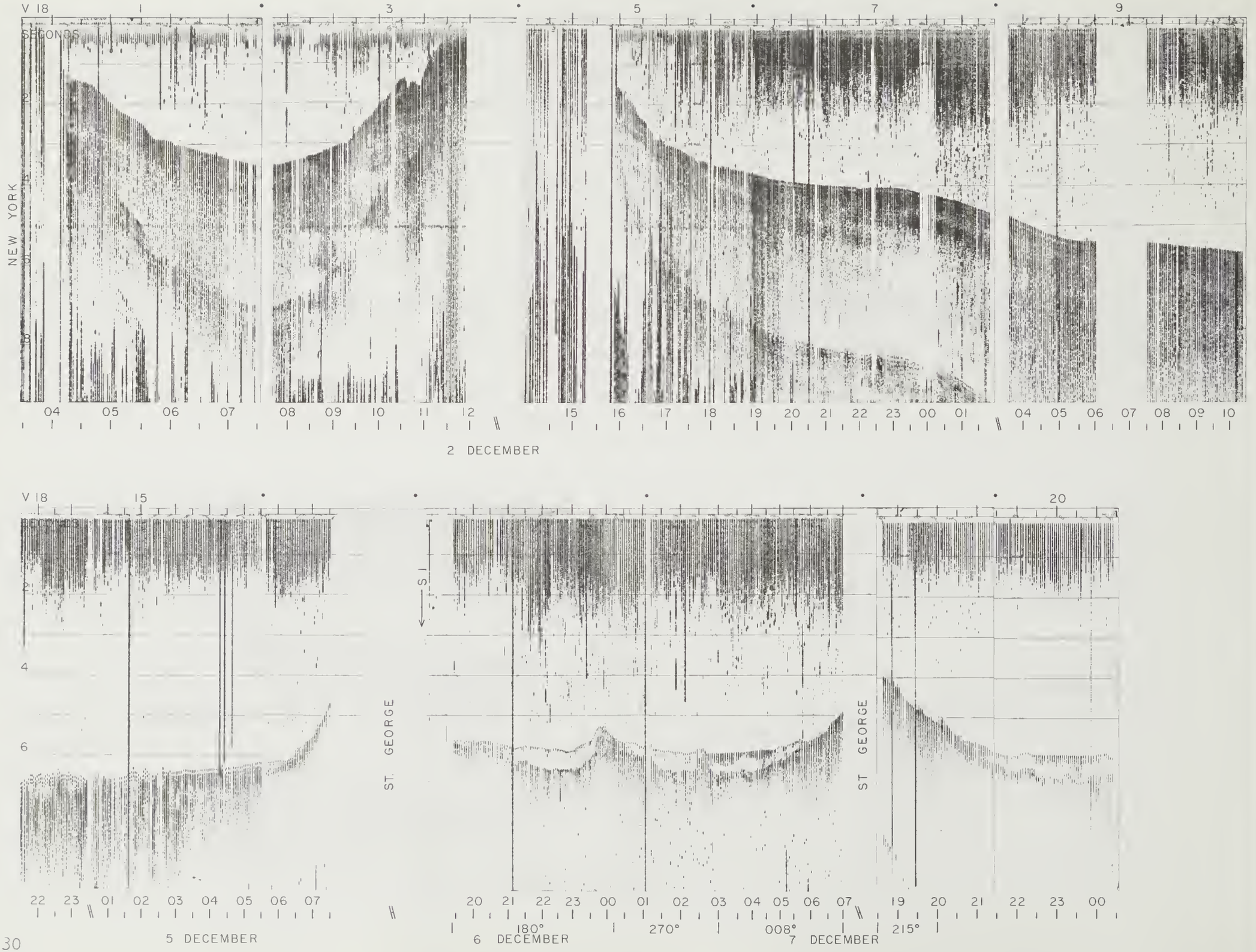

905
910
FATHOMS
800
1600
2400
S 244
01 02 03 04 05 06 07 08 09 14 15 16 17 18 00 01 02 03 04 05
180°
175°
167°
156°
165°
184°
25 SEPTEMBER
TZ +3→+4
26 SEPTEMBER
1961

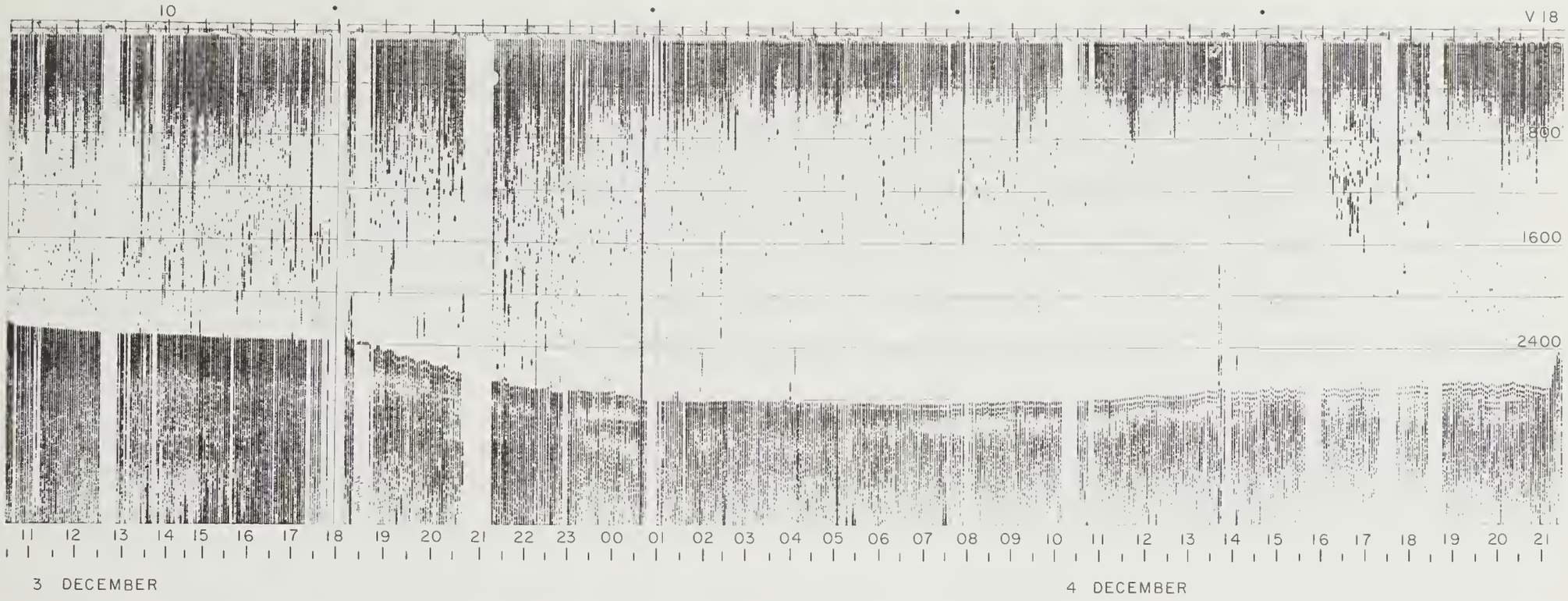

V 17
SECONDS
4
6
915
S 245
06 07 08 09 10 11
19 20 21 22 23 00 01 02 03
184°
26 SEPTEMBER
192°
213°
173°

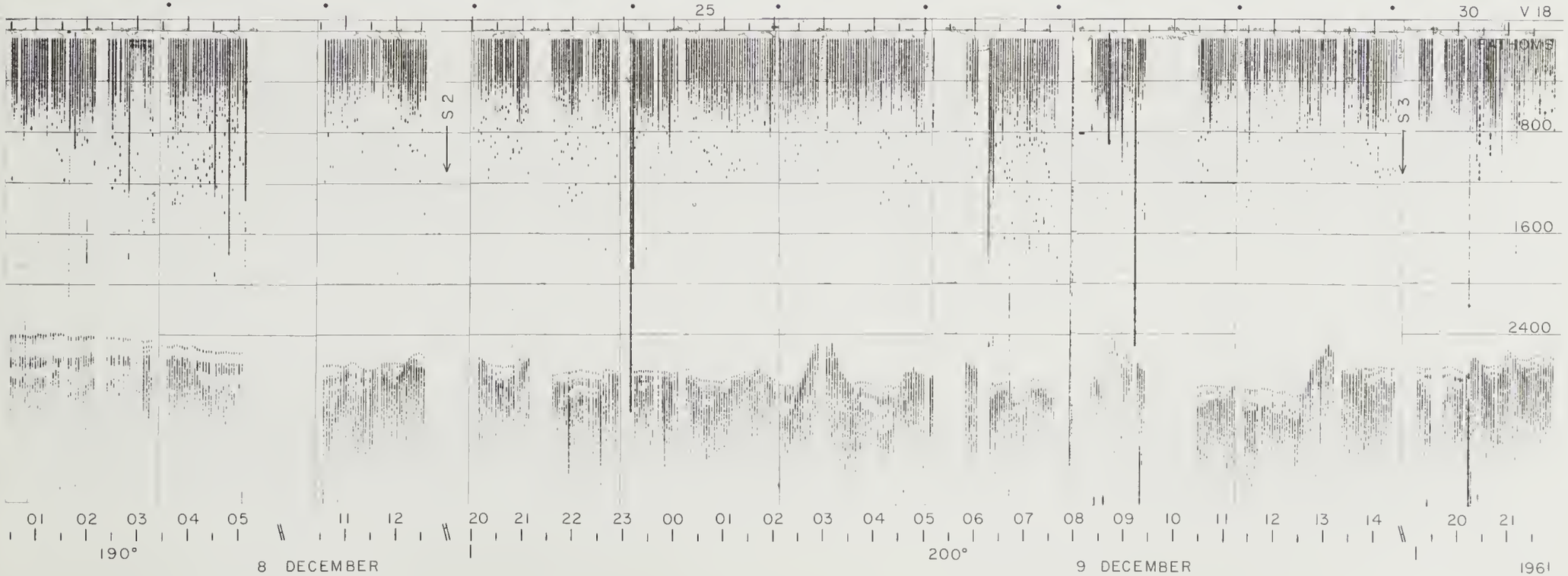

V 17
925
930
931
931 I
4
6
05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10
298°
314°
28 SEPTEMBER
300°
293°
312°
302°
298°
29 SEPT
296°

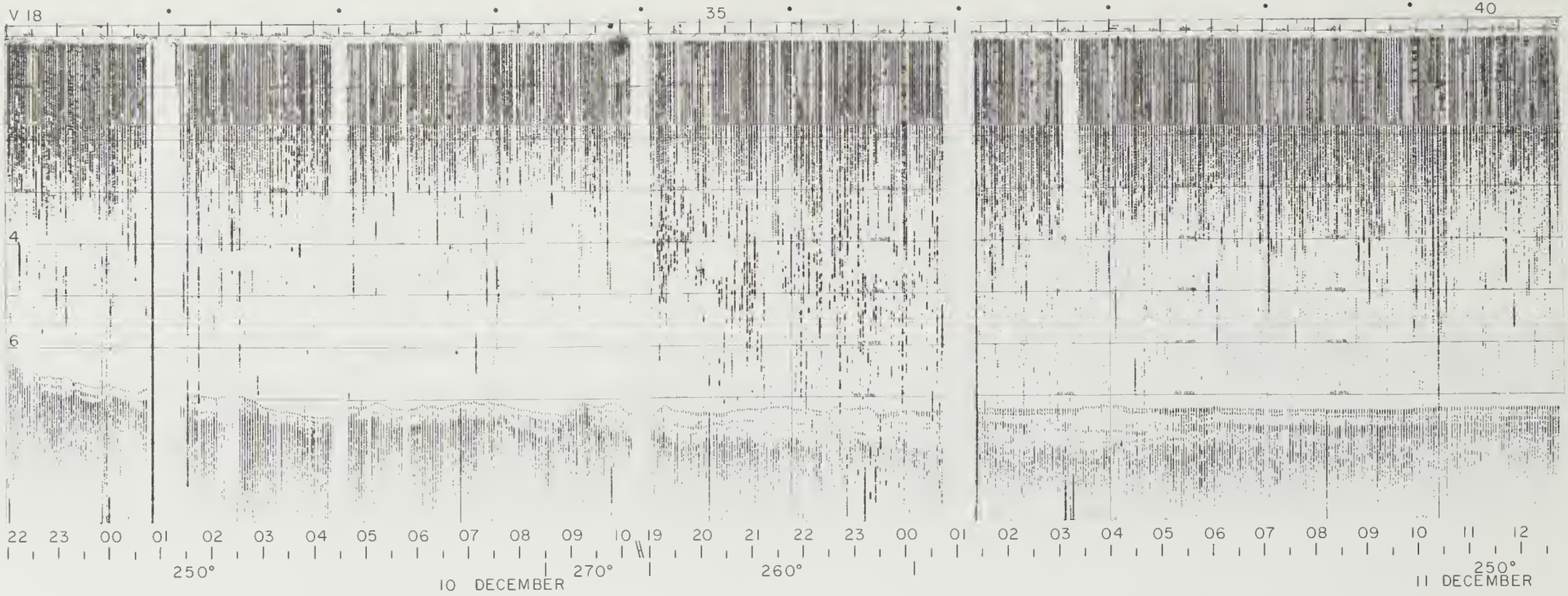

917
918
918I
917 R
918 R
919
920
FATHOMS
1600
2400
04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
184°
299°
295°
277°
245°
225°
290°
27 SEPTEMBER

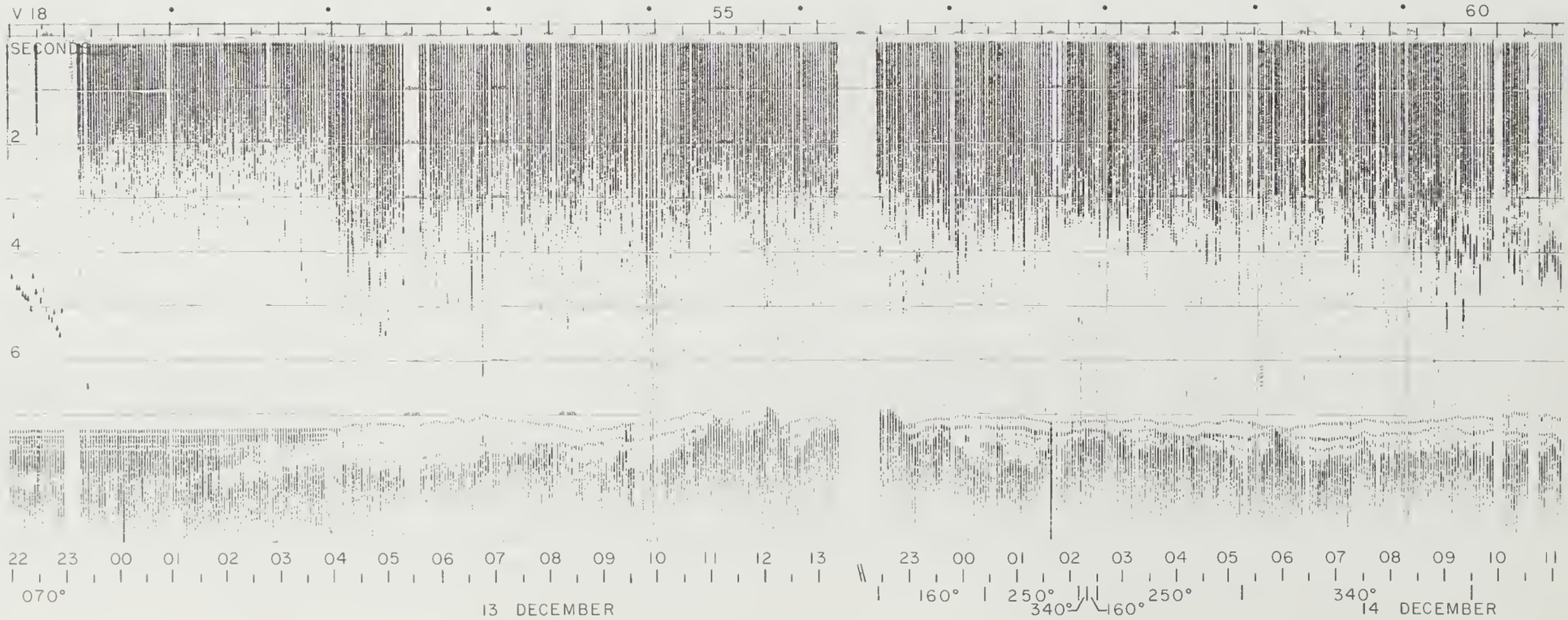

935
V 17
FATHOMS
800
1600
2400
3200
12 13 14 15 16 17 18 19 20 21 22 23
315°
320°
319°
1961
29 SEPT
NEW YORK, NEW YORK

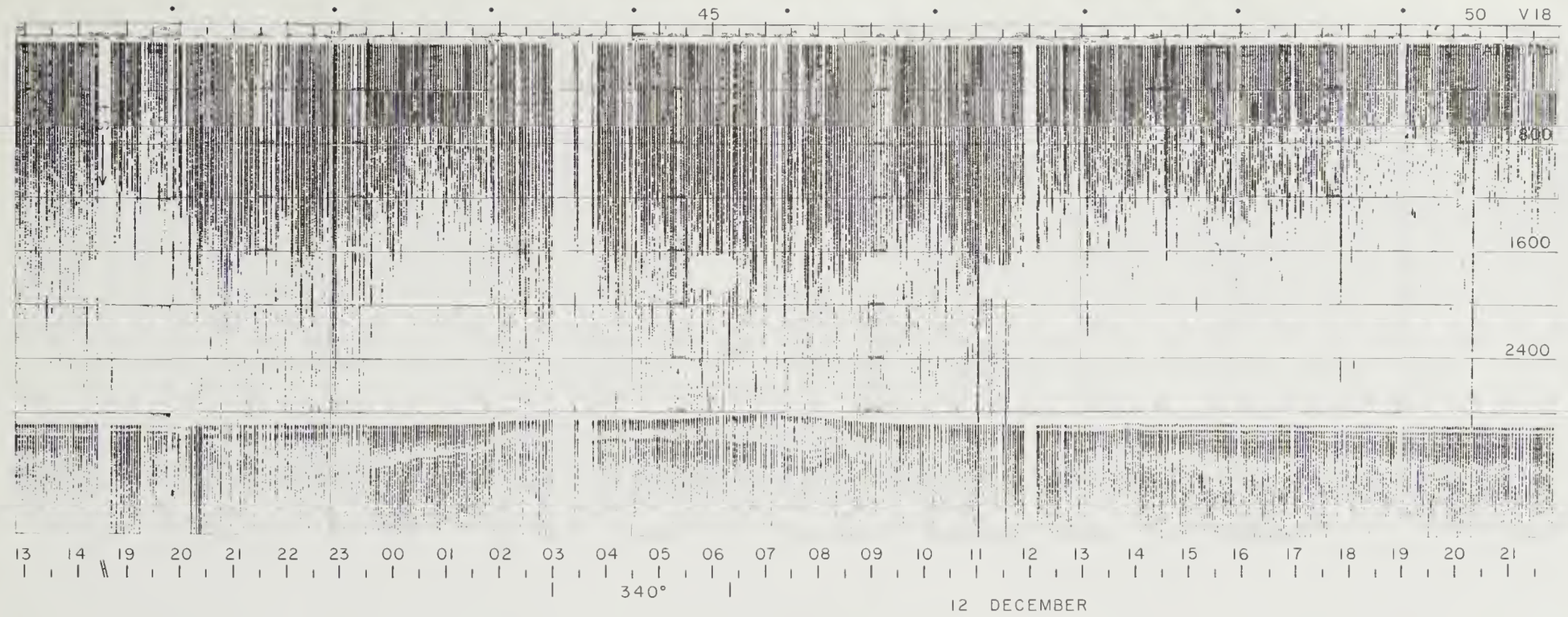

V 18
SECONDS
NEW YORK
ST. GEORGE
S
180°
270°
008°
215°
2 DECEMBER
5 DECEMBER
6 DECEMBER
7 DECEMBER

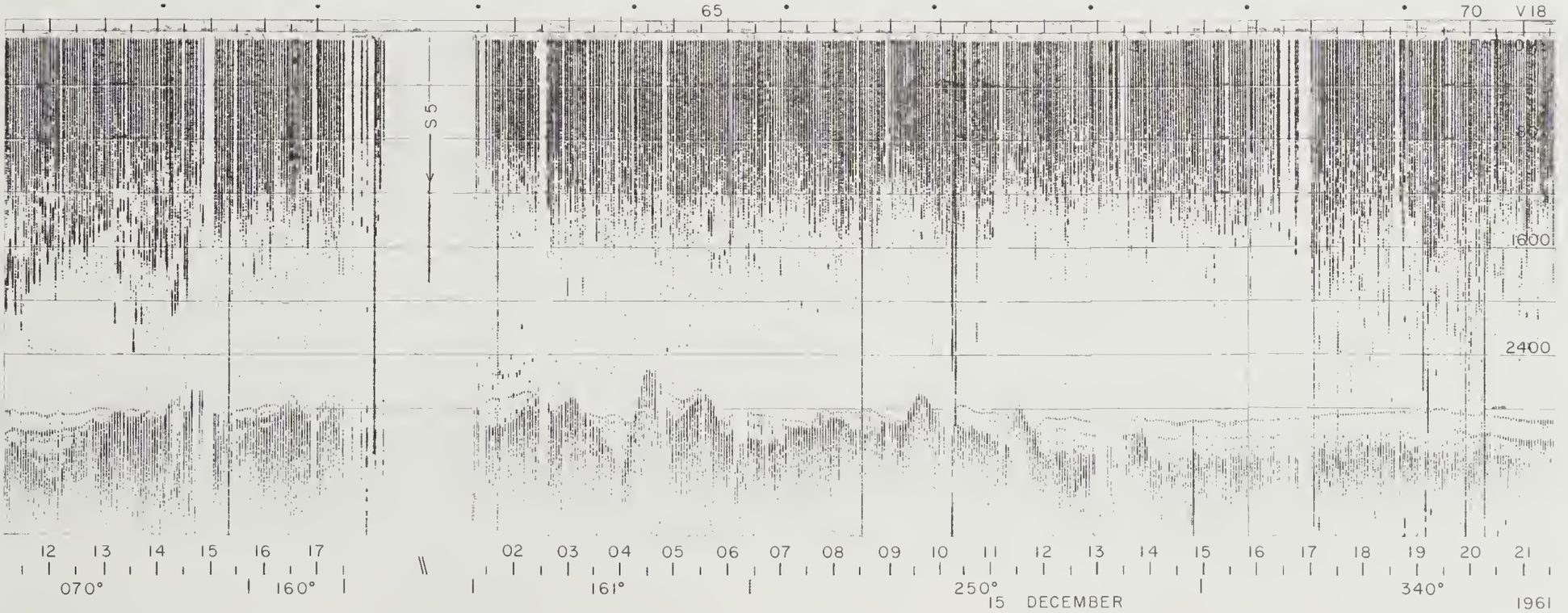

10
V 18
800
1600
2400
11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21
3 DECEMBER
4 DECEMBER

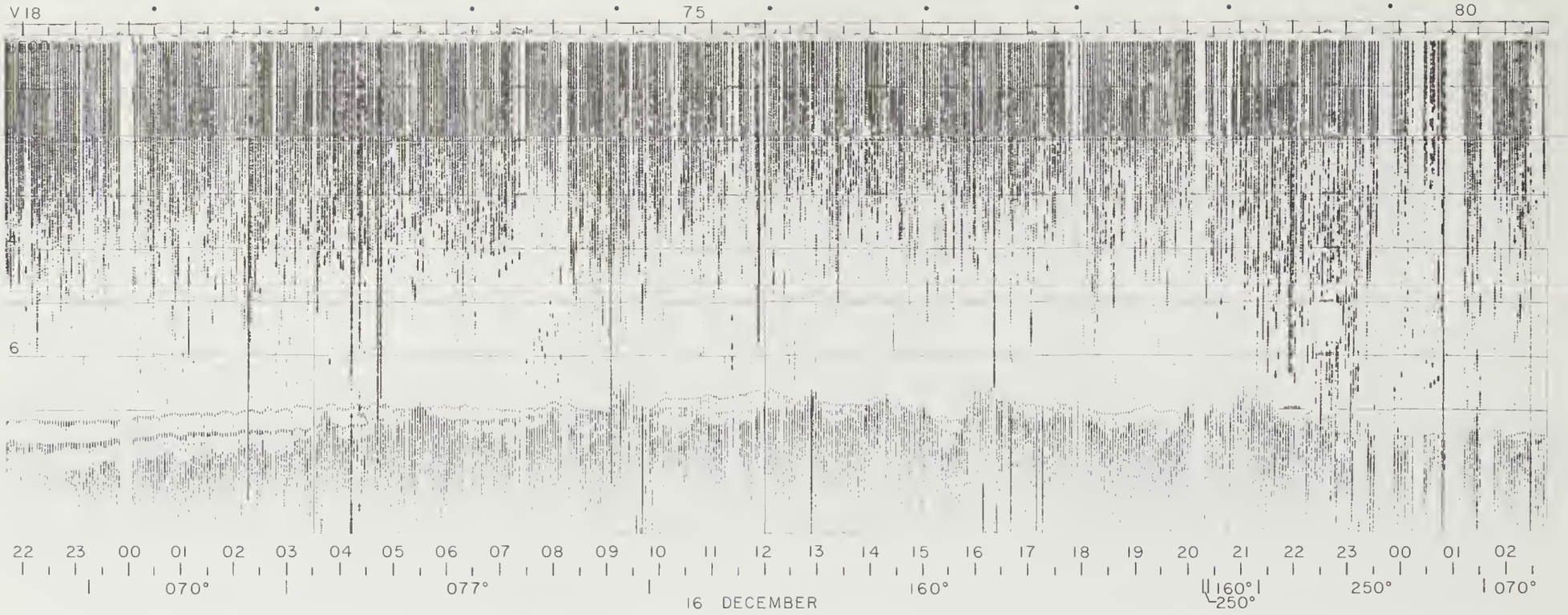

25
30
V 18
800
1600
2400
S 2
S 3
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190°
8 DECEMBER
200°
9 DECEMBER
1961

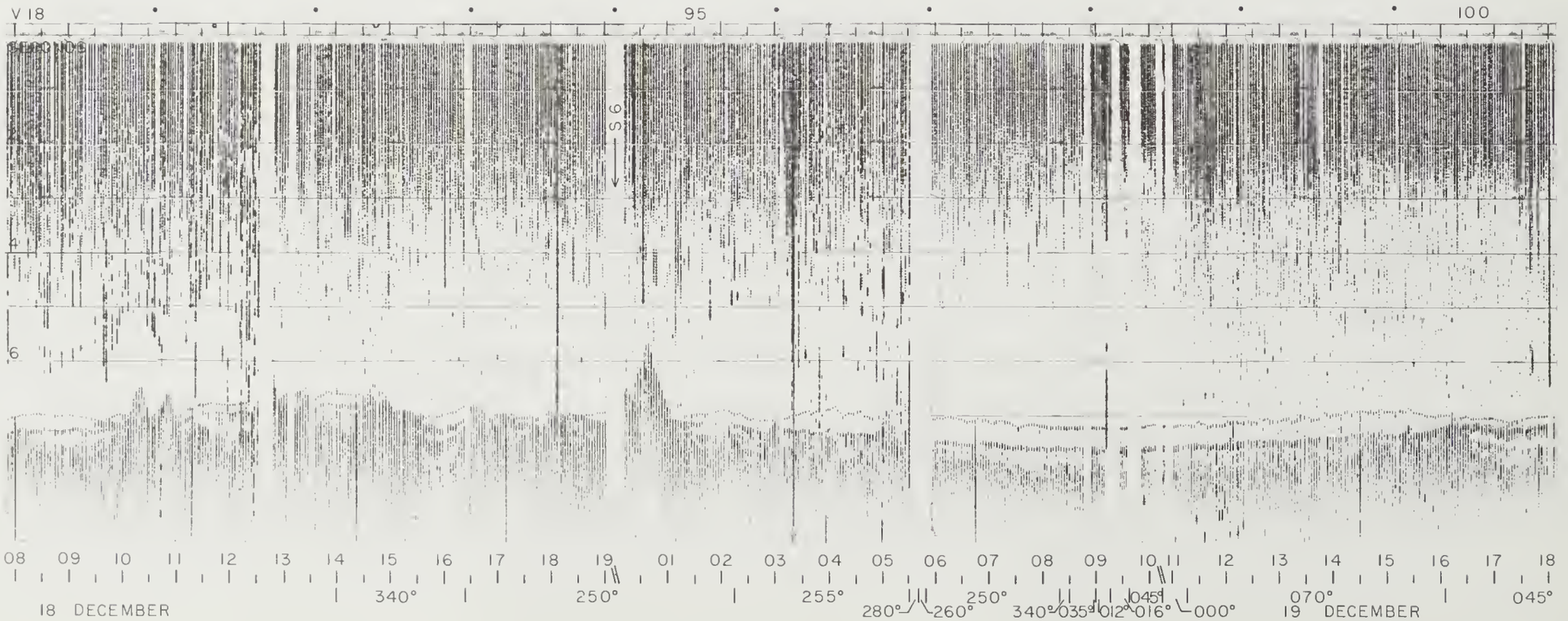

V 18
35
40
4
6
22 23 00 01 02 03 04 05 06 07 08 09 10 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12
250° 270° 260° 250°
10 DECEMBER
11 DECEMBER

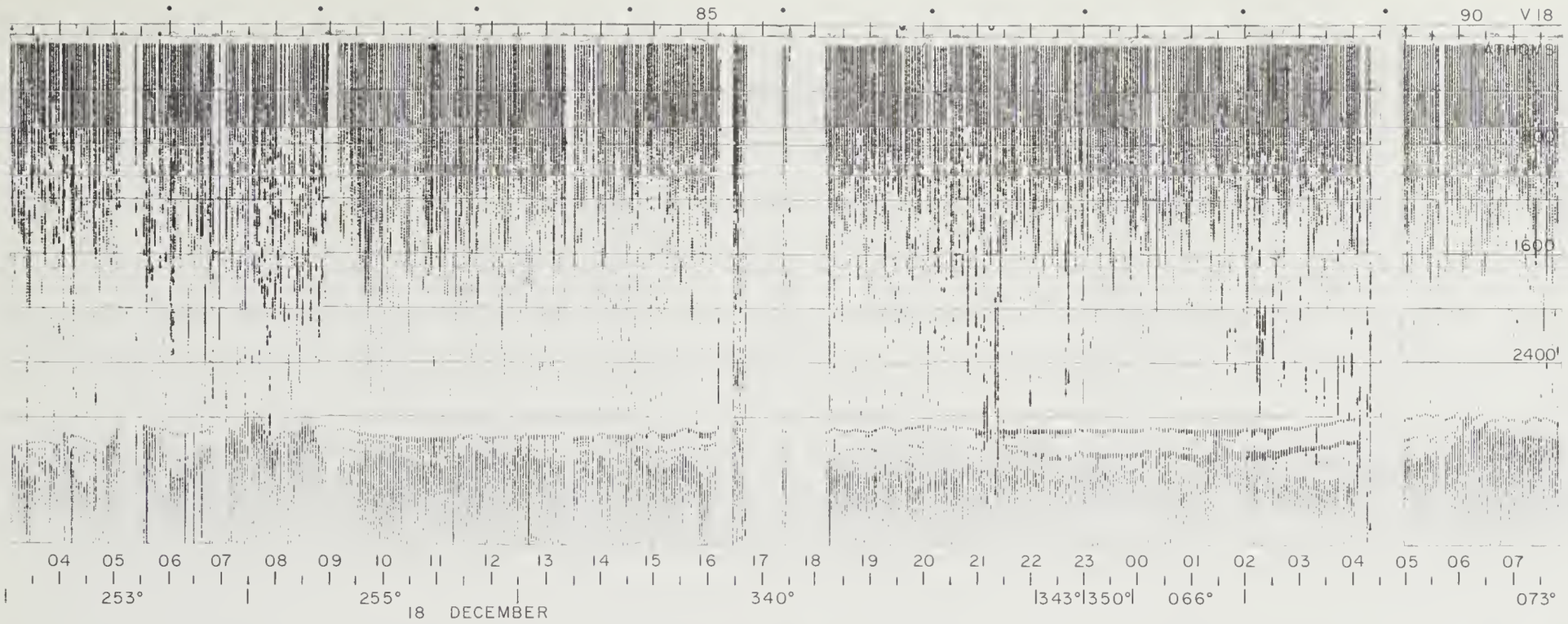

V 18
55
60
SECONDS
2
4
6
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 23 00 01 02 03 04 05 06 07 08 09 10 11
070° 160° 250° 340° 160° 250° 340°
13 DECEMBER
14 DECEMBER

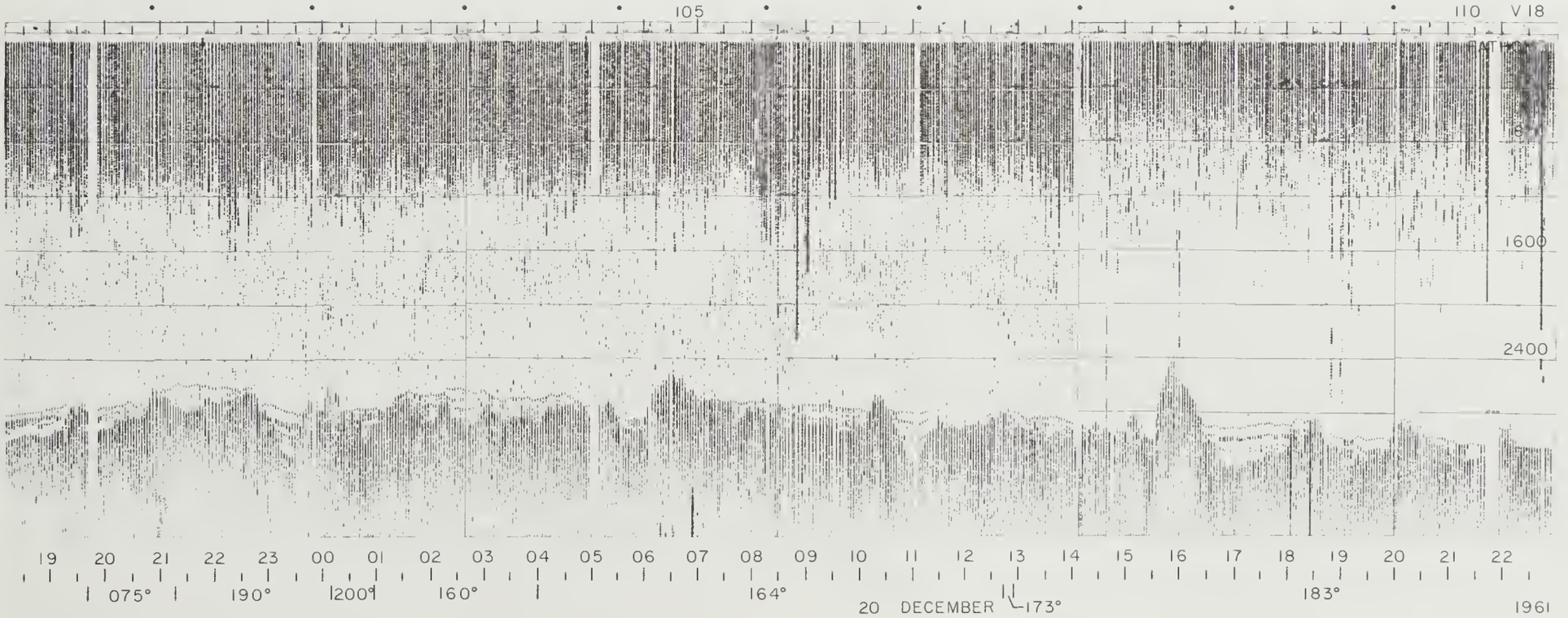

45
50
V18
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1600
2400
13 14 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21
340°
12 DECEMBER

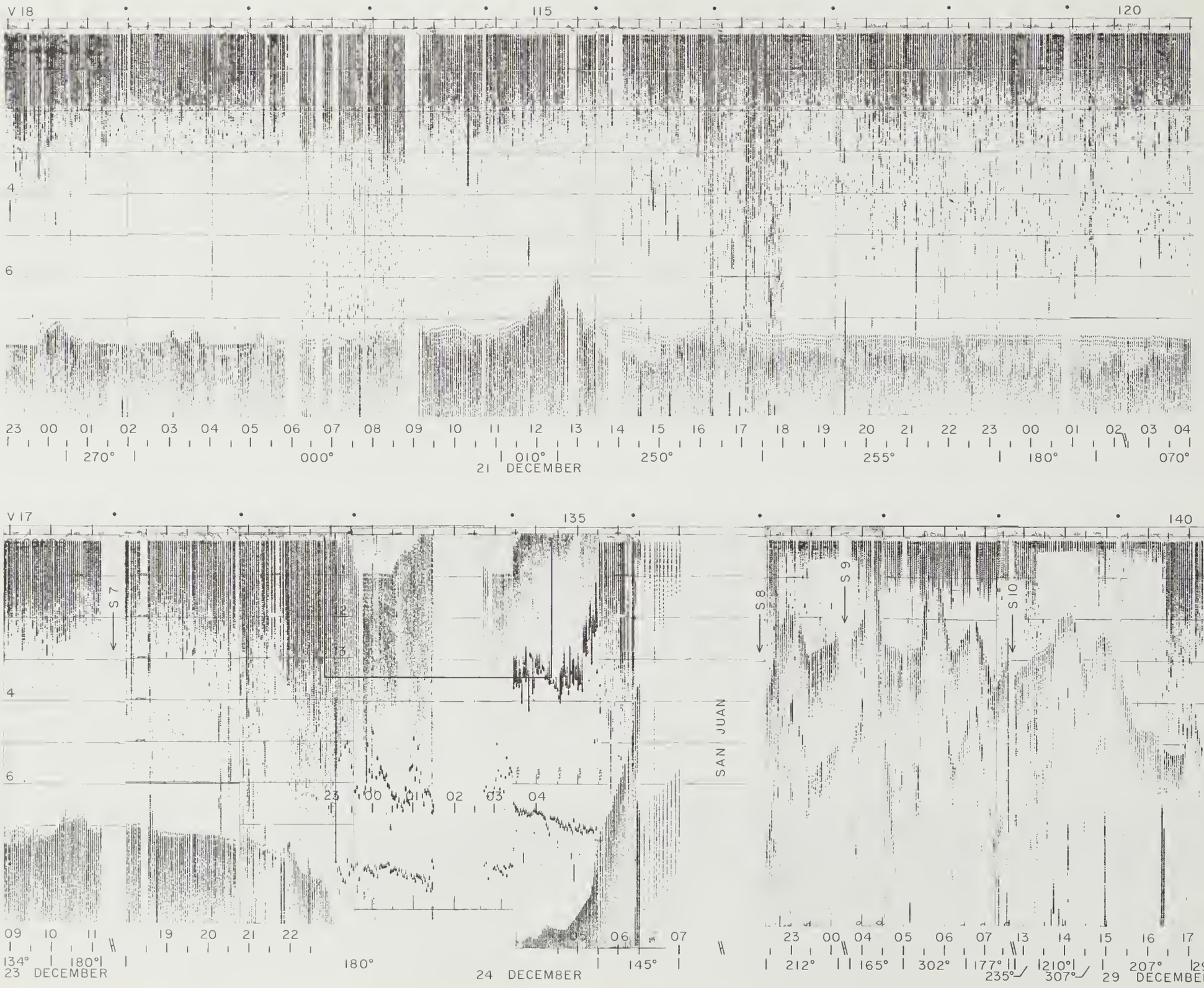

65
70
V18
S5
1600
2400
12 13 14 15 16 17
02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21
070°
160°
161°
250°
340°
15 DECEMBER
1961

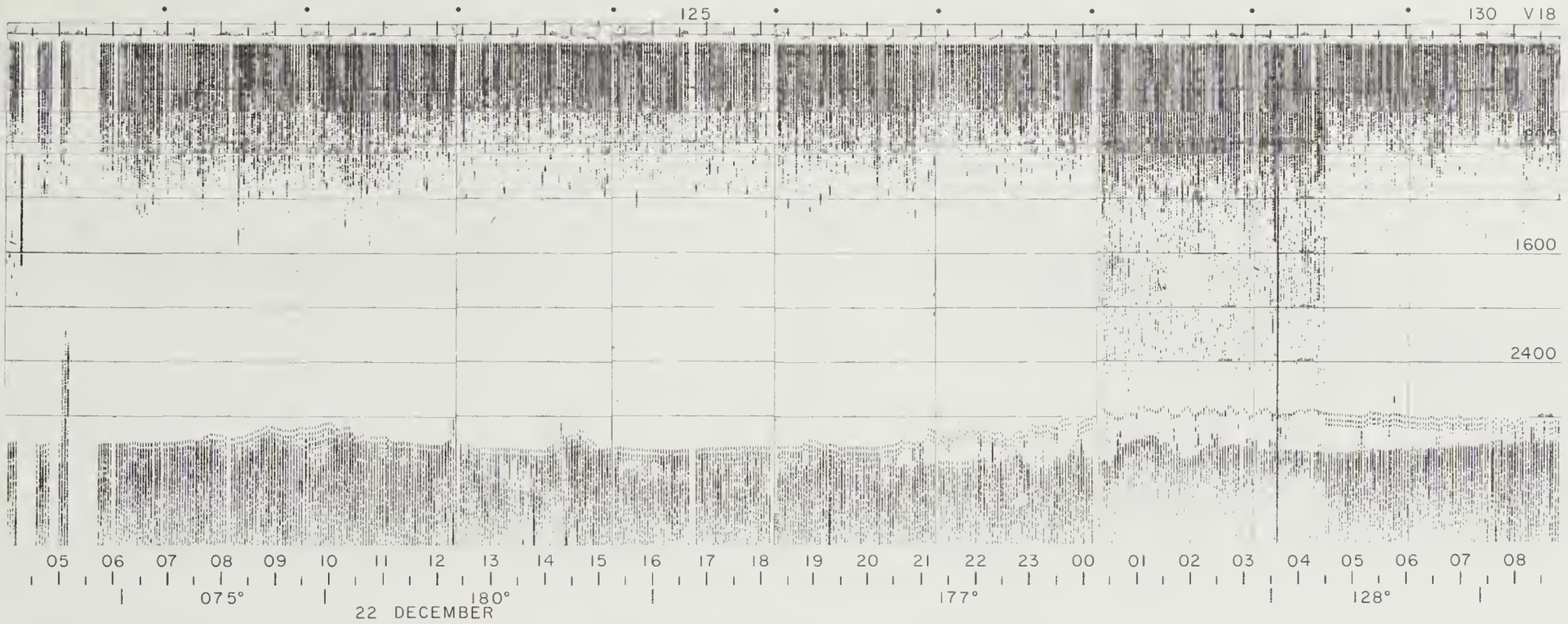

V 18
75
80
6
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02
070°
077°
160°
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250°
070°
16 DECEMBER

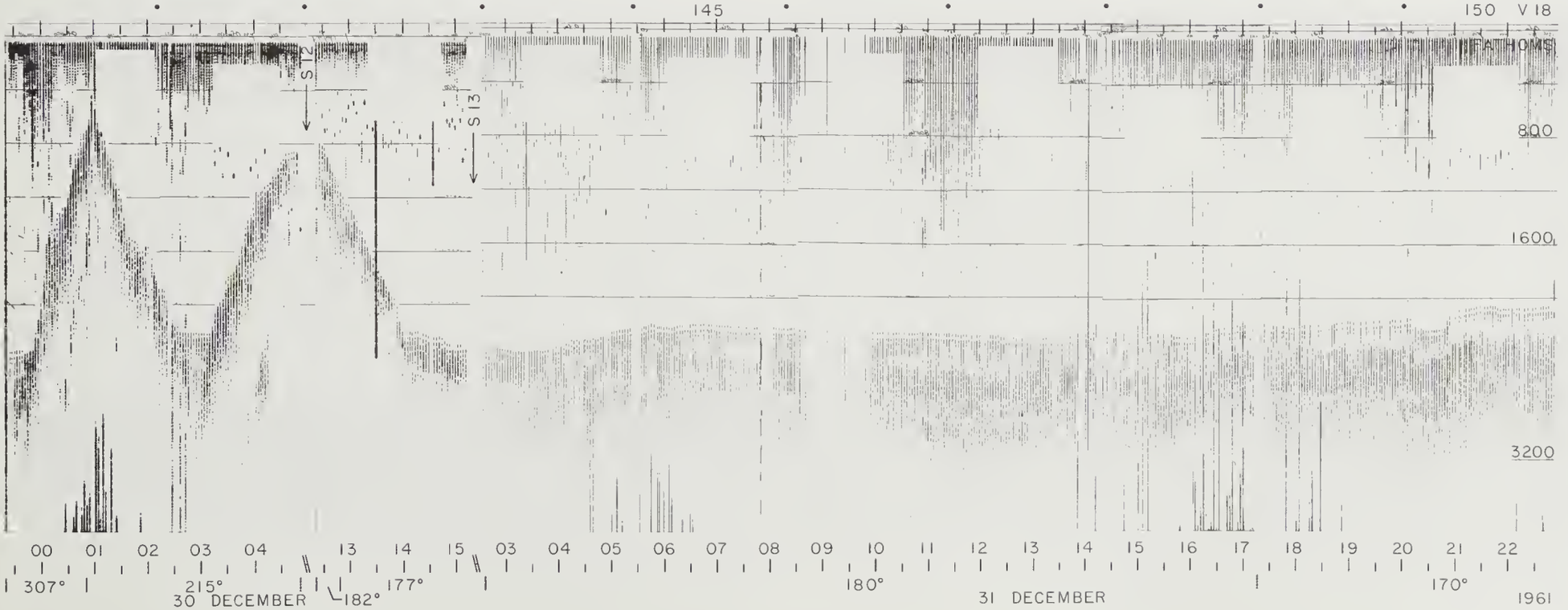

V 18
95
100
S 6
6
08 09 10 11 12 13 14 15 16 17 18 19 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
340°
250°
255°
250°
045°
070°
045°
18 DECEMBER
280°
260°
340°
035°
012°
016°
000°
19 DECEMBER

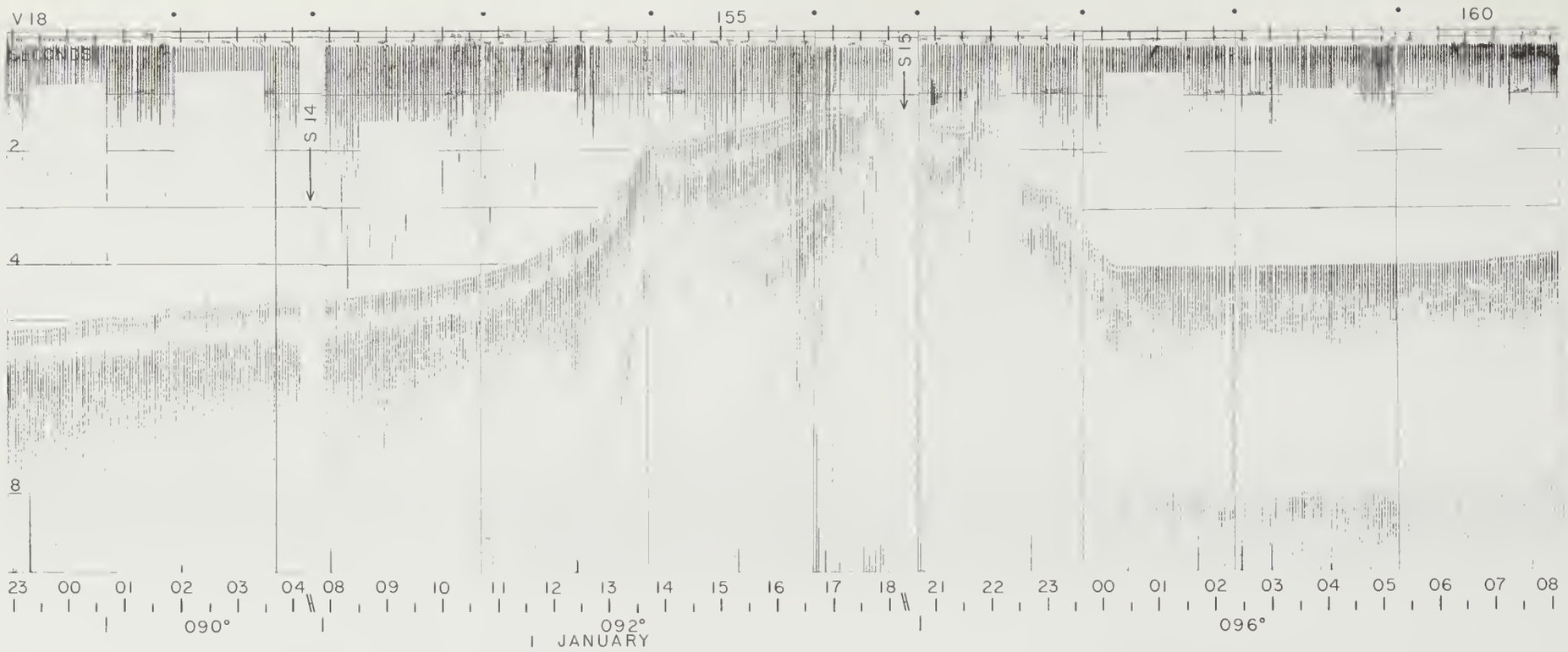

85
90
V 18
ANTHONY
1600
2400
04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07
253°
255°
340°
343°
350°
066°
073°
18 DECEMBER

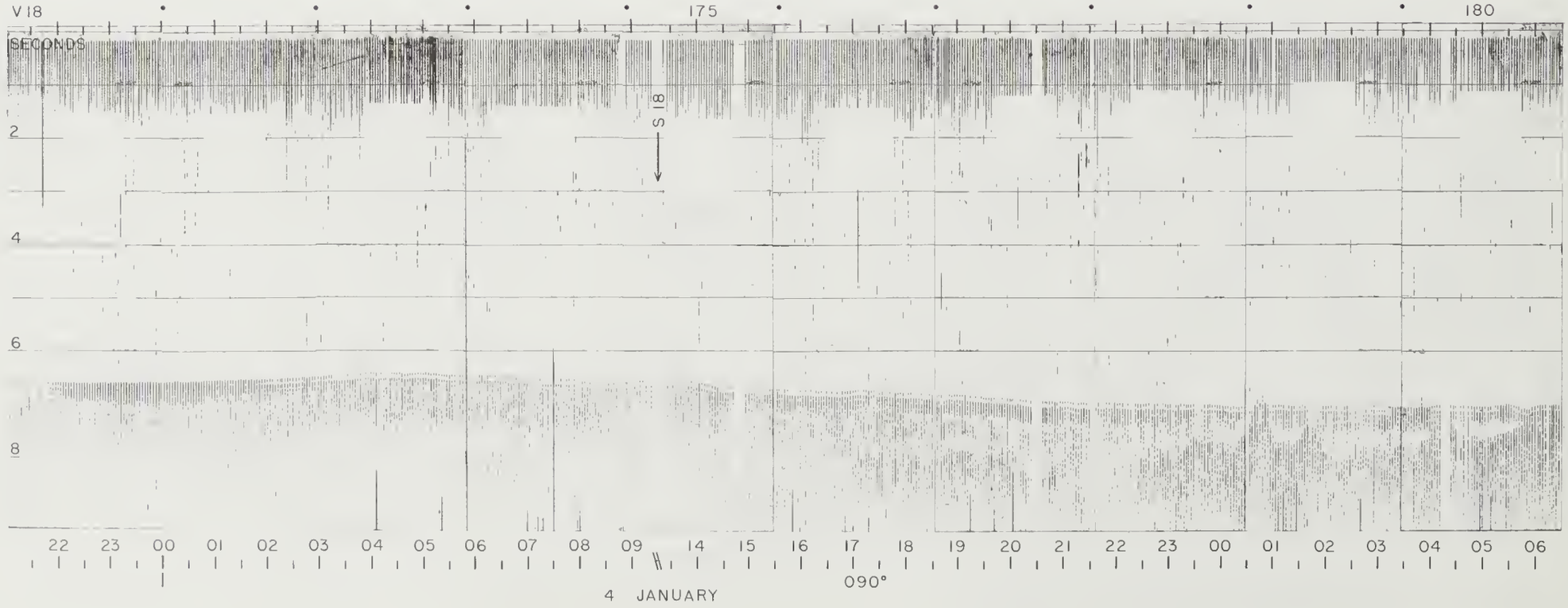

105
110
V 18
ANTHONY
1600
2400
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22
075°
190°
200°
160°
164°
173°
183°
20 DECEMBER
1961

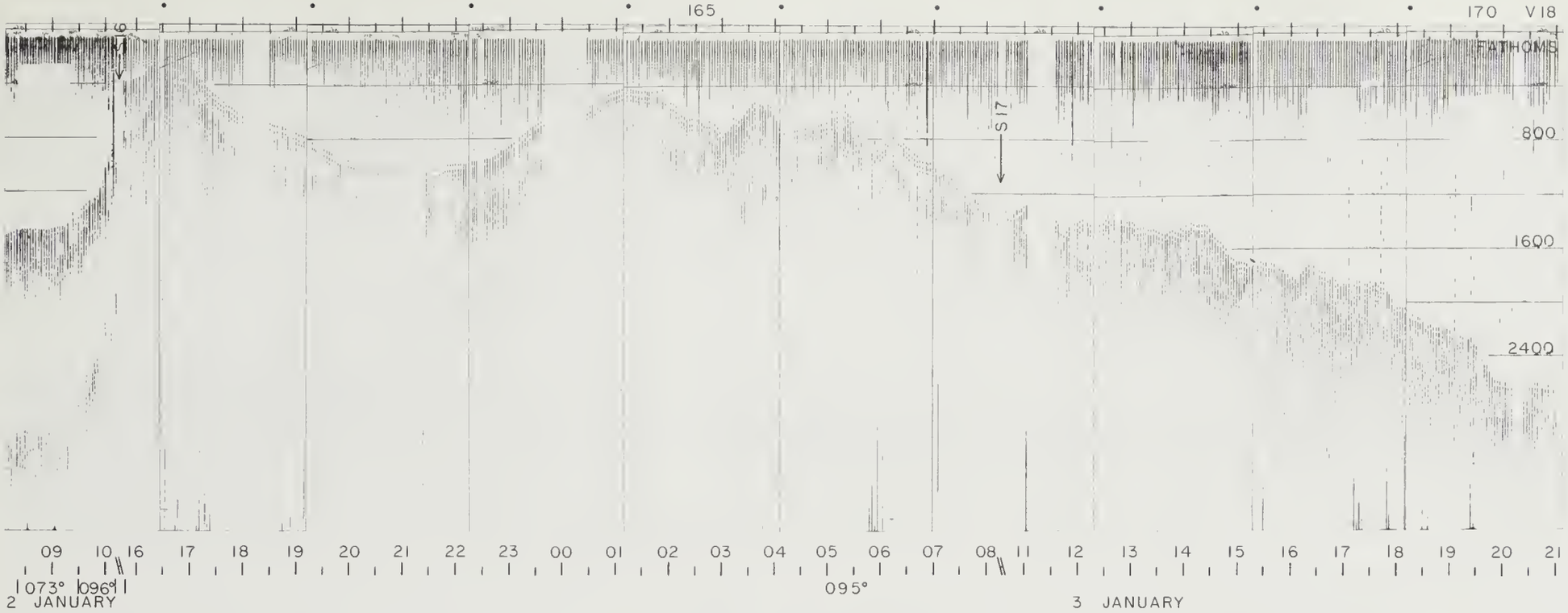

V 18
115
120
4
6
23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
270° 000° 010° 250° 255° 180° 070°
21 DECEMBER
V 17
135
140
S 7
S 8
S 9
S 10
S 11
4
6
23 00 01 02 03 04
09 10 11 19 20 21 22
05 06 07
23 00 04 05 06 07 13 14 15 16 17 18
134° 180°
180°
145°
212° 165° 302° 177° 210° 207° 297°
235° 307°
23 DECEMBER
24 DECEMBER
29 DECEMBER
SAN JUAN

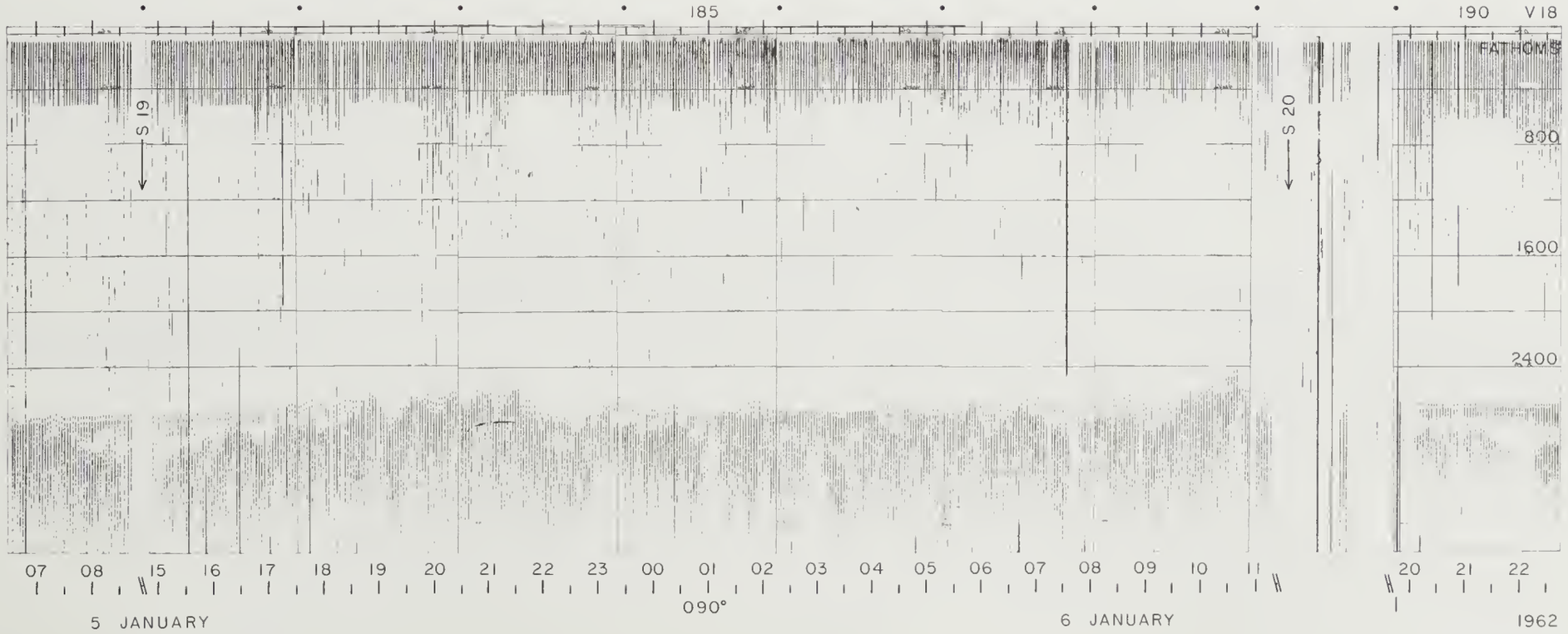

125
130
V18
1600
2400
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075°
180°
177°
128°
22 DECEMBER

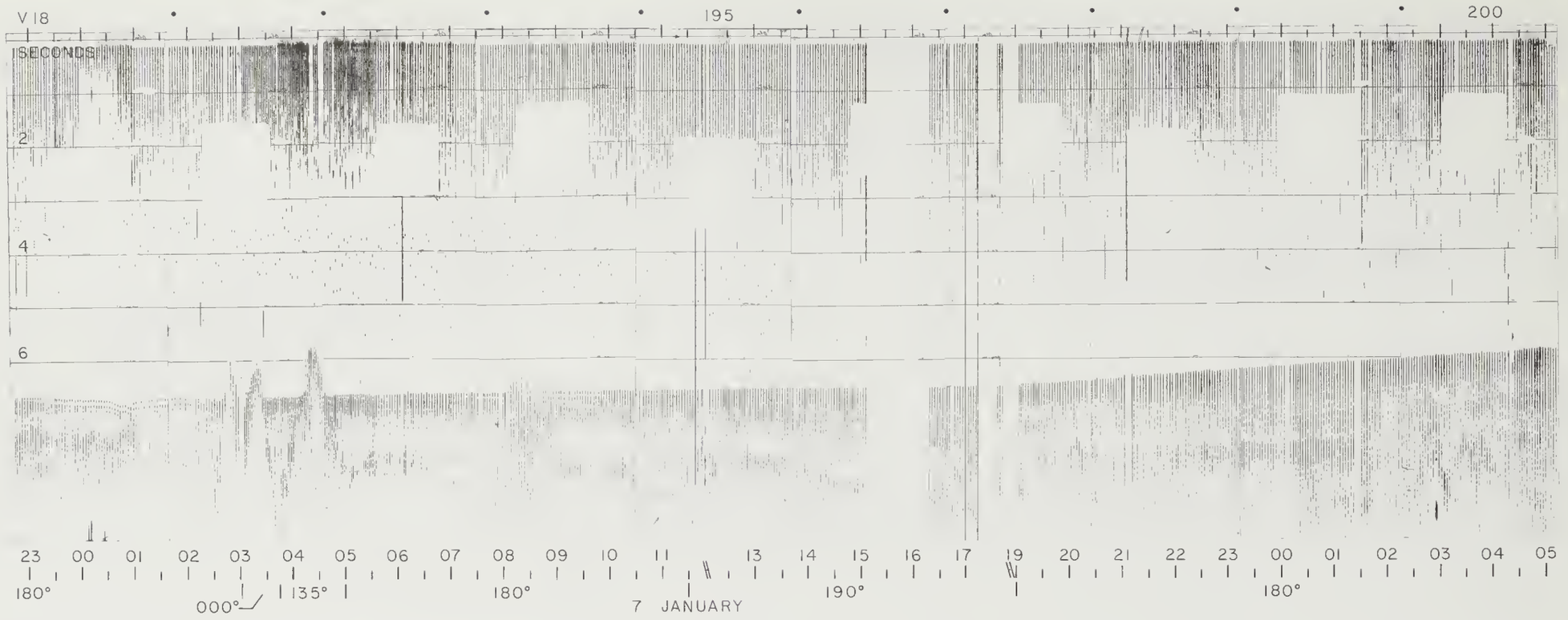

145
150
V18
FATHOMS
S12
S13
800
1600
3200
00 01 02 03 04 13 14 15 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22
307°
215°
177°
180°
170°
30 DECEMBER
182°
31 DECEMBER
1961

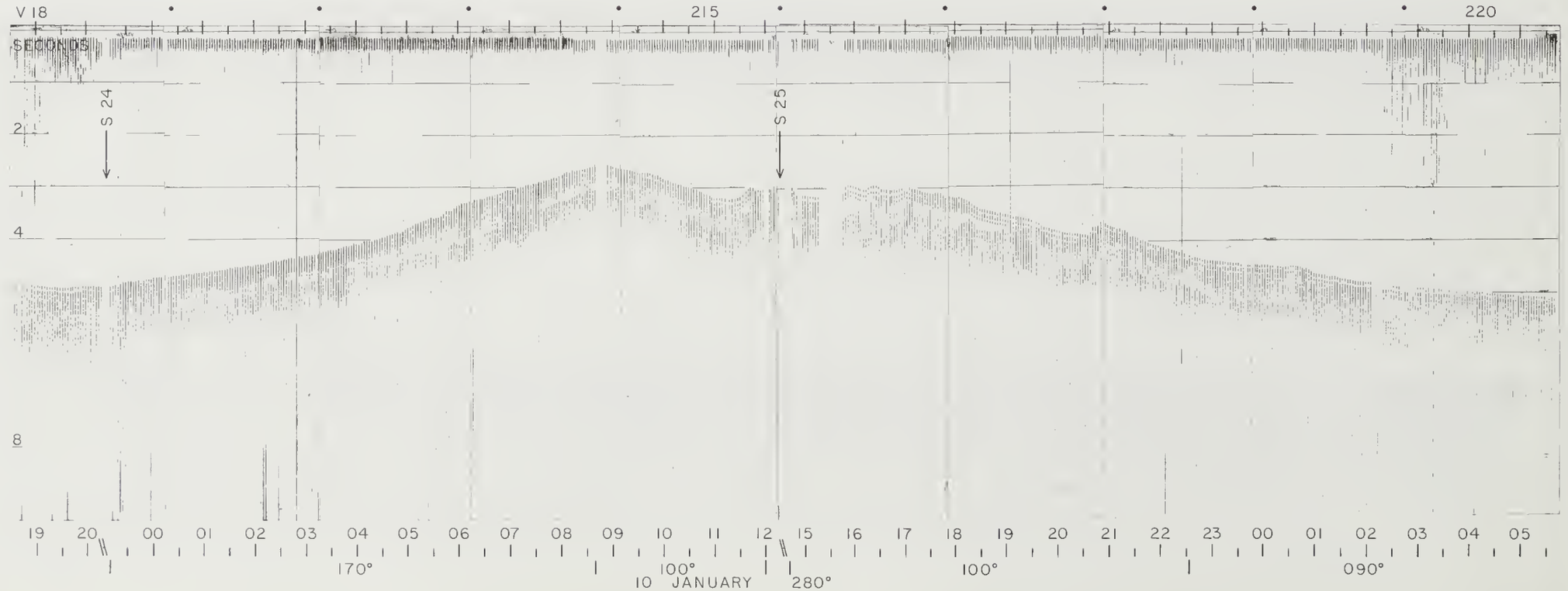

V 18
155
160
SECONDS
S 14
S 15
2
4
8
23 00 01 02 03 04 08 09 10 11 12 13 14 15 16 17 18 21 22 23 00 01 02 03 04 05 06 07 08
090°
092°
096°
1 JANUARY

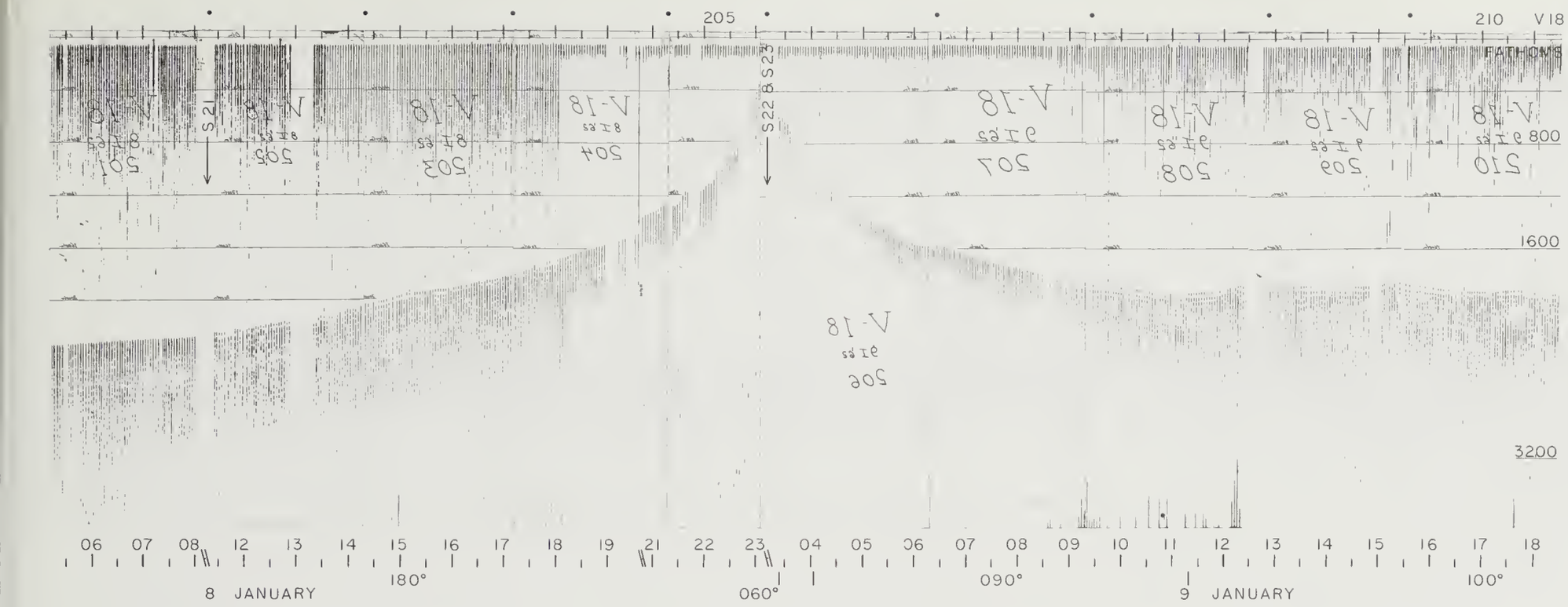

V 18
175
180
SECONDS
S 18
2
4
6
8
22 23 00 01 02 03 04 05 06 07 08 09 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06
090°
4 JANUARY

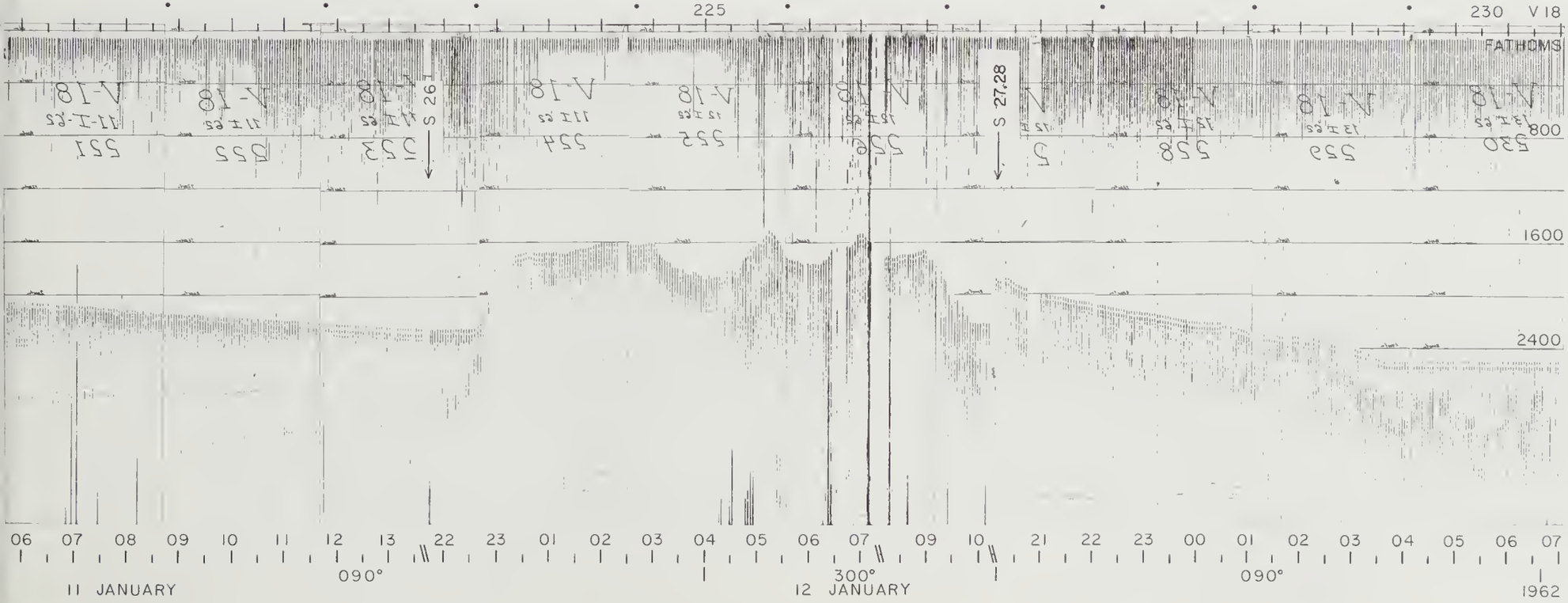

165
170
V18
FATHOMS
800
1600
2400
S17
09 10 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 11 12 13 14 15 16 17 18 19 20 21
073° 096°
095°
2 JANUARY
3 JANUARY

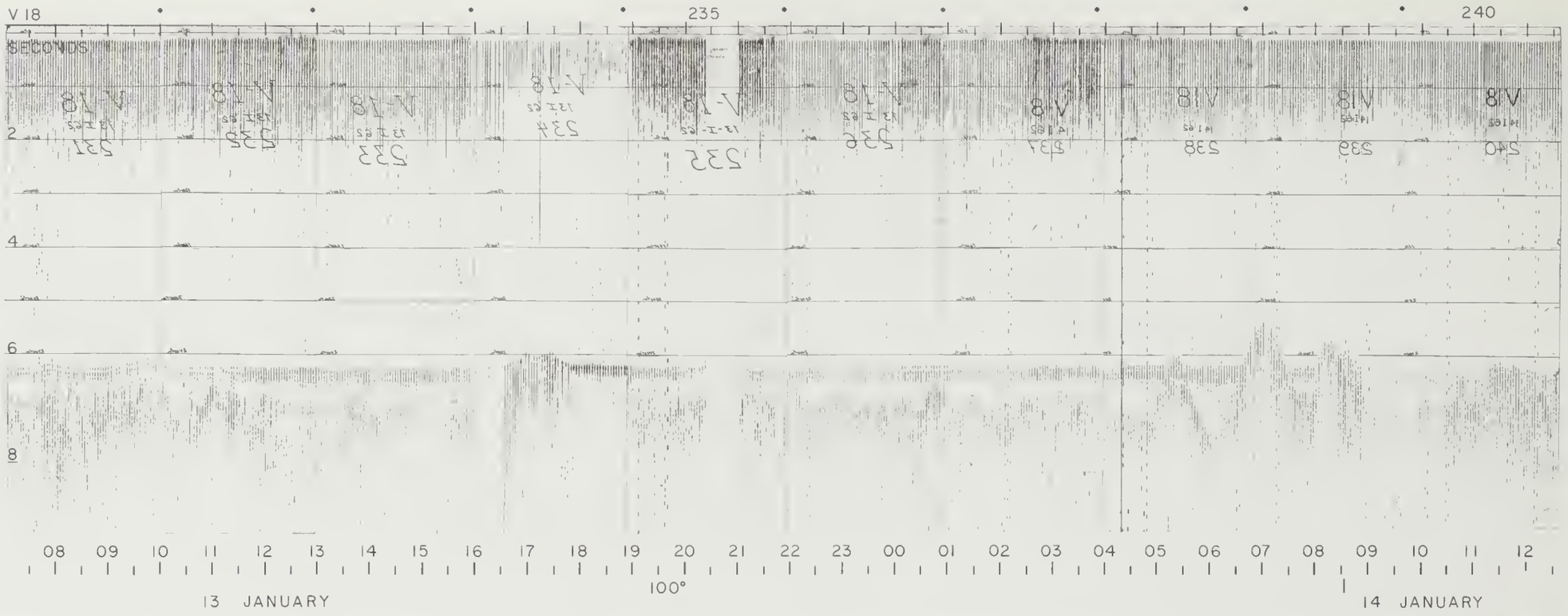

185
190
V18
FATHOMS
800
1600
2400
S19
S20
07 08 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 20 21 22
090°
5 JANUARY
6 JANUARY
1962

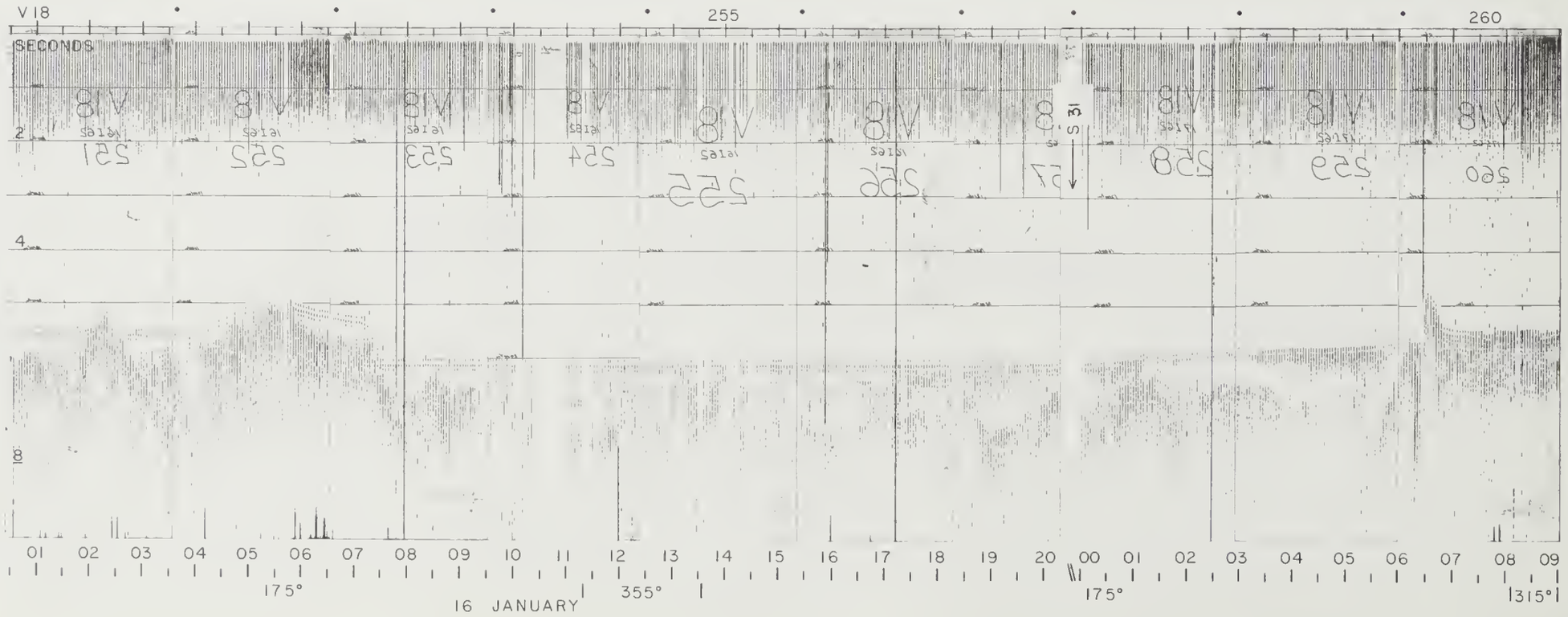

V 18
195
200
SECONDS
2
4
6
23 00 01 02 03 04 05 06 07 08 09 10 11 13 14 15 16 17 19 20 21 22 23 00 01 02 03 04 05
180° 000° 135° 180° 7 JANUARY 190° 180°

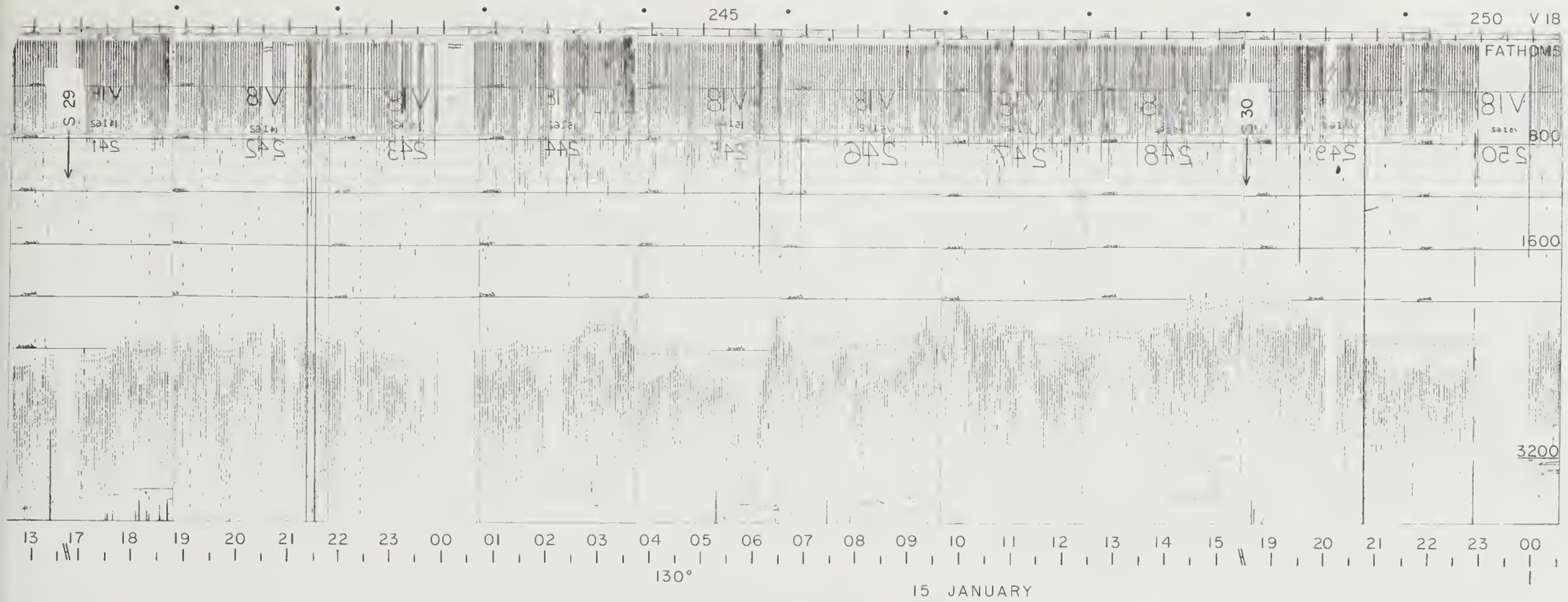

V 18
215
220
SECONDS
S 24
S 25
2
4
8
19 20 00 01 02 03 04 05 06 07 08 09 10 11 12 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05
170° 100° 10 JANUARY 280° 100° 090°

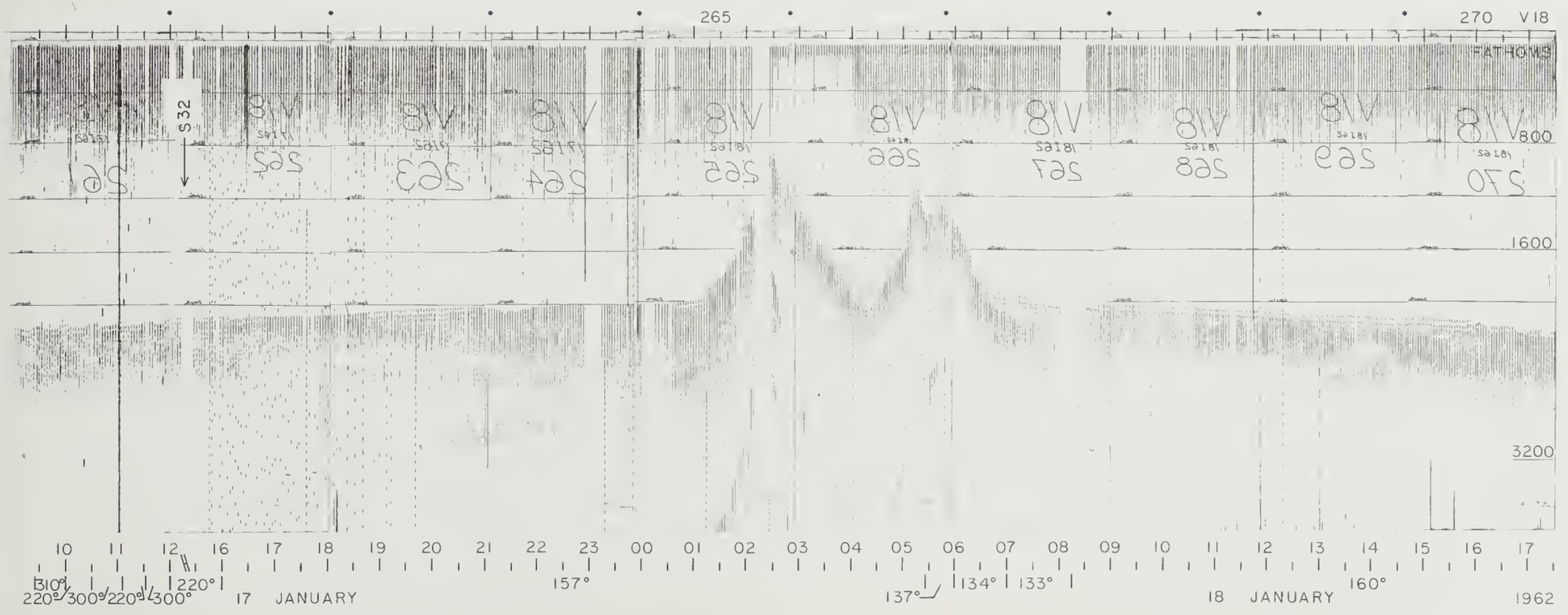

205
210
V18
FATHOMS
S 21
S 22 & S 23
800
1600
3200
06 07 08 12 13 14 15 16 17 18 19 21 22 23 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
8 JANUARY
180°
060°
090°
9 JANUARY
100°

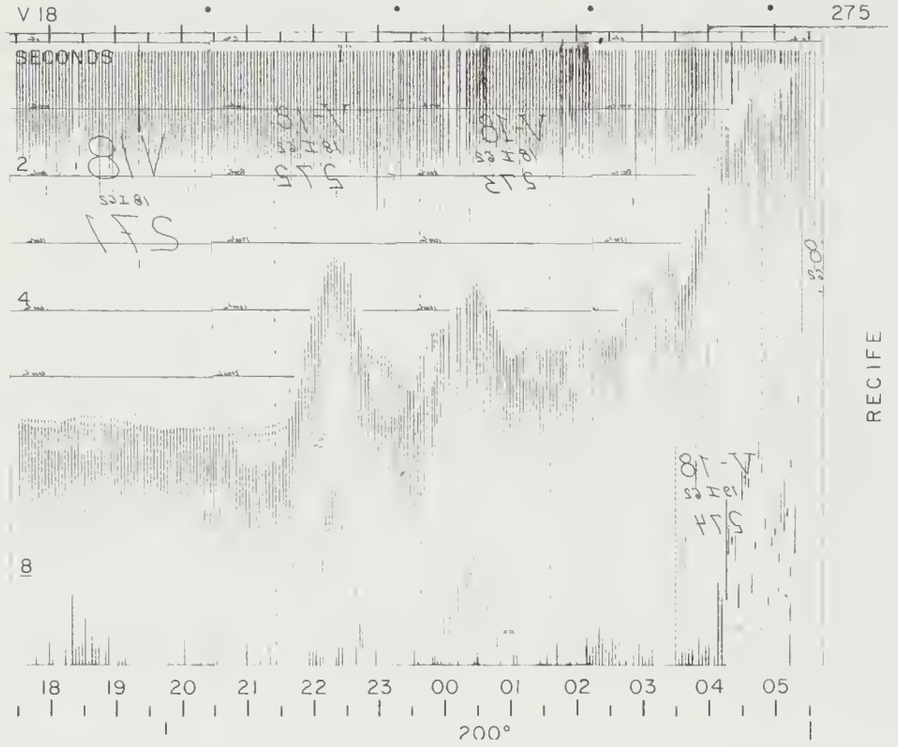

225
230
V18
FATHOMS
S 26
S 27,28
800
1600
2400
06 07 08 09 10 11 12 13 22 23 01 02 03 04 05 06 07 09 10 21 22 23 00 01 02 03 04 05 06 07
11 JANUARY
090°
300°
12 JANUARY
090°
1962

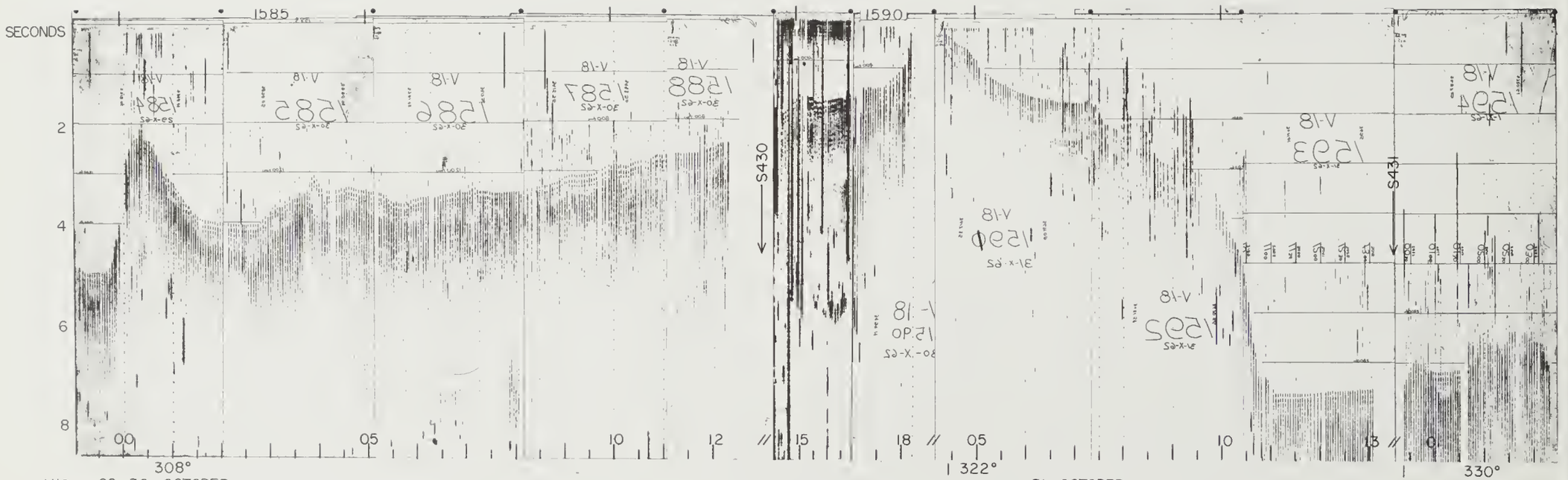

V 18
235
240
SECONDS
2
4
6
8
08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12
13 JANUARY
100°
14 JANUARY

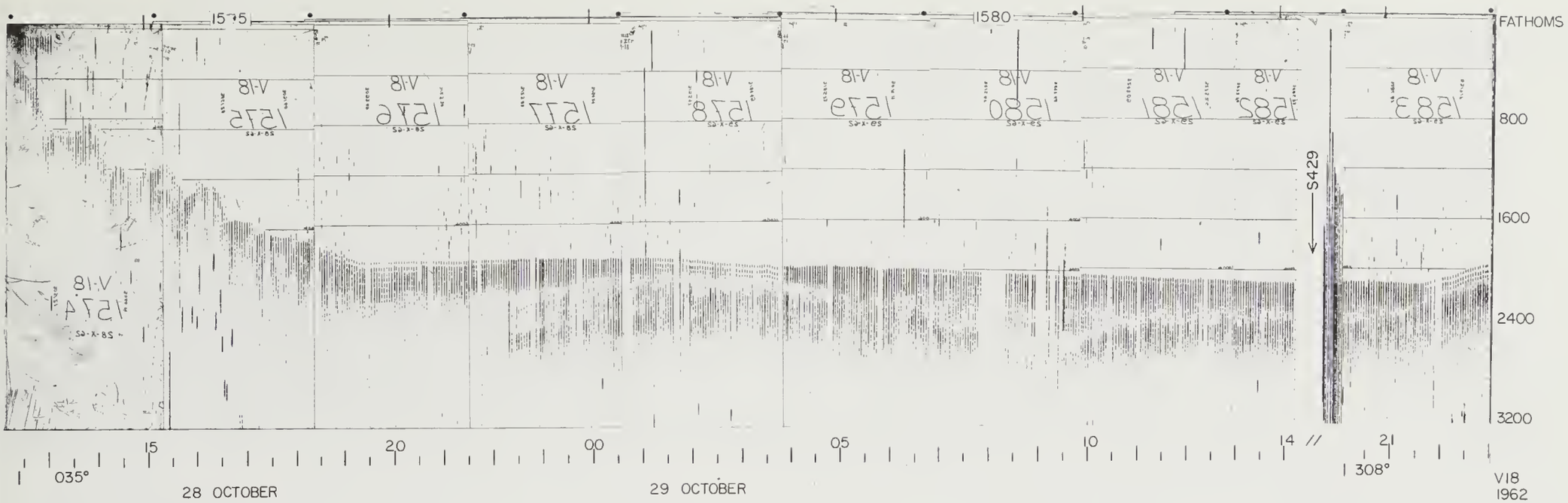

V 18
255
260
SECONDS
S 31
2
4
8
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 00 01 02 03 04 05 06 07 08 09
175°
16 JANUARY
355°
175°
1315°

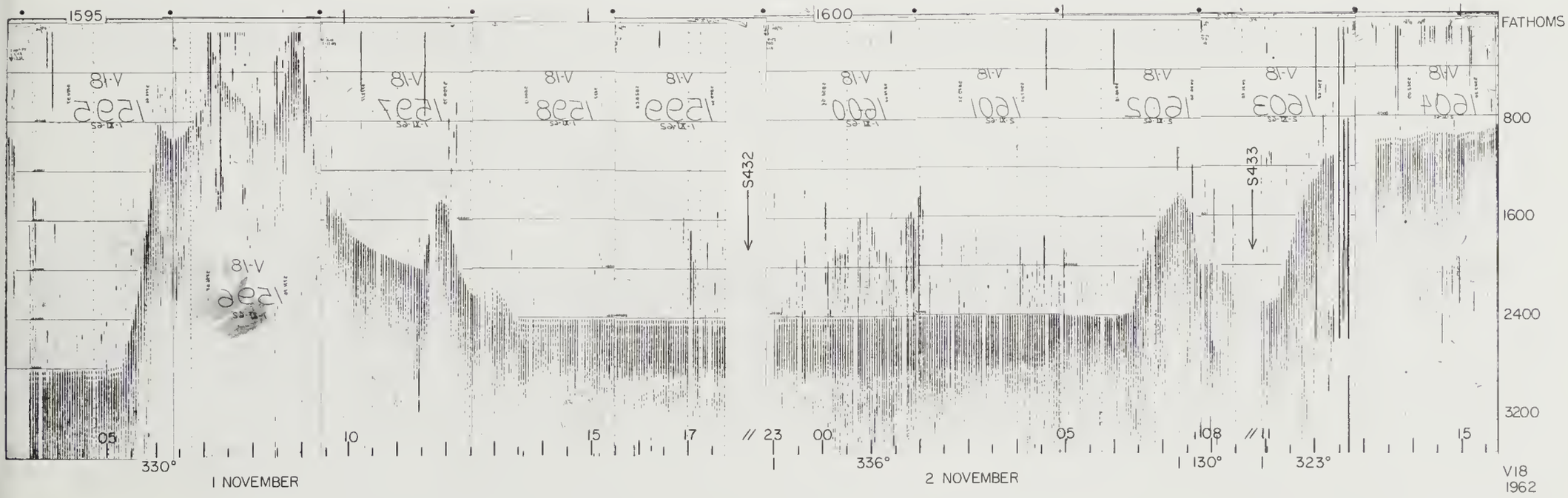

245
250
V18
FATHOMS
S 29
30
800
1600
3200
13 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 19 20 21 22 23 00
130°
15 JANUARY


265
270
V18
FATHOMS
S 32
800
1600
3200
10 11 12 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17
310°
220°
220° 300° 220° 300°
17 JANUARY
157°
137°
134°
133°
160°
18 JANUARY
1962

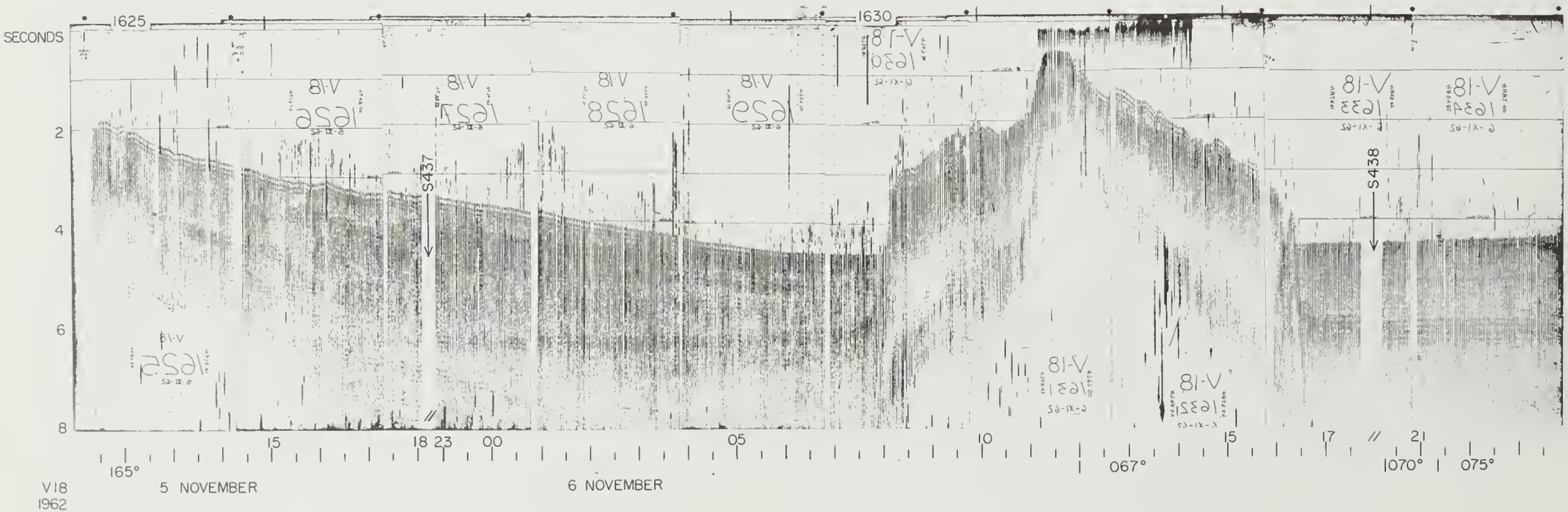

V 18
275
SECONDS
2
4
8
18 19 20 21 22 23 00 01 02 03 04 05
200°
RECIFE

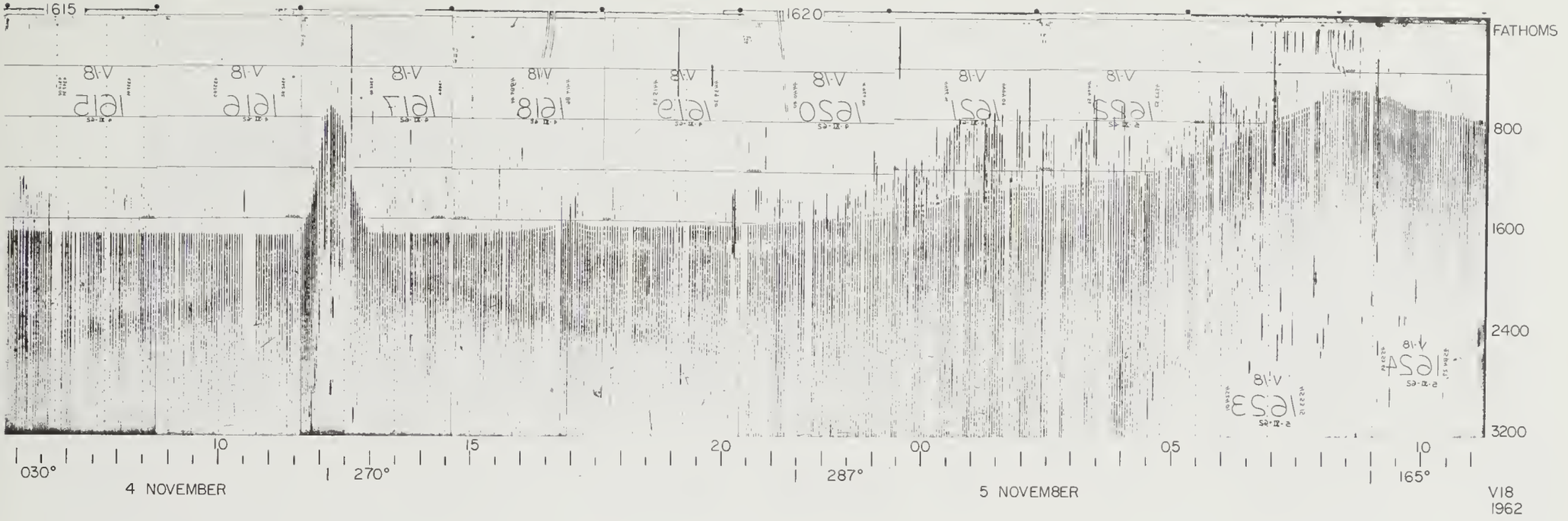

SECONDS
2
4
6
8
1585
1590
S430
S431
00
05
10
12
15
18
05
10
13
0
308°
322°
330°
V18
1962
29–30 OCTOBER
31 OCTOBER
1 NOVEMBER

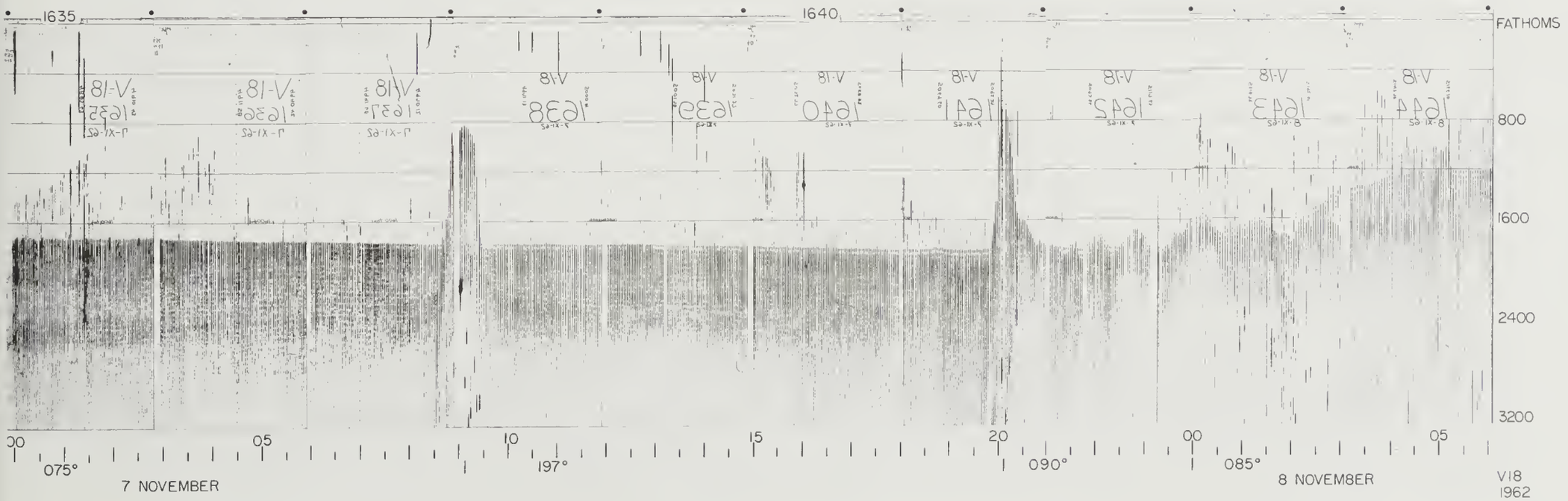

1575
1580
FATHOMS
800
1600
2400
3200
S429
15
20
00
05
10
14 //
21
035°
308°
28 OCTOBER
29 OCTOBER
V18
1962

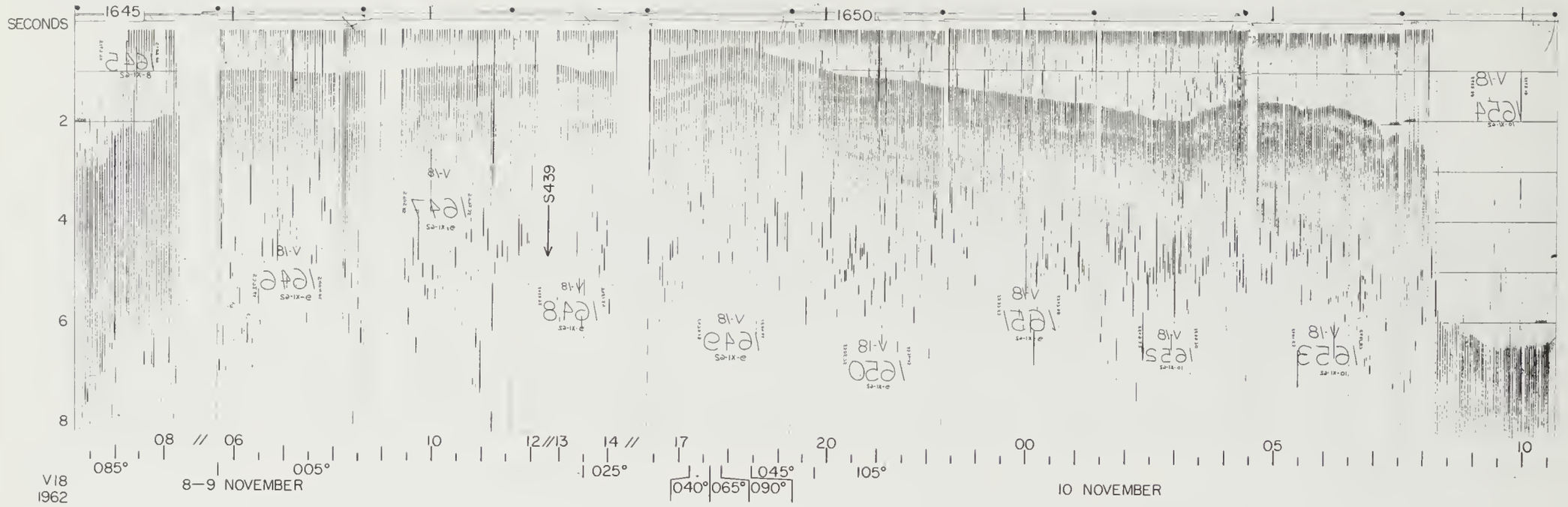

1595
1600
FATHOMS
800
1600
2400
3200
S432
S433
05
10
15
17
// 23
00
05
108
// 11
15
330°
336°
130°
323°
1 NOVEMBER
2 NOVEMBER
V18
1962

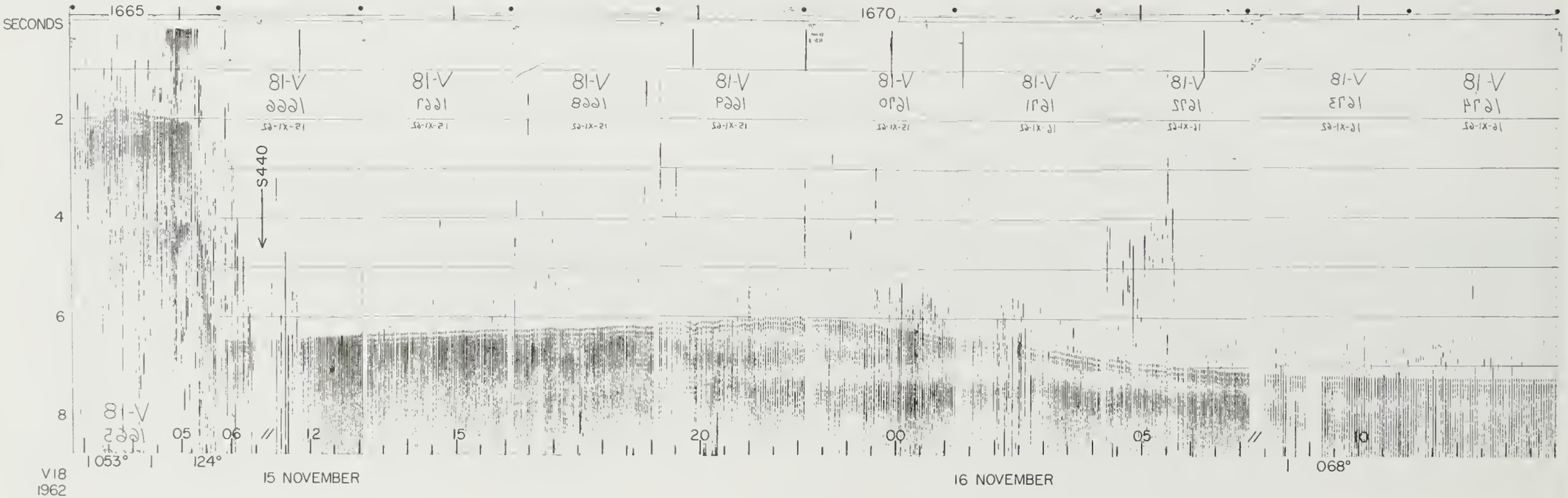

SECONDS
1605
1610
2
4
6
8
S434
S435
S436
18 // 20
00 01 // 08 10 // 12 14 // 18 20
00 05
323°
030°
2 NOVEMBER
3 NOVEMBER
4 NOVEMBER
000° 030°
V18
1962

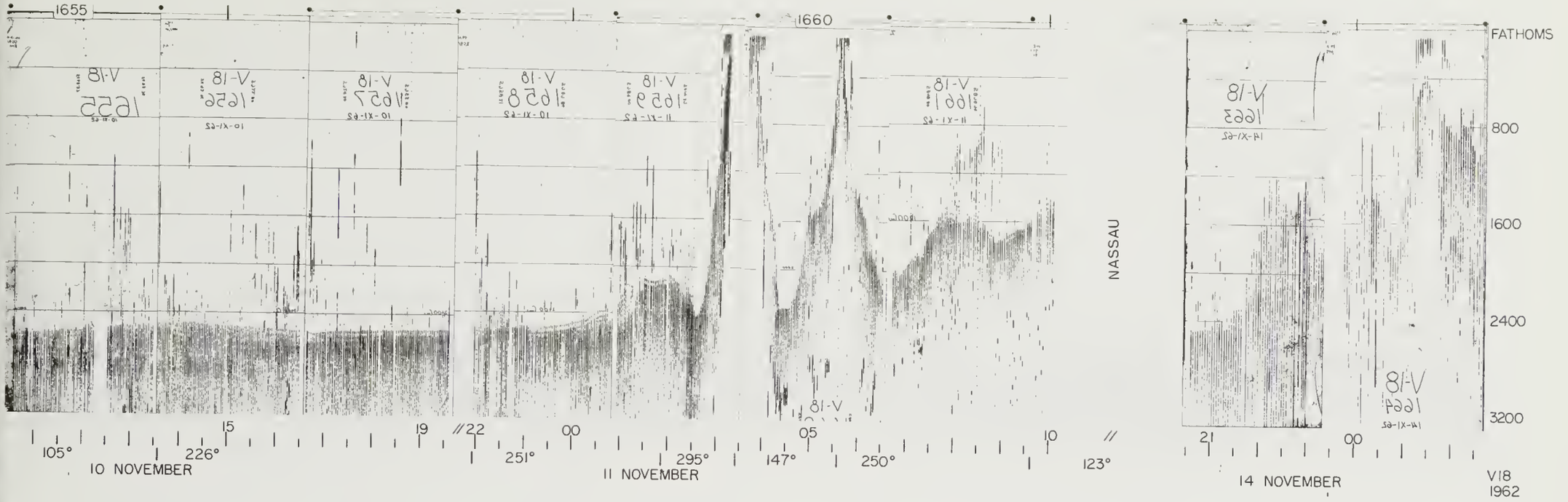

SECONDS
1625
1630
2
4
6
8
S437
S438
15
18 23 00
05
10
15
17 // 21
165°
067°
1070° 075°
5 NOVEMBER
6 NOVEMBER
V18
1962

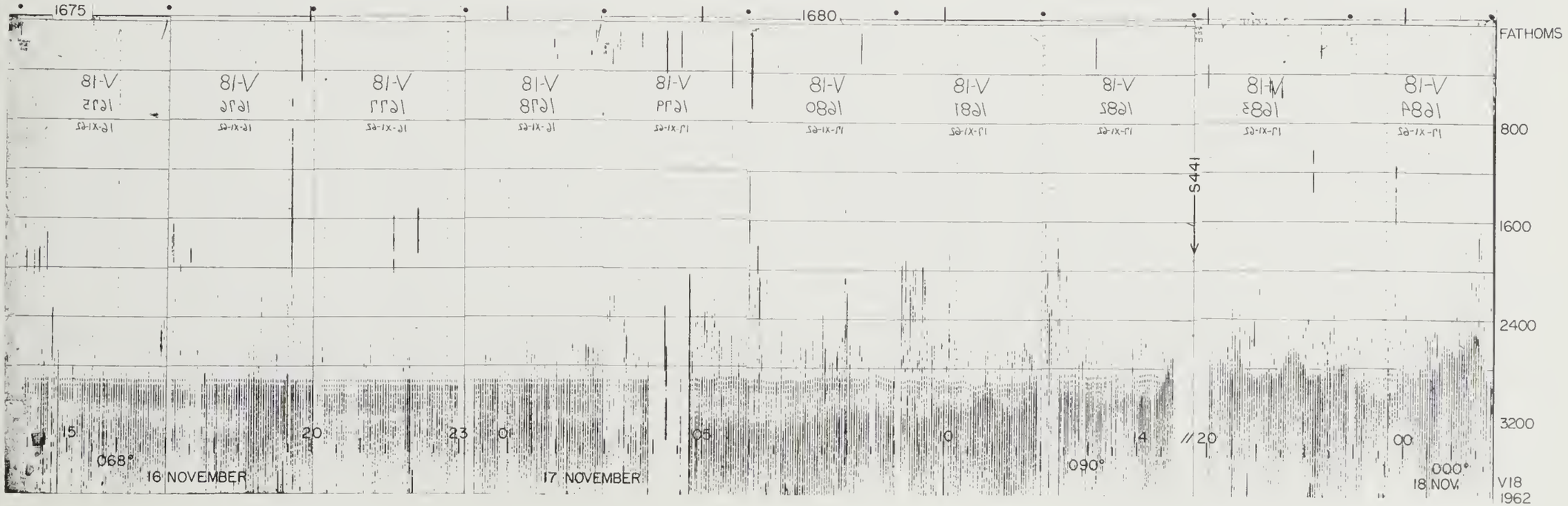

1615
1620
FATHOMS
800
1600
2400
3200
10
15
20
00
05
10
030°
270°
287°
165°
4 NOVEMBER
5 NOVEMBER
V18
1962

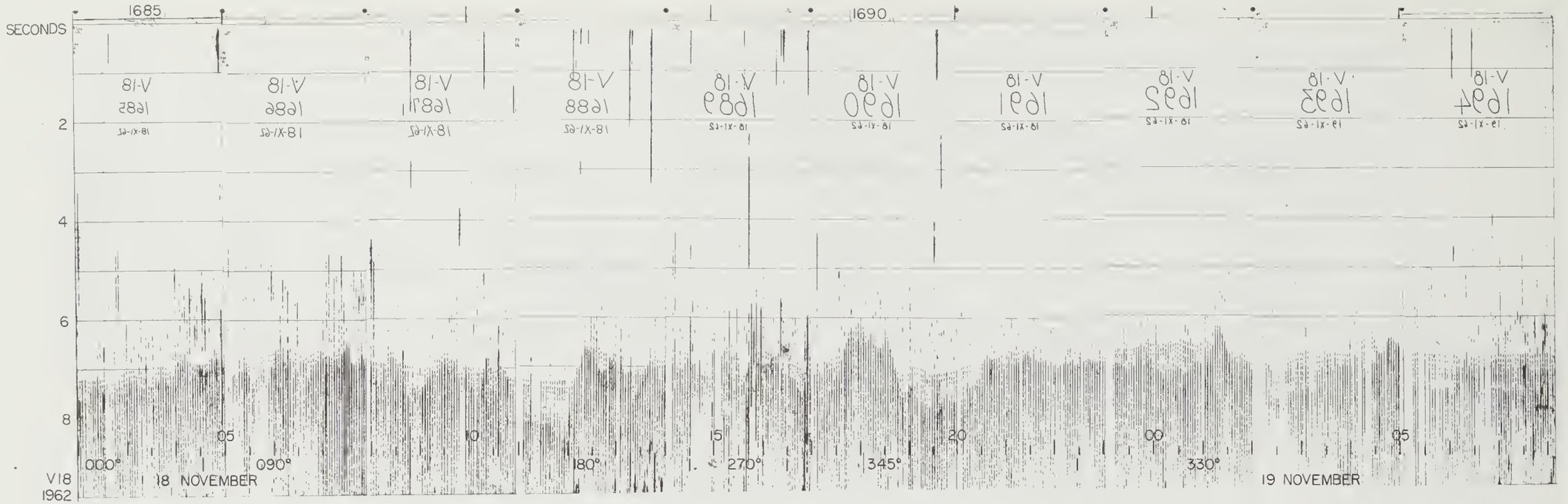

1635
1640
FATHOMS
800
1600
2400
3200
00
05
10
15
20
00
05
075°
197°
090°
085°
7 NOVEMBER
8 NOVEMBER
V18
1962

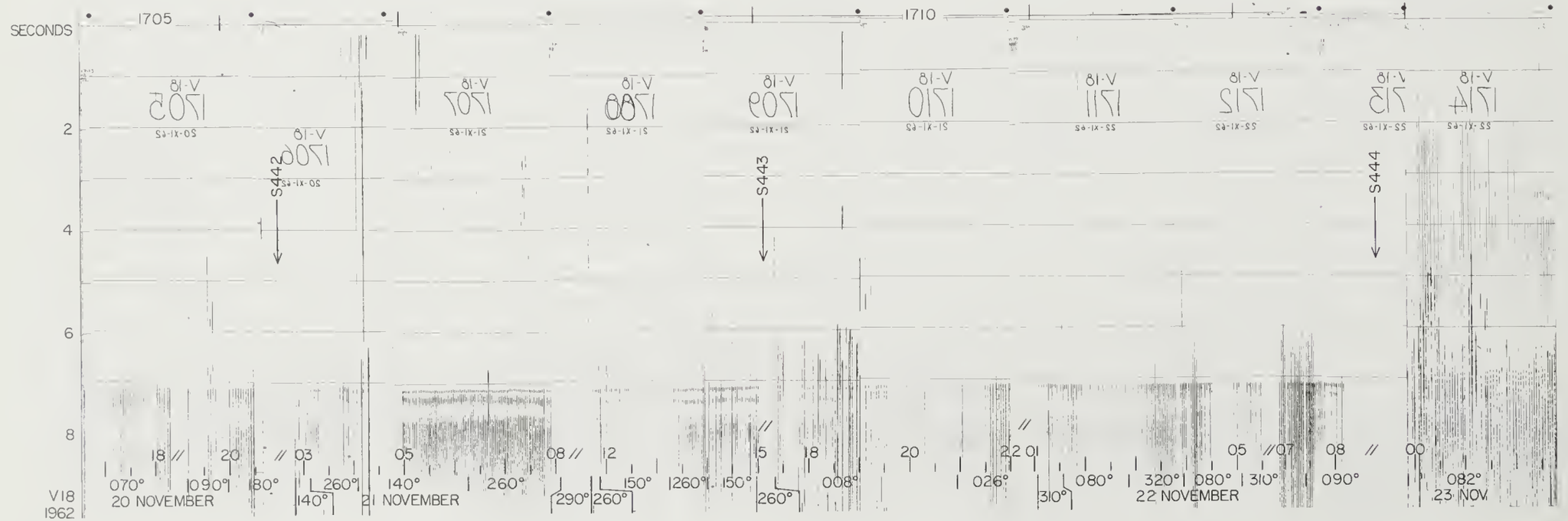

SECONDS
1645
1650
2
4
6
8
S439
08 // 06
10
12//13
14 //
17
20
00
05
10
085°
005°
025°
040°
065°
090°
045°
105°
V18
1962
8—9 NOVEMBER
10 NOVEMBER


SECONDS
1665
1670
2
4
6
8
S440
05
06 //
12
15
20
00
05 //
10
053°
124°
068°
V18
1962
15 NOVEMBER
16 NOVEMBER

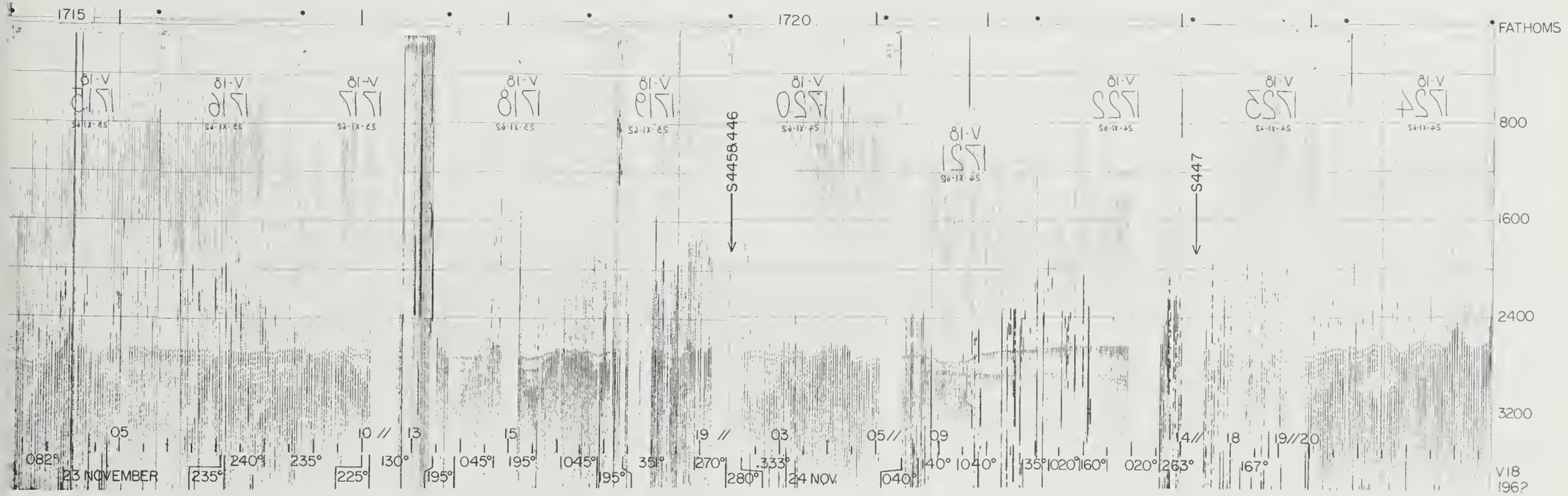

1655
1660
FATHOMS
800
1600
2400
3200
NASSAU
15
19
22
00
05
10
21
00
105°
226°
251°
295°
147°
250°
123°
10 NOVEMBER
11 NOVEMBER
14 NOVEMBER
V18
1962

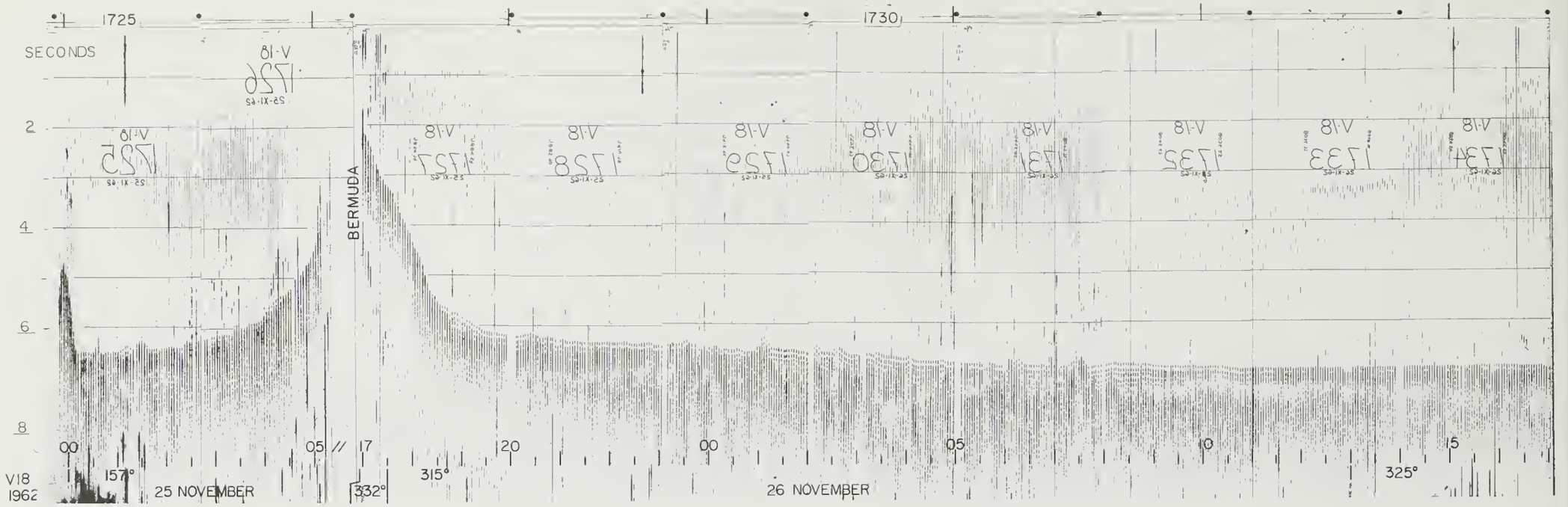

1675
1680
FATHOMS
800
1600
2400
3200
S441
15
20
23
05
10
14
20
00
068°
090°
000°
16 NOVEMBER
17 NOVEMBER
18 NOV.
V18
1962

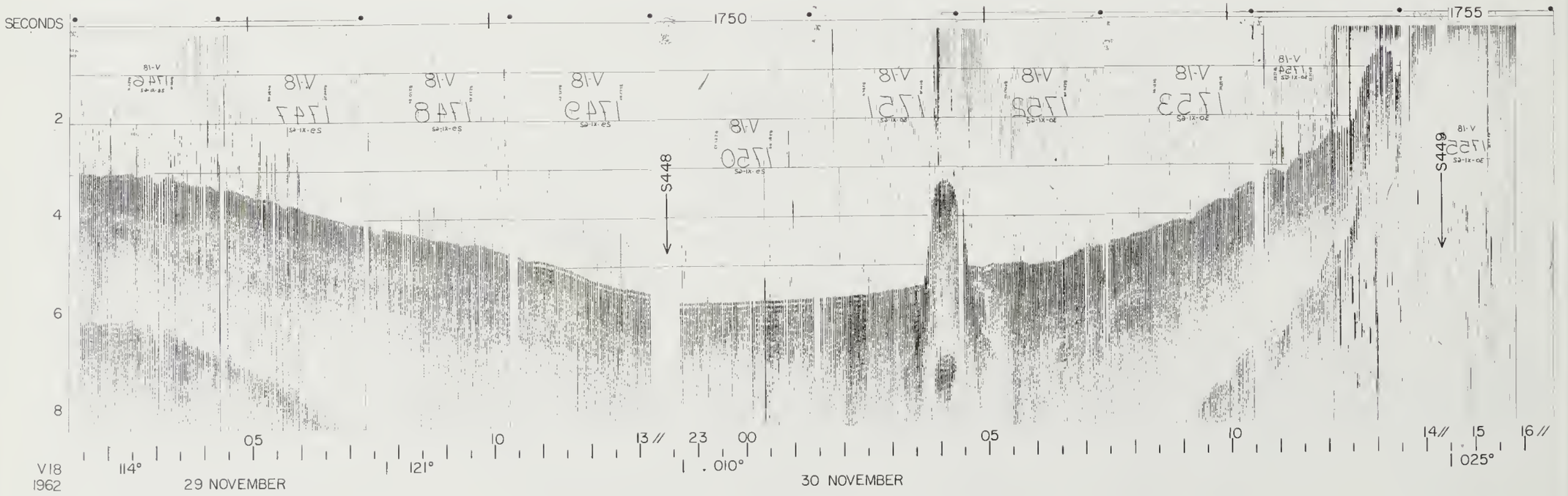

SECONDS
1685
1690
2
4
6
8
05
10
15
20
00
05
000°
090°
180°
270°
345°
330°
V18
1962
18 NOVEMBER
19 NOVEMBER

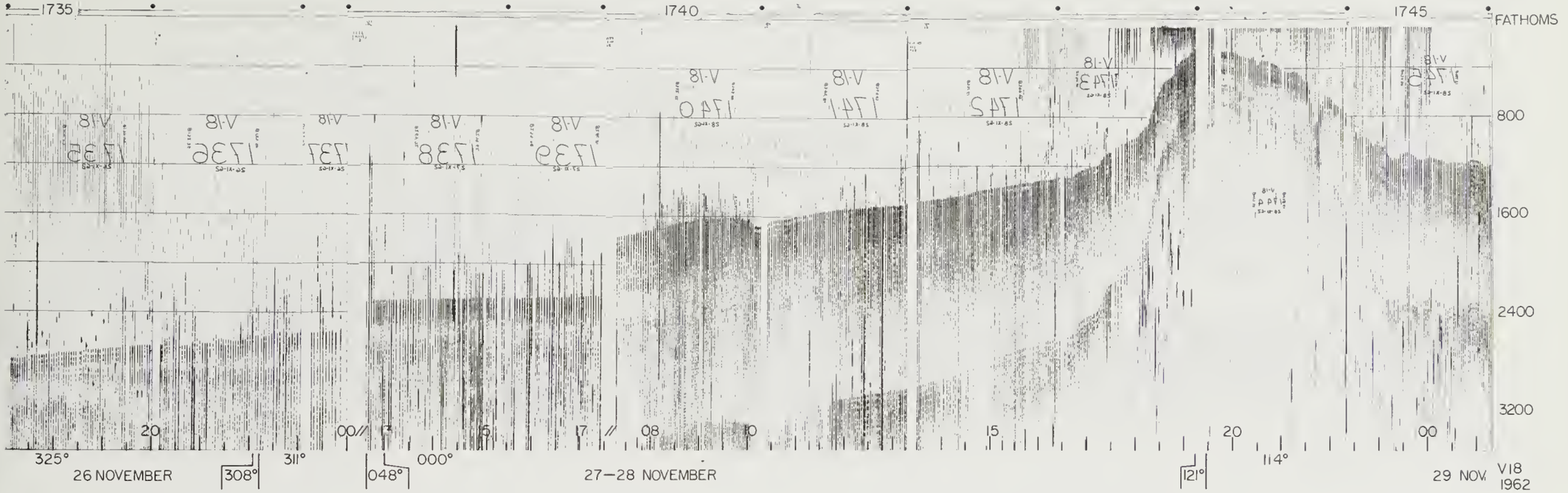

SECONDS
1705
1710
2
4
6
8
S442
S443
S444
18
20
03
05
08
12
15
18
20
22
01
05
07
08
00
070°
090°
180°
260°
140°
260°
150°
260°
150°
008°
026°
080°
320°
080°
310°
090°
082°
V18
1962
20 NOVEMBER
21 NOVEMBER
22 NOVEMBER
23 NOV

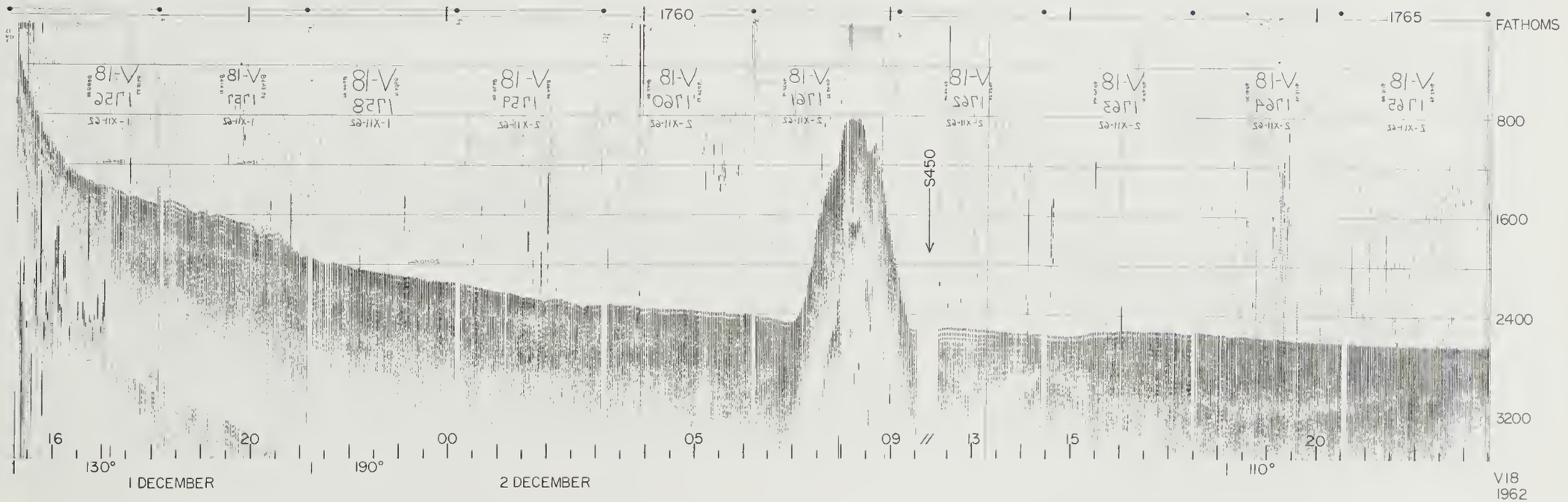

1695
1700
FATHOMS
800
1600
2400
3200
330°
10
4//
17
20
343°
00
05
10
15
000°
070°
19 NOVEMBER
20 NOVEMBER
V18
1962


1715
1720
FATHOMS
800
1600
2400
3200
S445 8446
S447
05
10 // 13
15
19 //
03
05//
09
4//
18
19//20
082°
240°
235°
130°
045°
195°
045°
351°
270°
333°
040°
040°
035°
020°
160°
020°
263°
167°
23 NOVEMBER
235°
225°
195°
195°
280°
24 NOV.
V18
1962

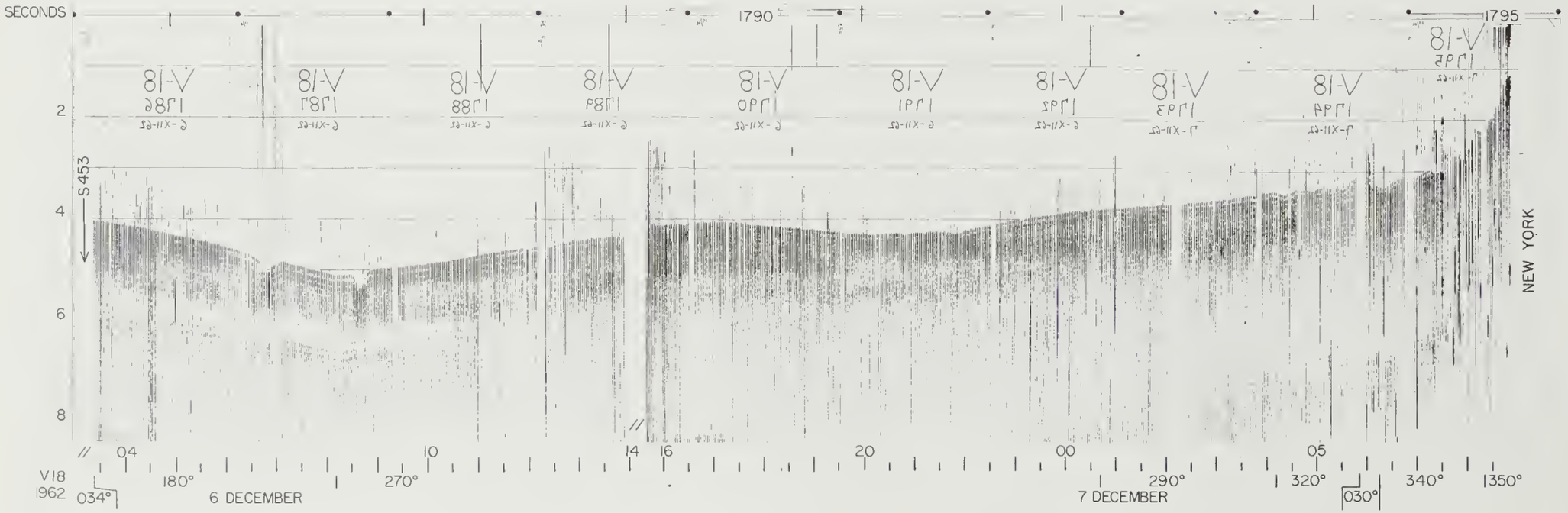

1725
1730
SECONDS
2
4
6
8
BERMUDA
00
05
17
20
00
05
10
15
V18
1962
157°
25 NOVEMBER
332°
315°
26 NOVEMBER
325°

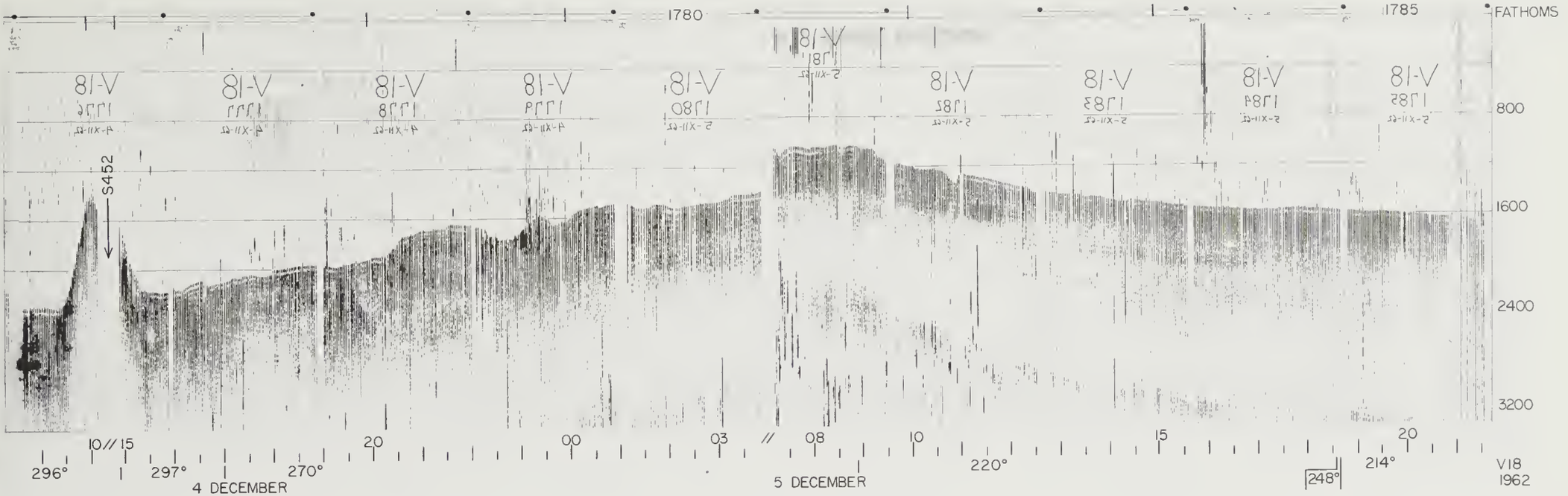

SECONDS
1750
1755
2
4
6
8
S448
S448
05
10
13
23
00
05
10
14
15
16
V18
1962
114°
29 NOVEMBER
121°
010°
30 NOVEMBER
025°

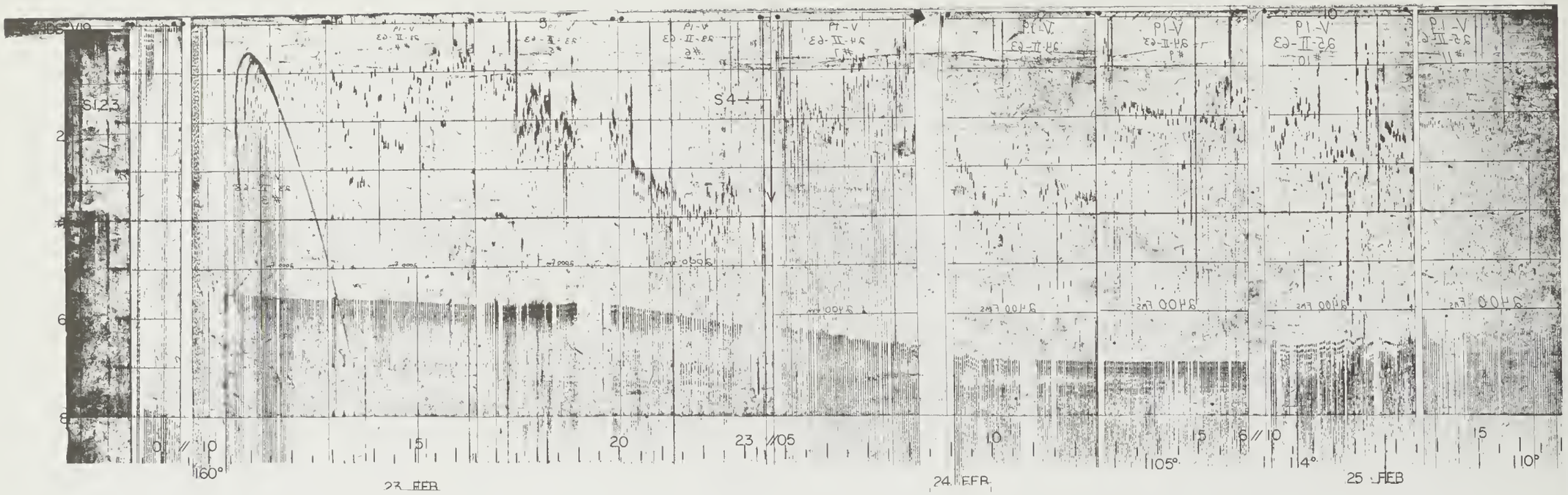

1735
1740
1745
FATHOMS
800
1600
2400
3200
20
00
13
15
17
08
10
15
20
00
325°
311°
000°
114°
26 NOVEMBER
308°
048°
27–28 NOVEMBER
121°
29 NOV.
V18
1962

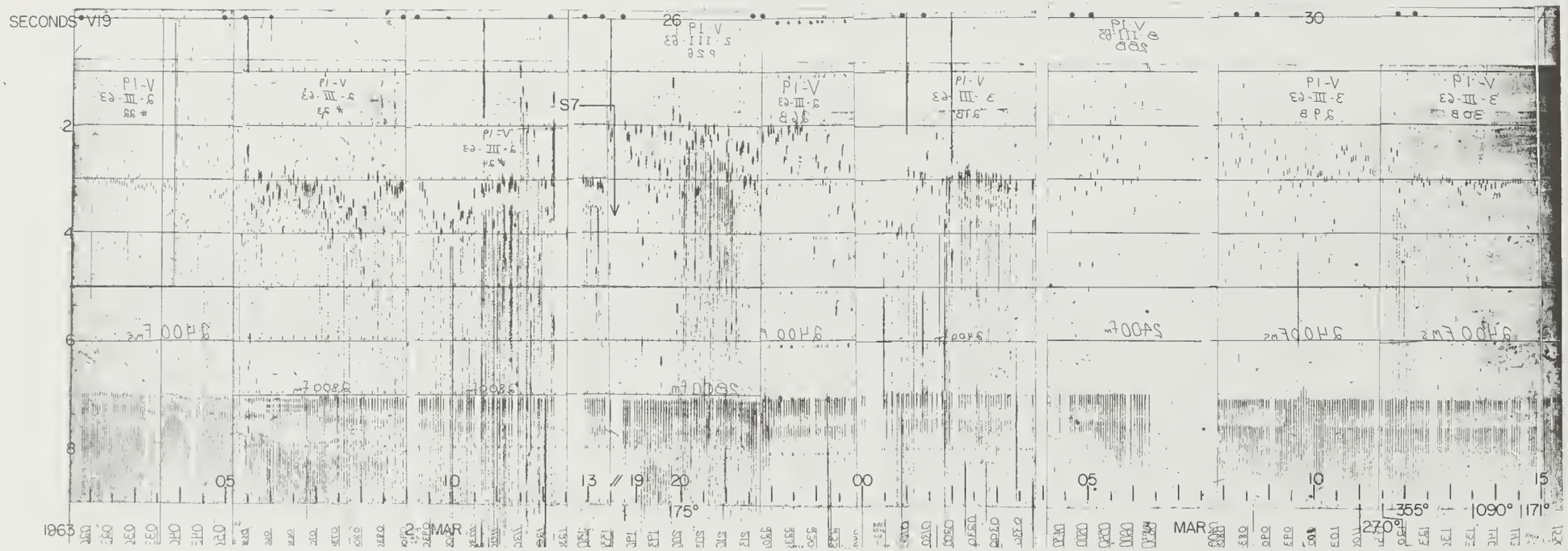

1760
1765
FATHOMS
800
1600
2400
3200
S450
16
20
00
05
09
13
15
20
130°
190°
110°
1 DECEMBER
2 DECEMBER
V18
1962

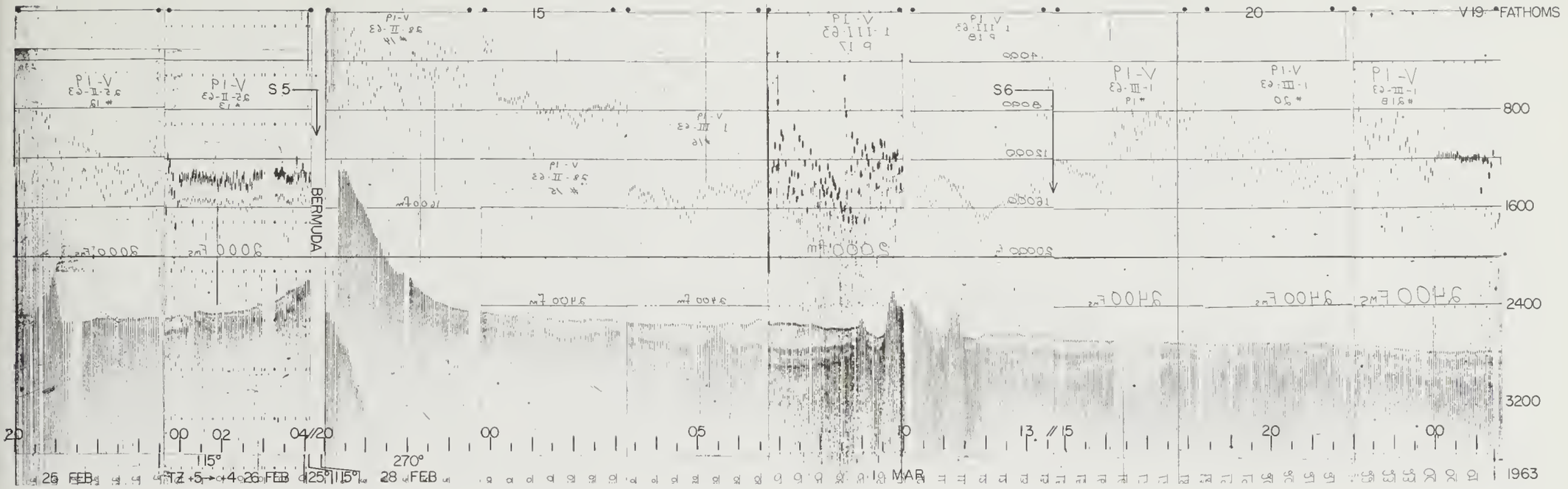

SECONDS
1770
1775
2
4
6
8
S451
00
05
10
14
18
20
00
05
V18
1962
110°
000°
3 DECEMBER
045°
000°
233°
240°
4 DECEMBER
305°
296°

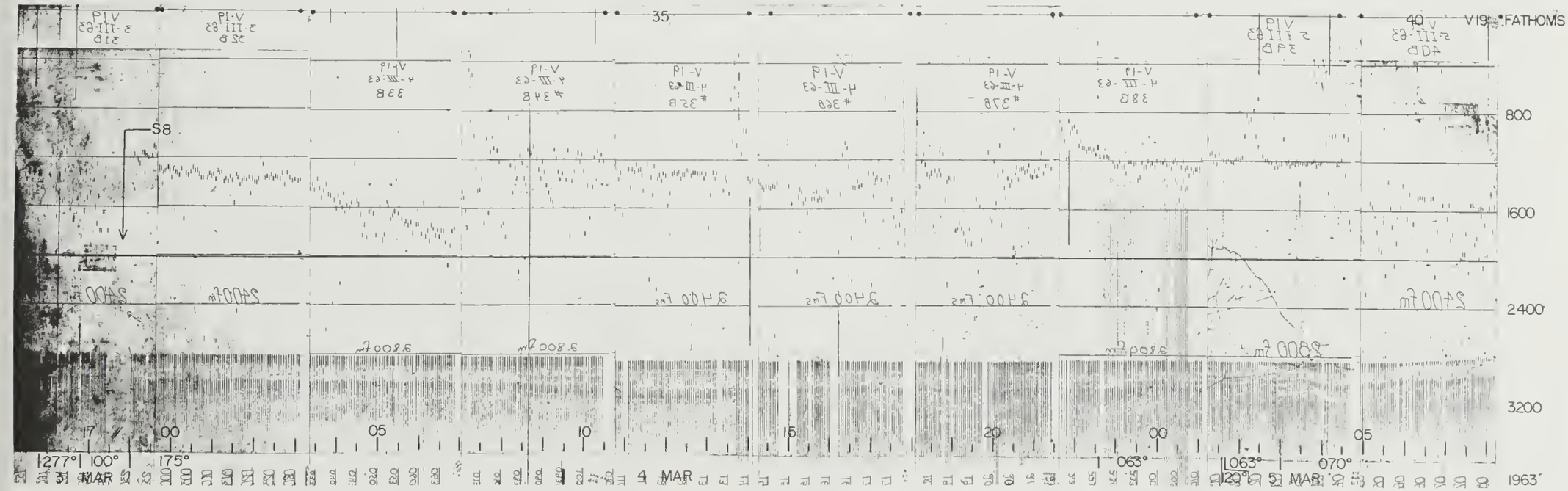

SECONDS
1790
1795
2
4
6
8
S453
NEW YORK
04
10
14
16
20
00
05
V18
1962
180°
270°
034°
6 DECEMBER
290°
320°
340°
1350°
030°
7 DECEMBER

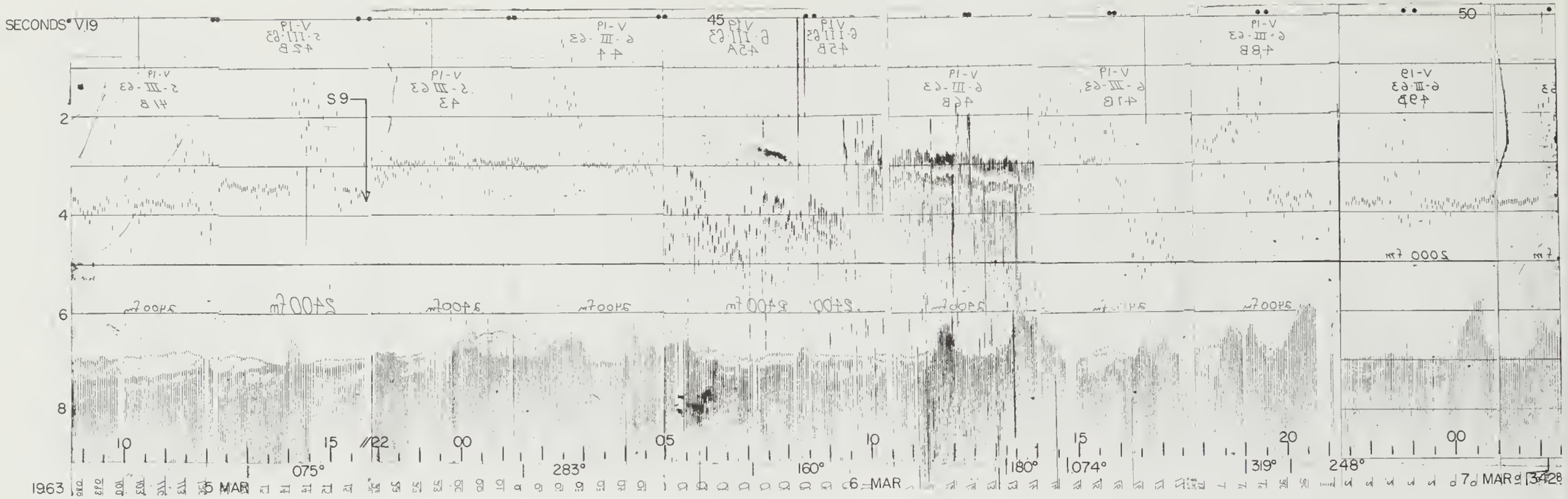

1780
1785
FATHOMS
800
1600
2400
3200
S452
10// 15
20
00
03
// 08
10
15
20
296°
297°
270°
4 DECEMBER
5 DECEMBER
220°
248°
214°
V18
1962

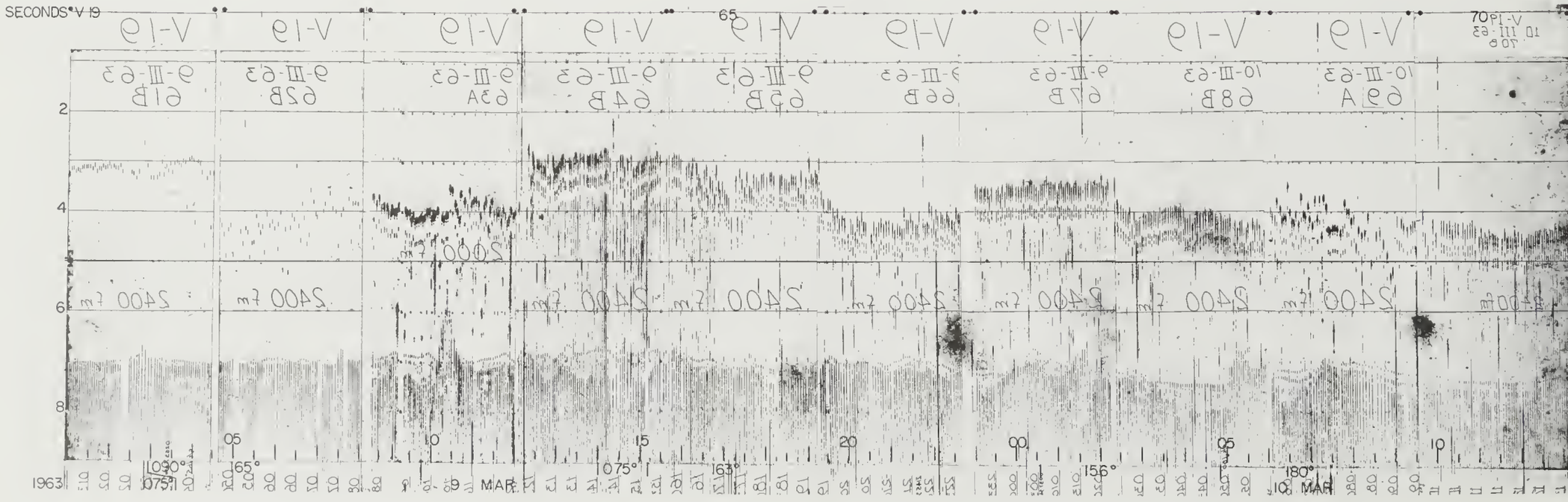

S4
23 FEB
24 FEB
25 FEB

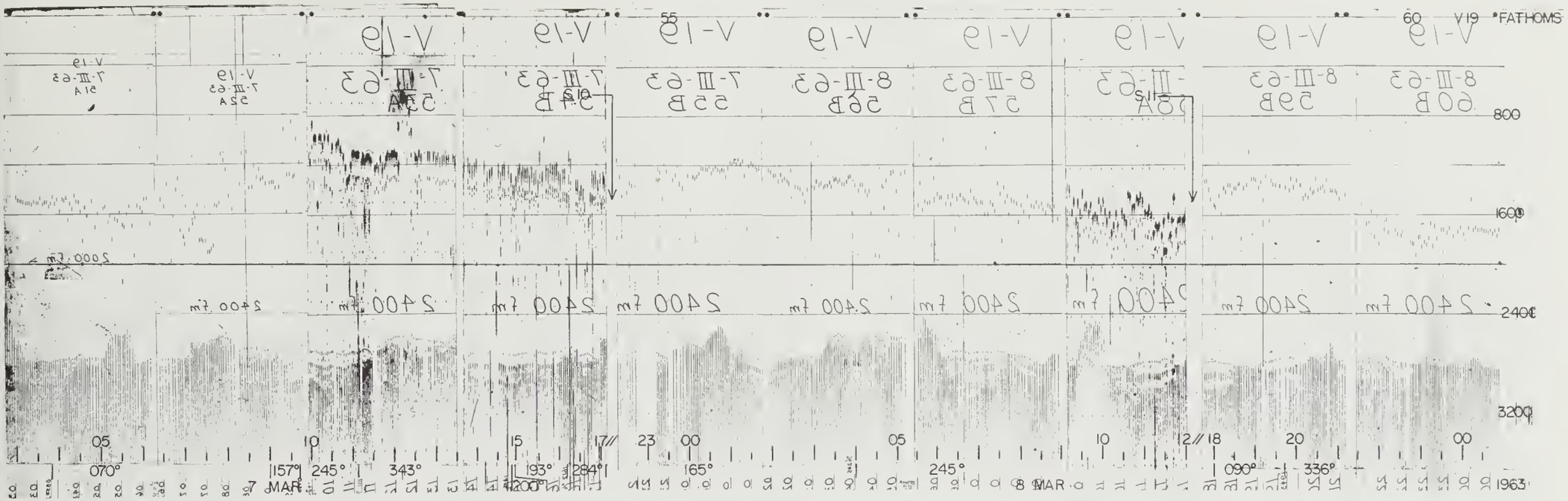

SECONDS V19
S7
1963
2 MAR
MAR

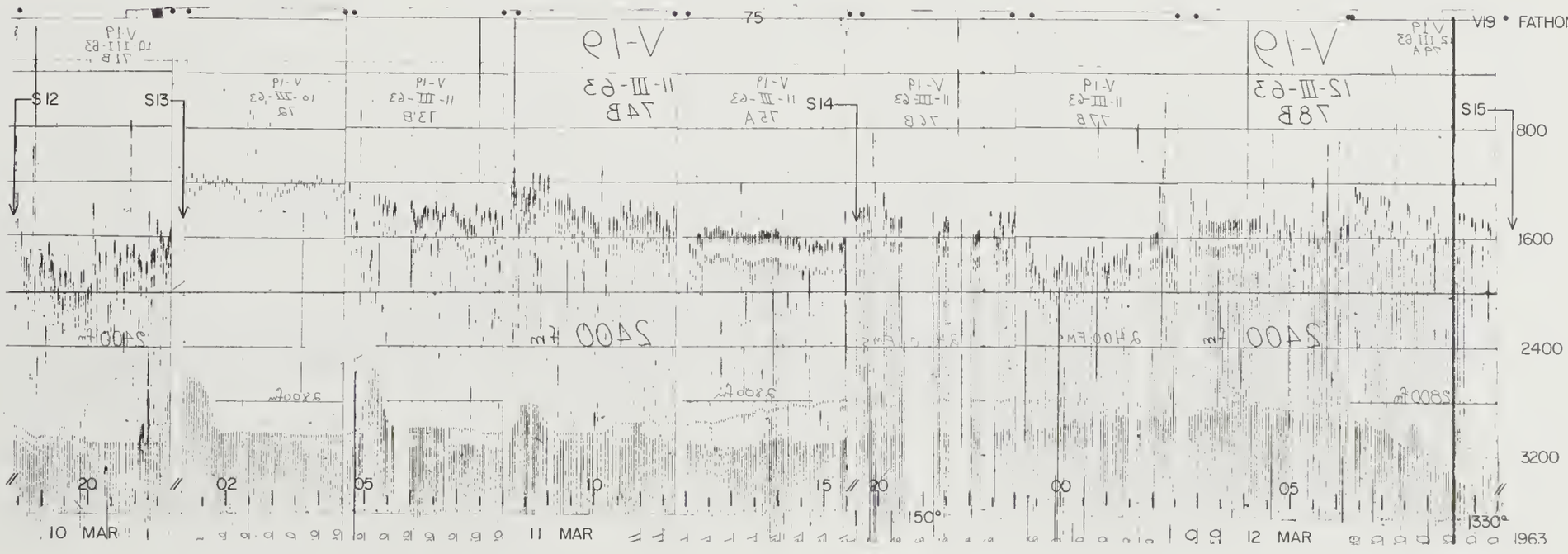

V 19 FATHOMS
15
20
S 5
S6
BERMUDA
800
1600
2400
3200
20
00
02
04/20
00
05
10
13 // 15
20
00
1963
26 FEB
TZ +5 → +4 26 FEB
125° 115°
270°
28 FEB
10 MAR

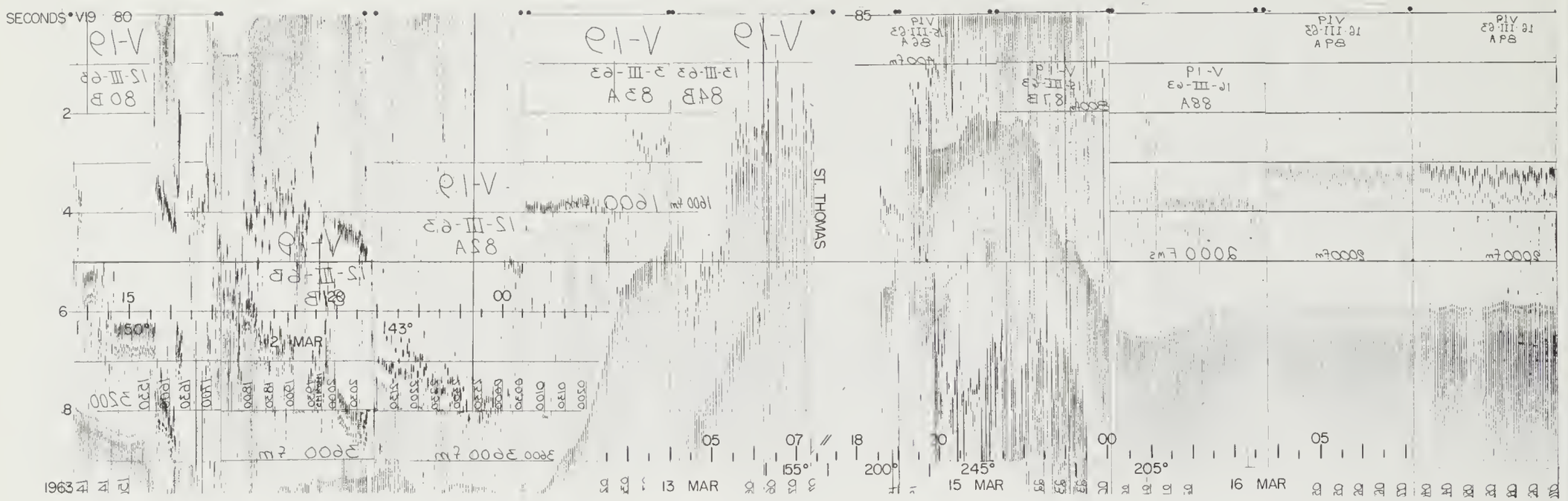

V 19 FATHOMS
35
40
S8
800
1600
2400
3200
17 // 00
05
10
15
20
00
05
277° 100° 175°
063°
063° 070°
31 MAR
4 MAR
5 MAR
1963

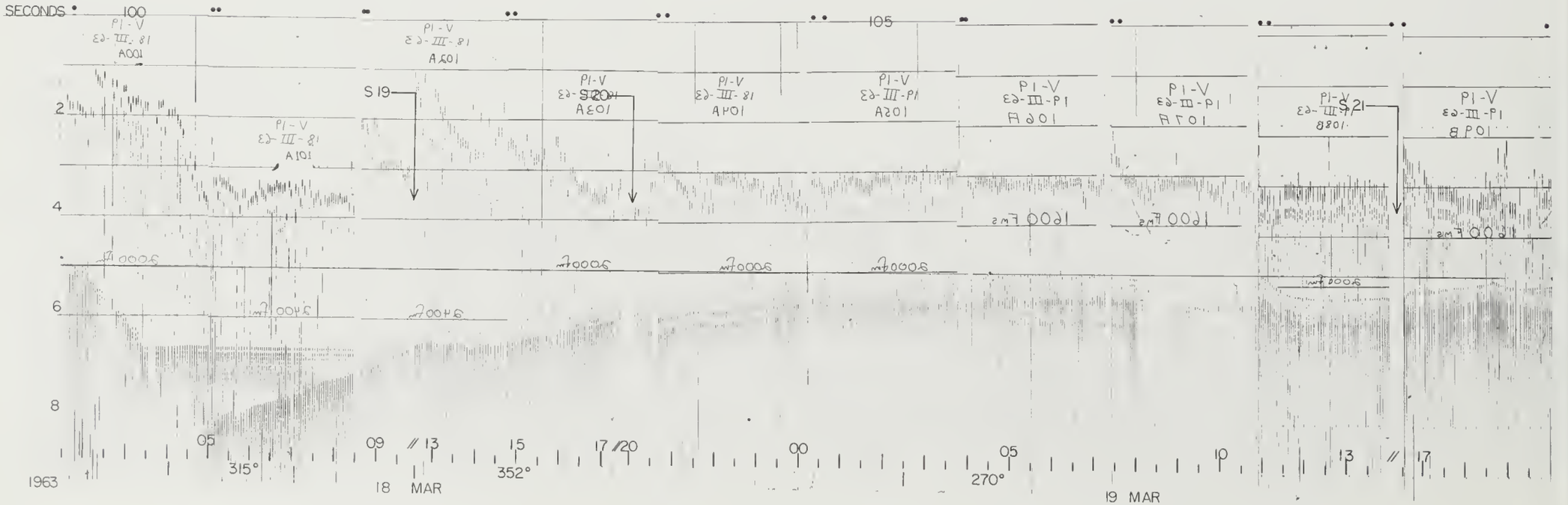

SECONDS
2
4
6
8
45
50
10
15
20
00
075°
283°
160°
180°
074°
319°
248°
1963
MAR

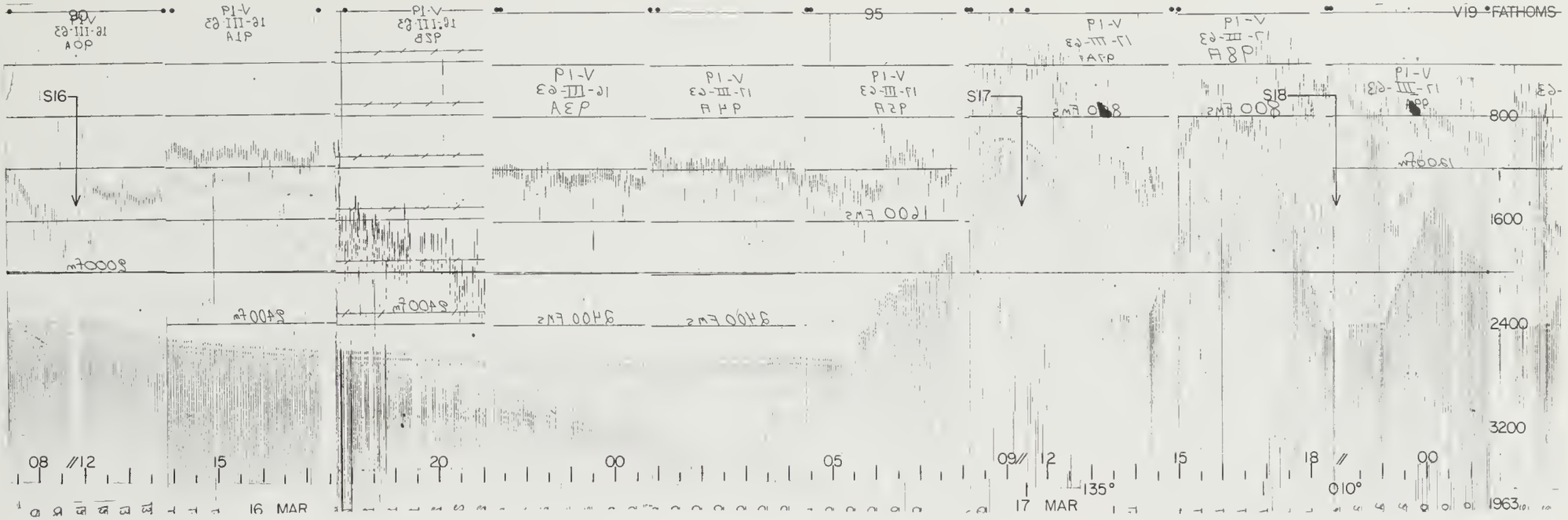

SECONDS
2
4
6
8
65
70
05
10
15
20
00
05
10
090°
165°
075°
163°
156°
180°
1963
MAR

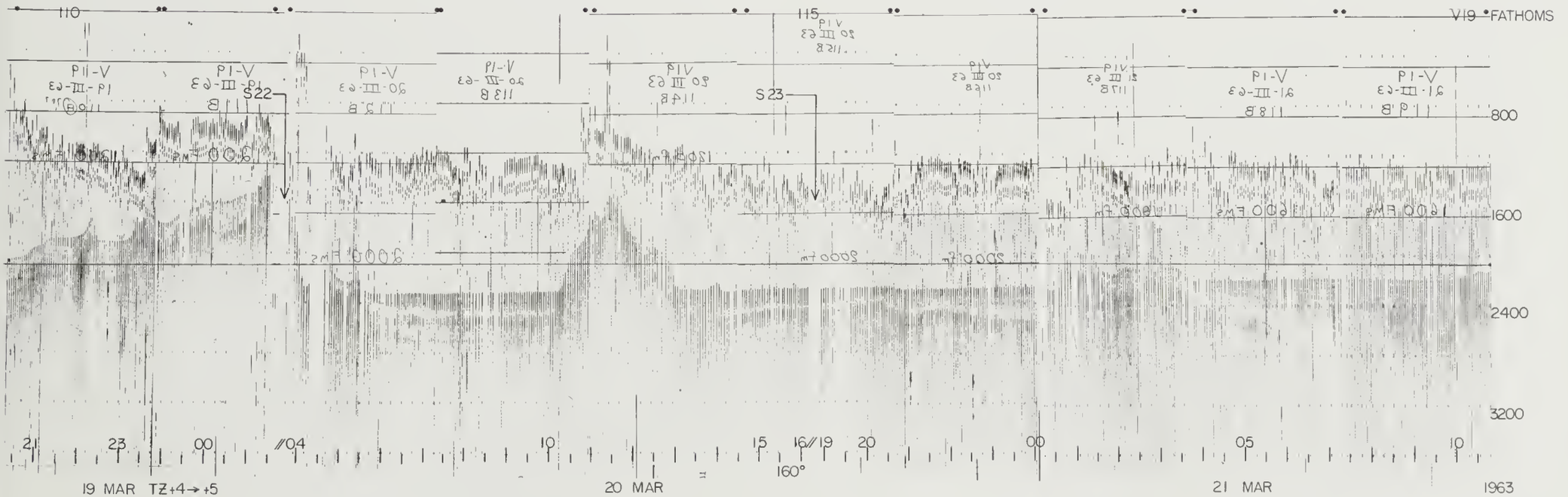

V19 • FATHOMS
800
1600
2400
3200
2400 fm
070°
157°
245°
343°
193°
284°
165°
245°
090°
336°
7 MAR
8 MAR
1963

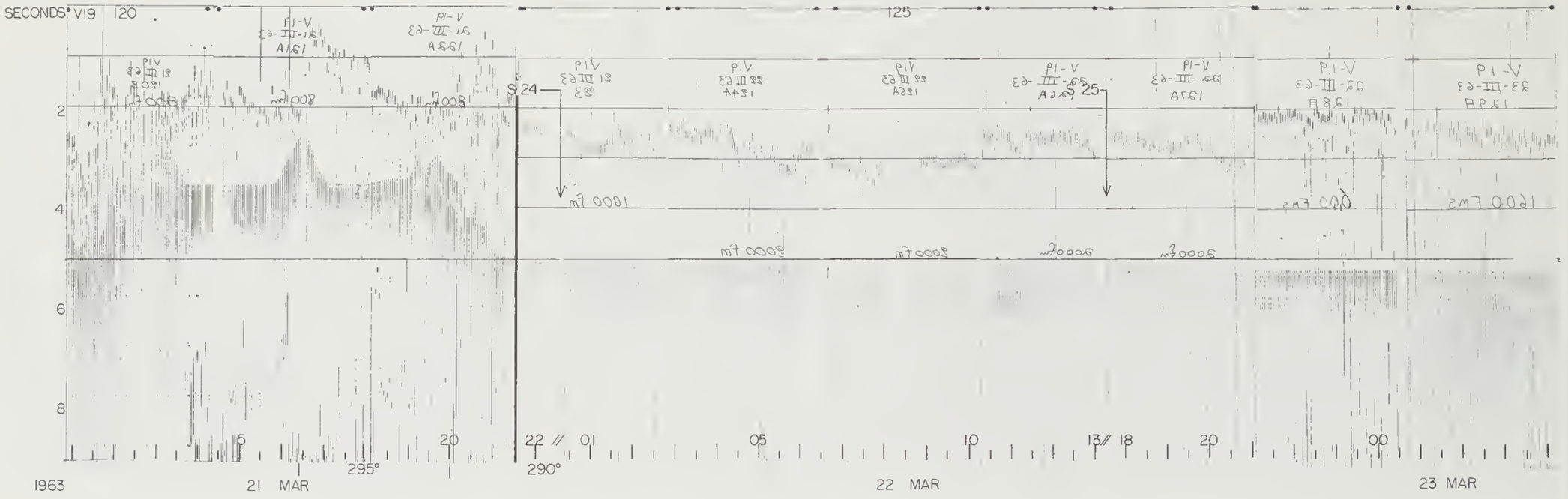

V19 • FATHOMS
S12
S13
S14
S15
800
1600
2400
3200
2400 fm
150°
330°
10 MAR
11 MAR
12 MAR
1963

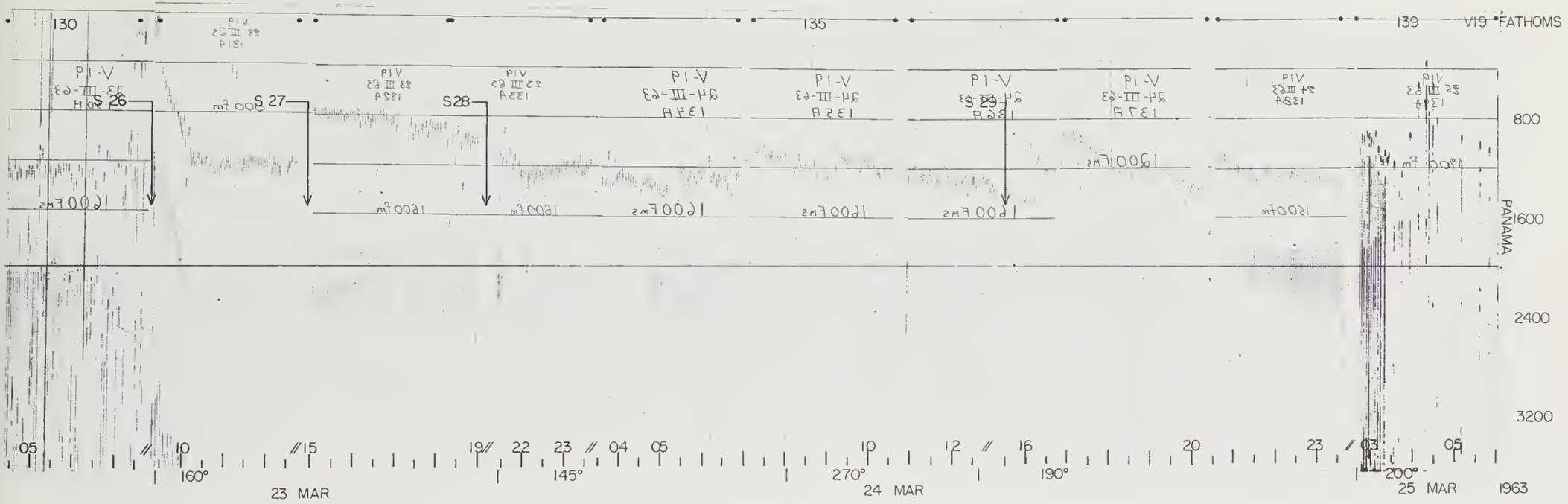

SECONDS
ST. THOMAS
12 MAR
13 MAR
15 MAR
16 MAR
1963

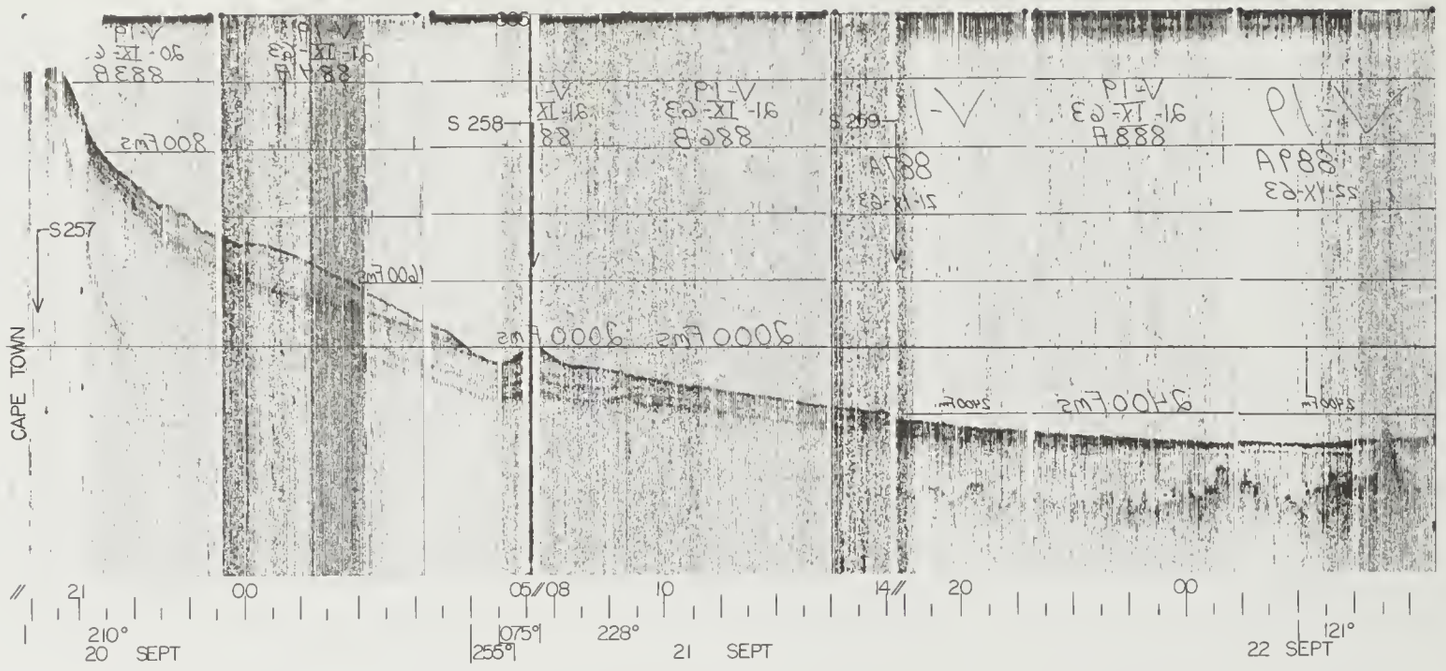

SECONDS
18 MAR
19 MAR
1963

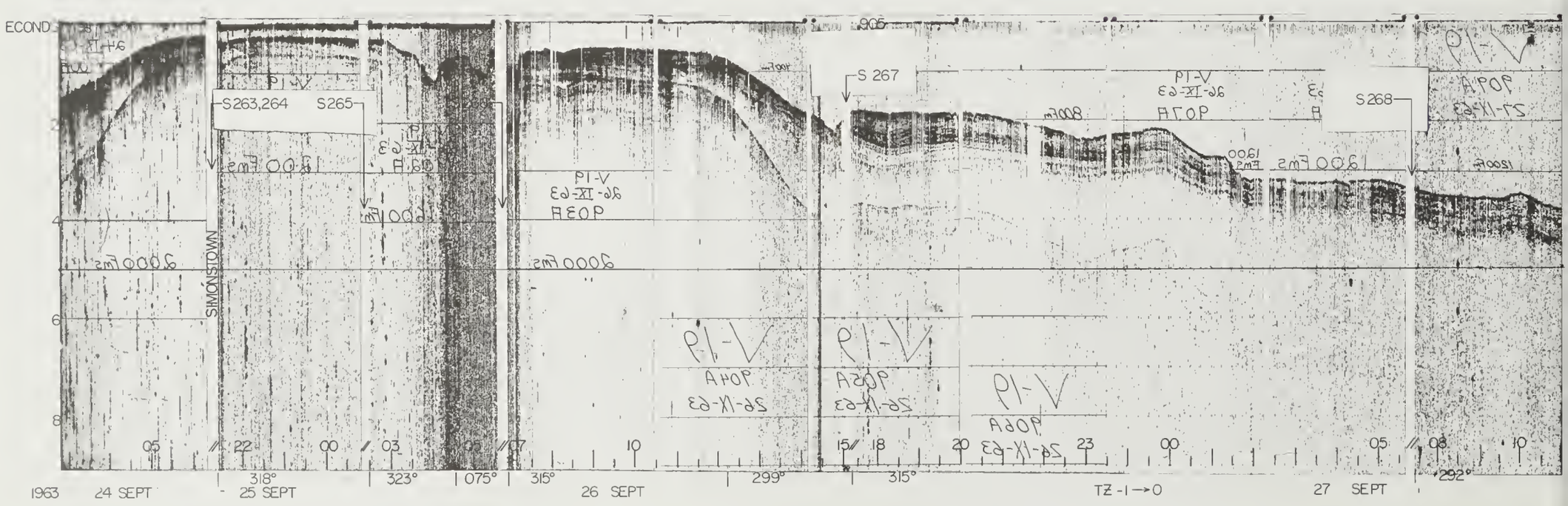

V19 FATHOMS
S16
S17
S18
800
1600
2400
3200
08 12 15 20 00 05 09 12 15 18 00
16 MAR
17 MAR
135°
010°
1963

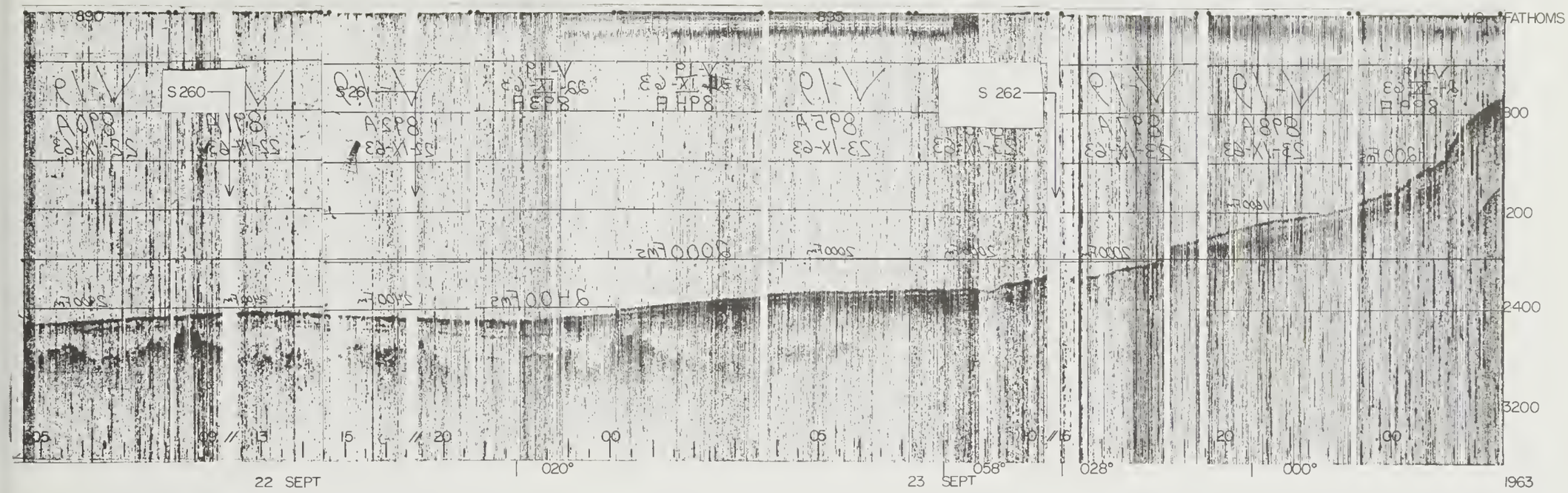

V19 FATHOMS
S22
S23
800
1600
2400
3200
21 23 00 04 10 15 16 19 20 00 05 10
19 MAR TZ+4→+5
20 MAR
160°
21 MAR
1963

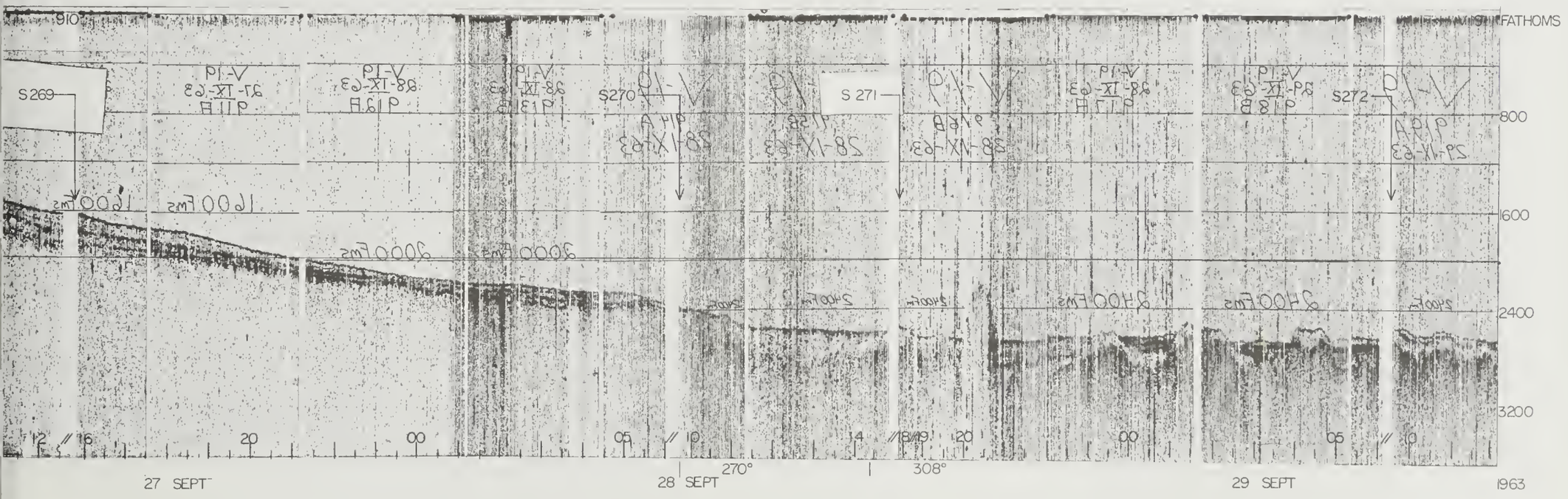

SECONDS
V19
120
125
2
4
6
8
S 24
S 25
15
20
22 // 01
05
10
13 // 18
20
00
295°
290°
1963
21 MAR
22 MAR
23 MAR

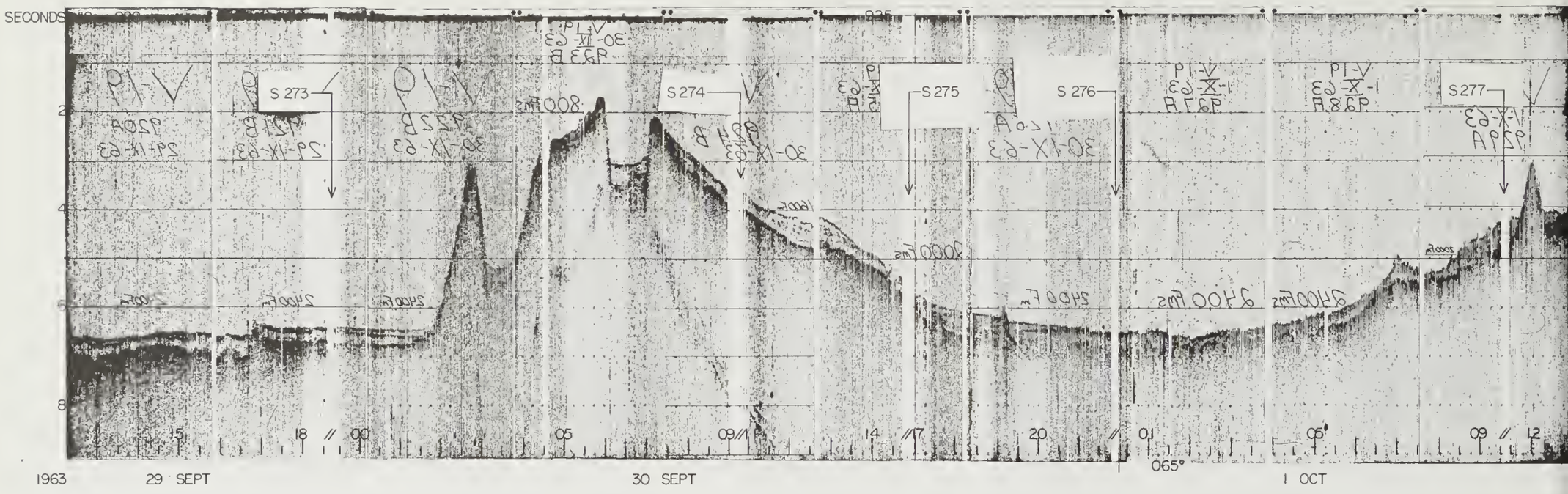

130
135
139
V19 FATHOMS
S 26
S 27
S28
800
1600
2400
3200
PANAMA
05
10
15
19
22
23
04
05
10
12
16
20
23
03
05
160°
145°
270°
190°
200°
23 MAR
24 MAR
25 MAR
1963

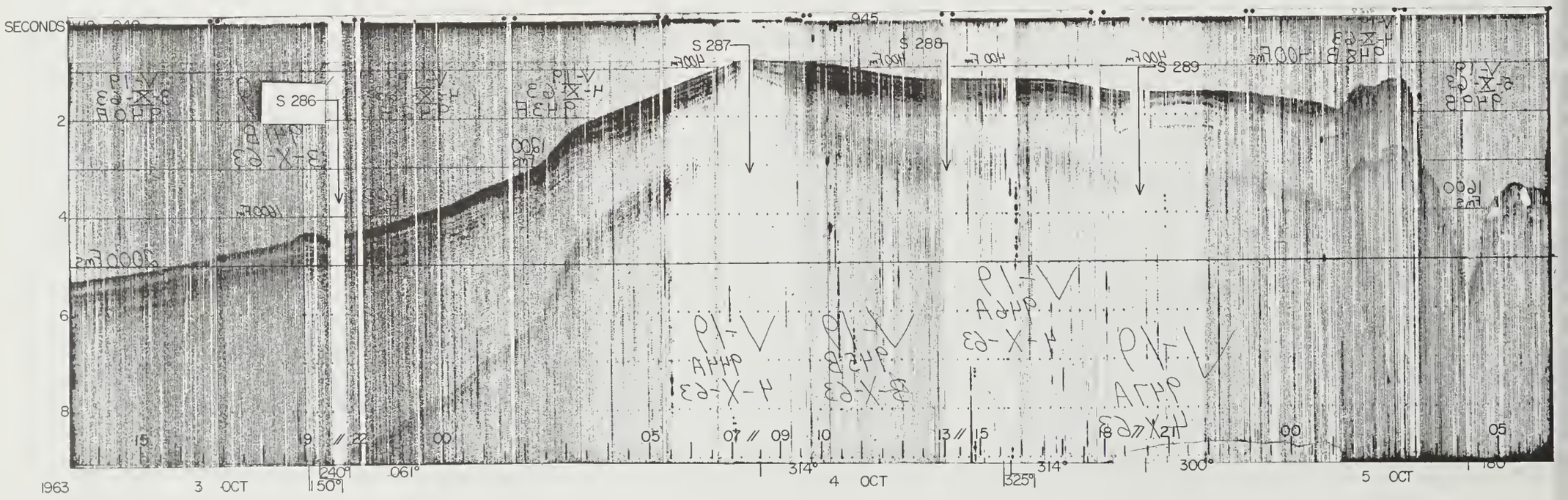

CAPE TOWN
S 257
S 258
S 259
3000 Fms
1800 Fms
21
00
05
08
10
14
20
00
210°
20 SEPT
075°
255°
228°
21 SEPT
121°
22 SEPT

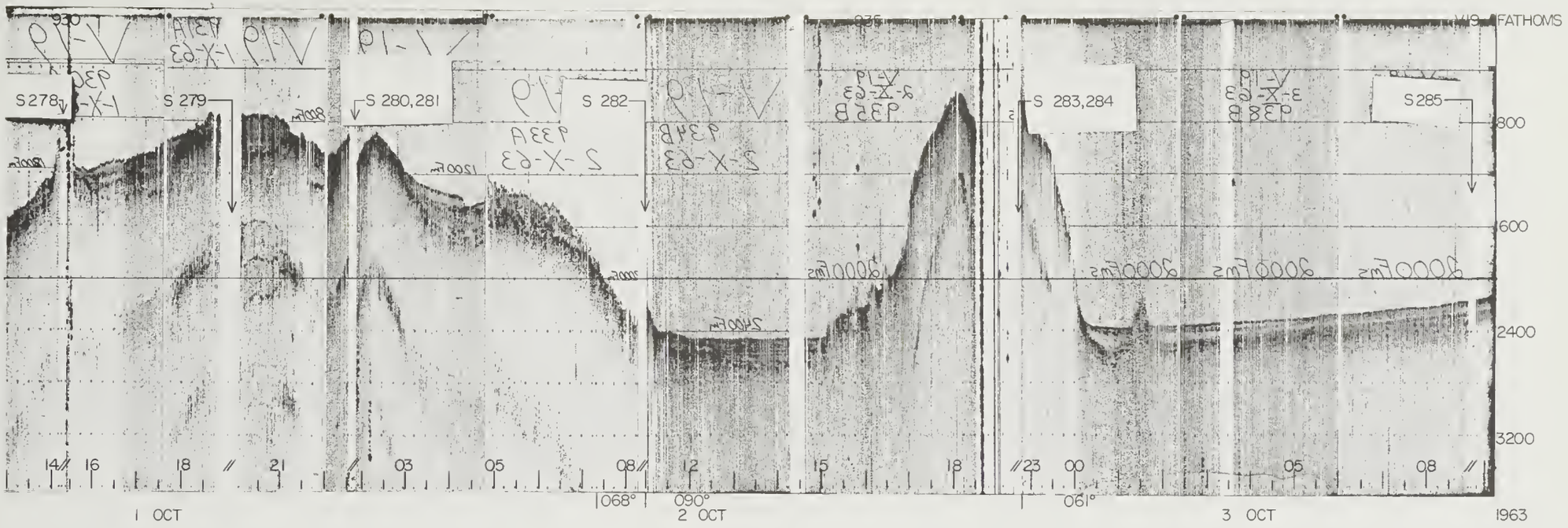

ECOND
SIMONSTOWN
S 263,264
S 265
S 267
S 268
3000 Fms
1800 Fms
05
22
00
03
07
10
15
18
20
23
00
05
08
10
318°
323°
075°
315°
299°
315°
292°
1963
24 SEPT
25 SEPT
26 SEPT
TZ -1 → 0
27 SEPT

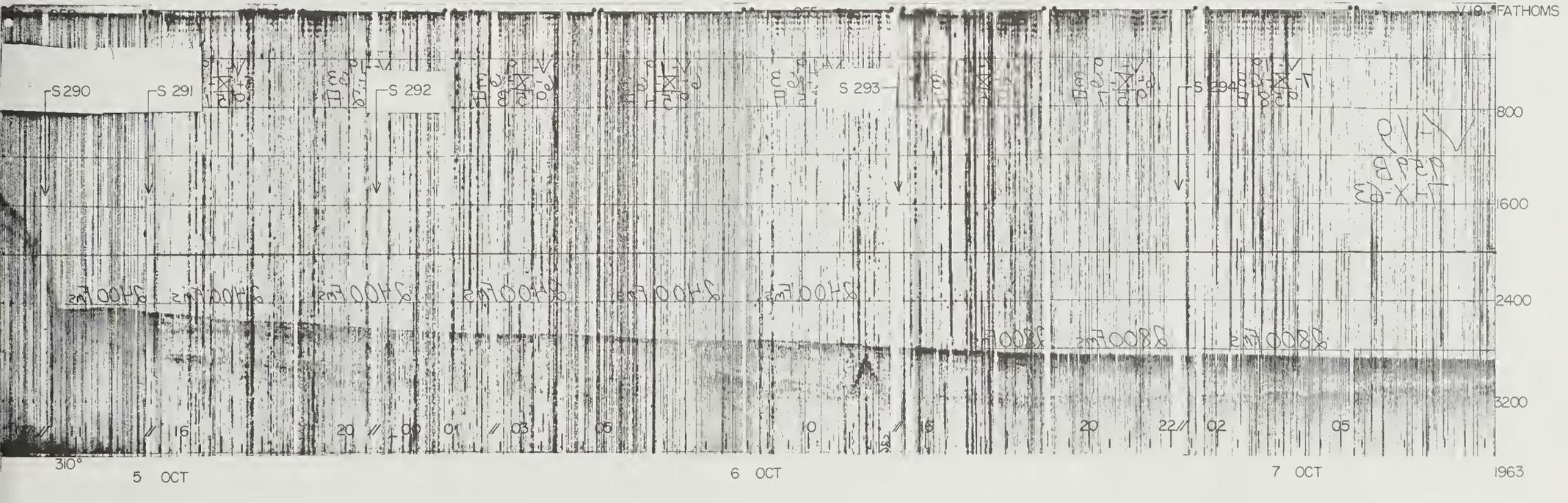

FATHOMS
800
200
2400
3200
S 260
S 262
22 SEPT
23 SEPT
1963

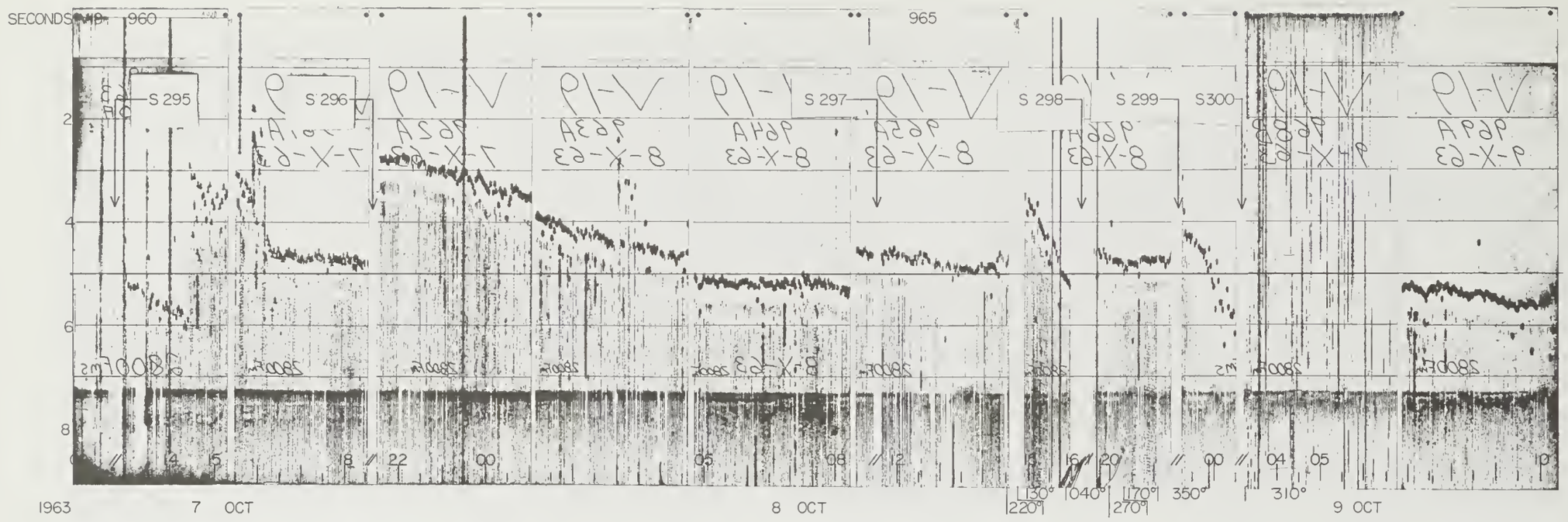

FATHOMS
S 269
S 270
S 271
S 272
800
1600
2400
3200
27 SEPT
28 SEPT
29 SEPT
1963

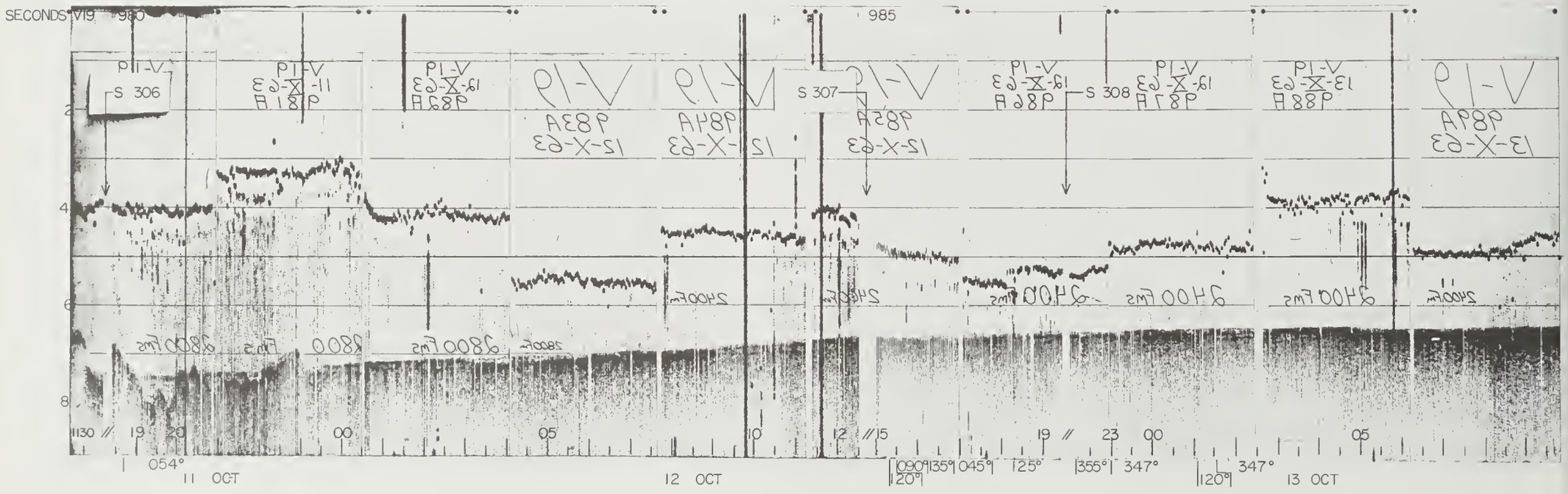

SECONDS
S 273
S 274
S 275
S 276
S 277
2
4
6
8
15
18
00
05
09
14
17
20
01
05
09
12
1963
29 SEPT
30 SEPT
065°
1 OCT

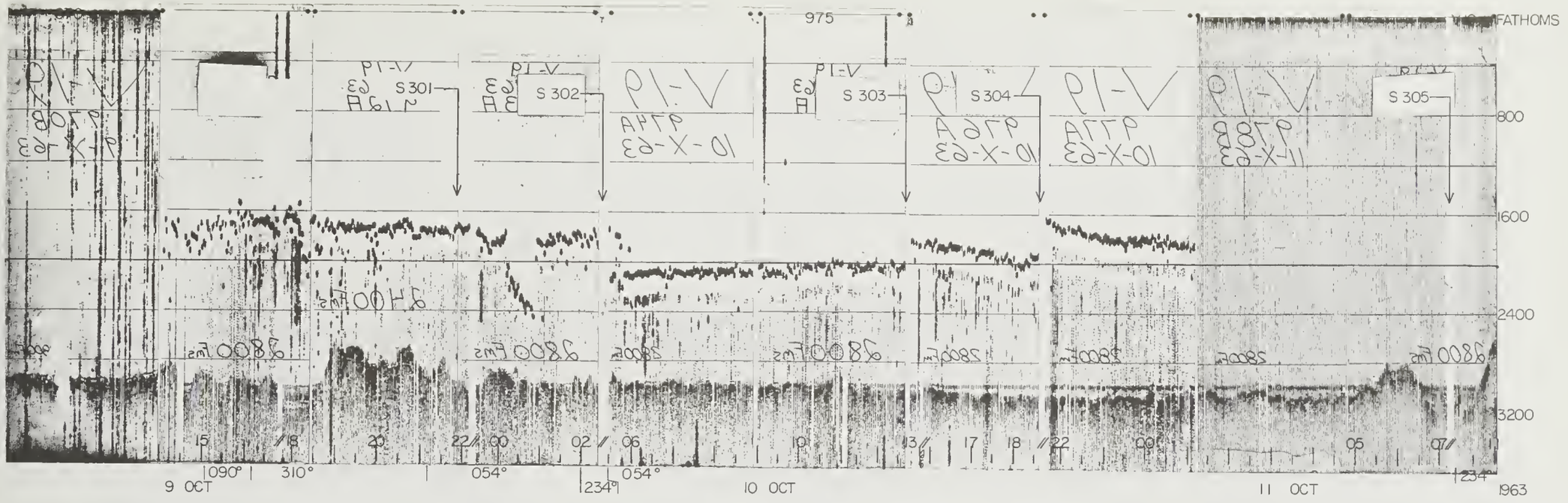

SECONDS
S 286
S 287
S 288
S 289
2
4
6
8
15
19
22
00
05
07
09
10
13
15
18
21
00
05
1963
3 OCT
240°
150°
061°
314°
4 OCT
325°
314°
300°
5 OCT
180°

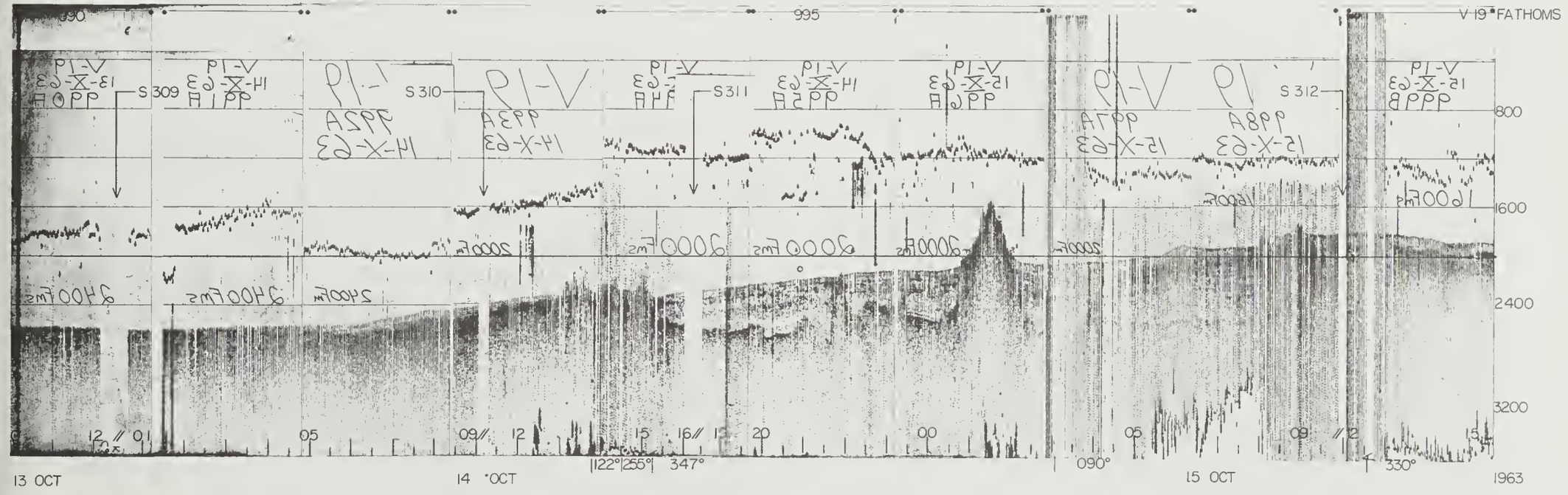

FATHOMS
800
1600
2400
3200
S 278
S 279
S 280,281
S 282
S 283,284
S 285
14
16
18
21
03
05
08
12
15
18
23
00
05
08
068°
090°
190°
1 OCT
2 OCT
3 OCT
1963

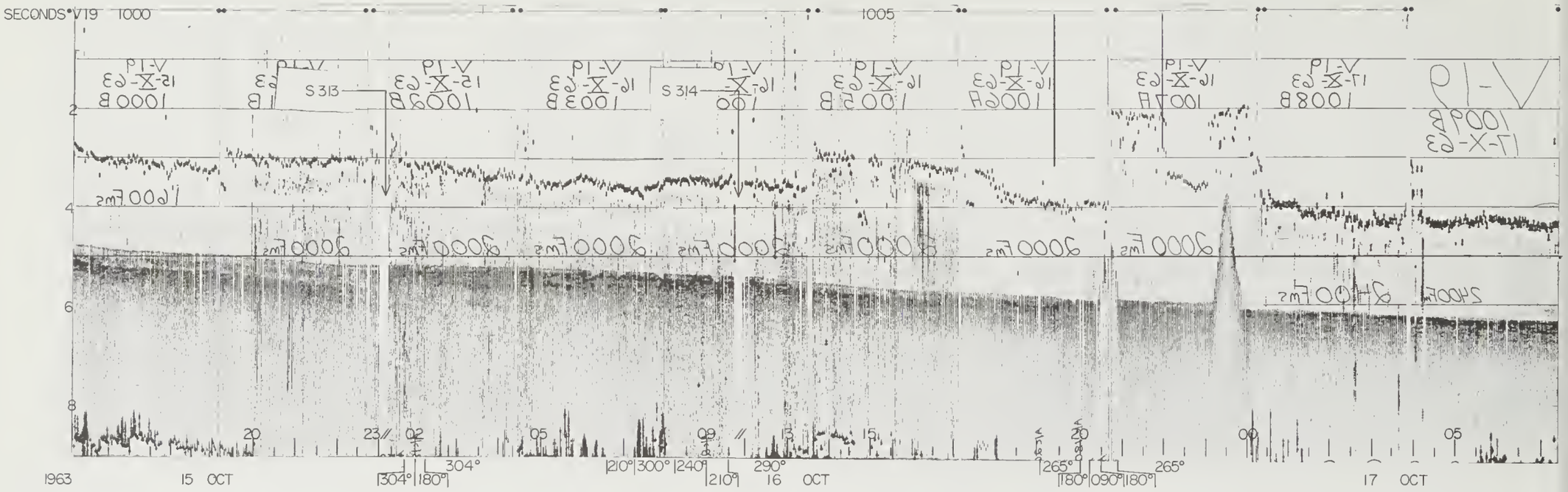

FATHOMS
800
1600
2400
3200
S 290
S 291
S 292
S 293
S 294
16
20
00
01
03
05
10
15
20
22
02
05
310°
5 OCT
6 OCT
7 OCT
1963

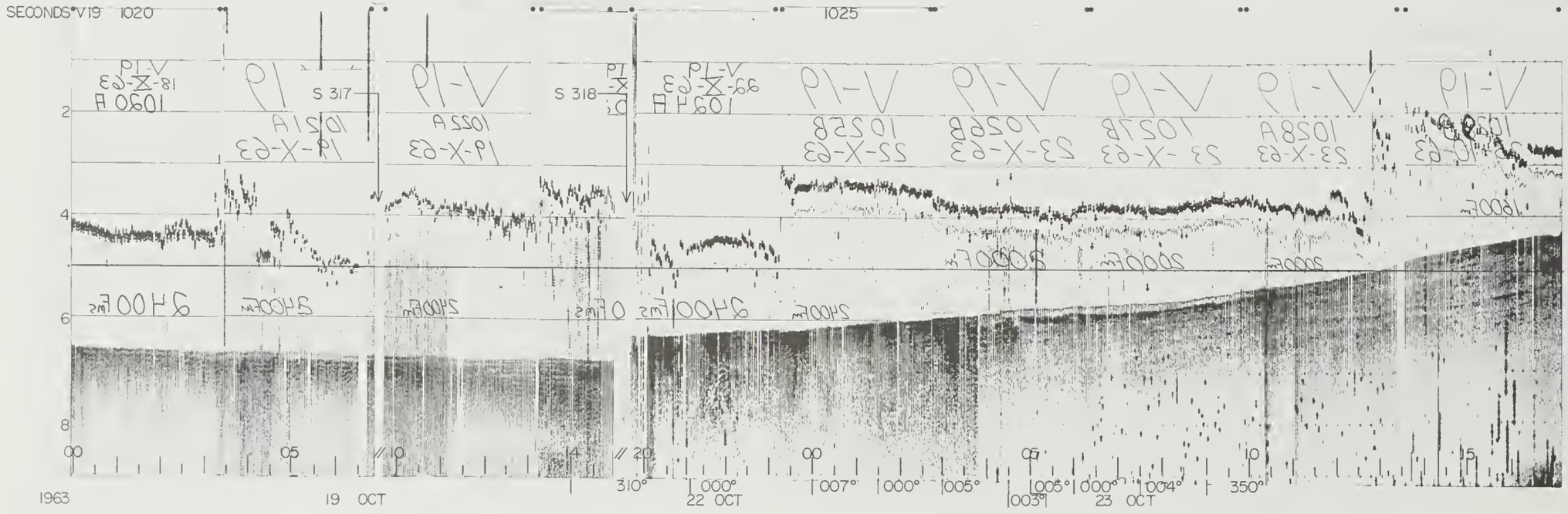

SECONDS
960
965
S 295
S 296
S 297
S 298
S 299
S 300
2800 Fms
1963
7 OCT
8 OCT
9 OCT

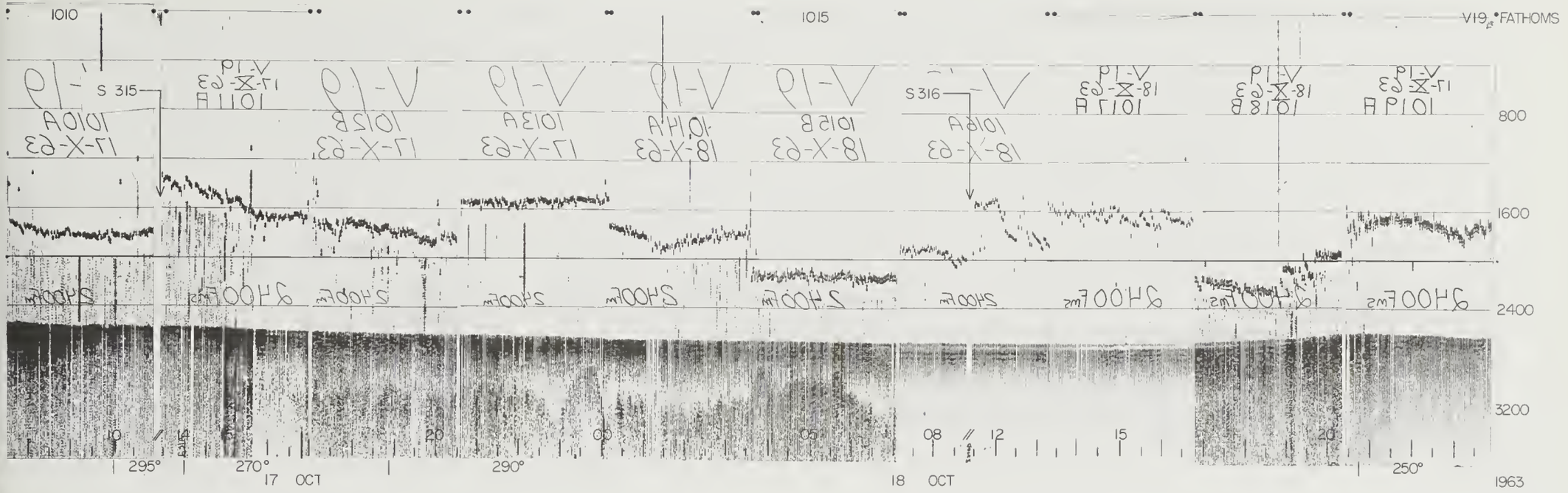

SECONDS
980
985
S 306
S 307
S 308
2800 Fms
2900 Fms
3000 Fms
3100 Fms
11 OCT
12 OCT
13 OCT

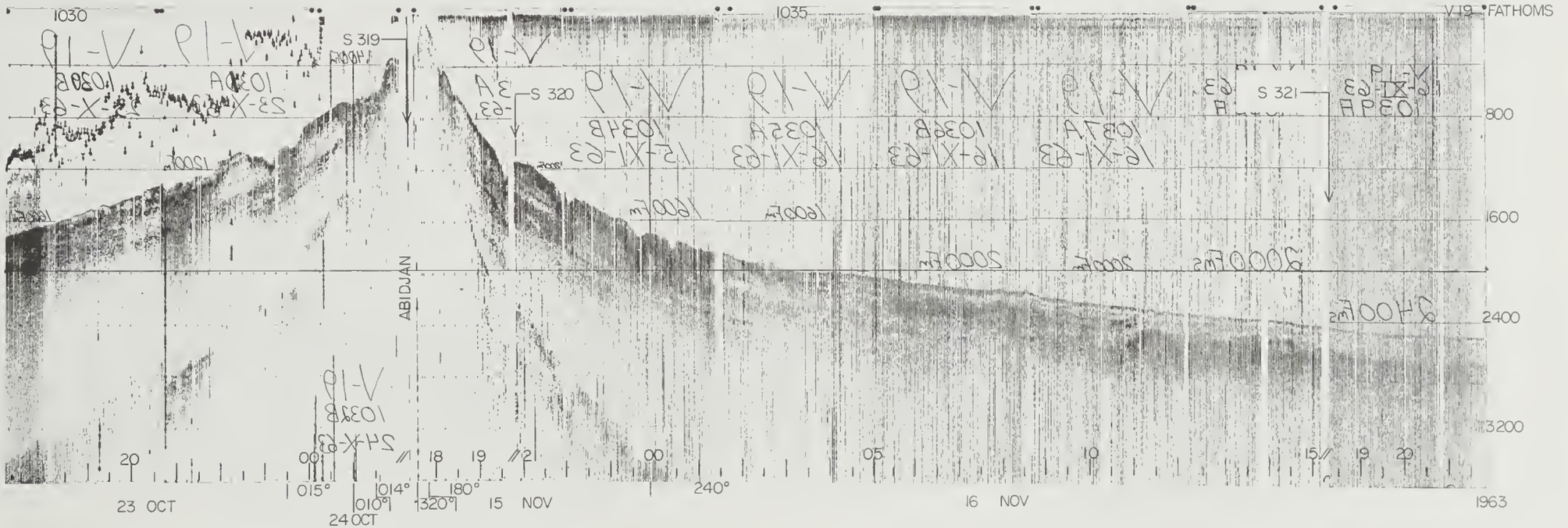

975
FATHOMS
S 301
S 302
S 303
S 304
S 305
800
1600
2400
3200
15
18
20
22
00
02
06
10
13
17
18
22
00
05
07
090°
310°
054°
234°
054°
234°
9 OCT
10 OCT
11 OCT
1963

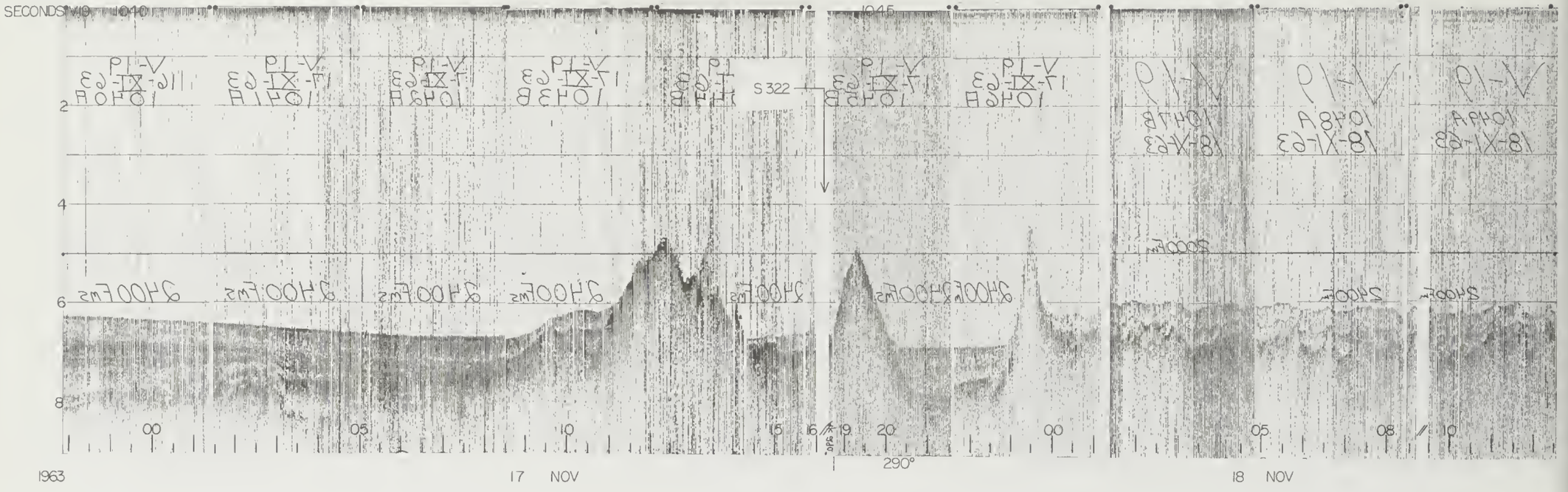

995
V-19 FATHOMS
S 309
S 310
S 311
S 312
800
1600
2400
3200
12
01
05
09
12
15
16
20
00
05
09
12
15
122°
255°
347°
090°
330°
13 OCT
14 OCT
15 OCT
1963

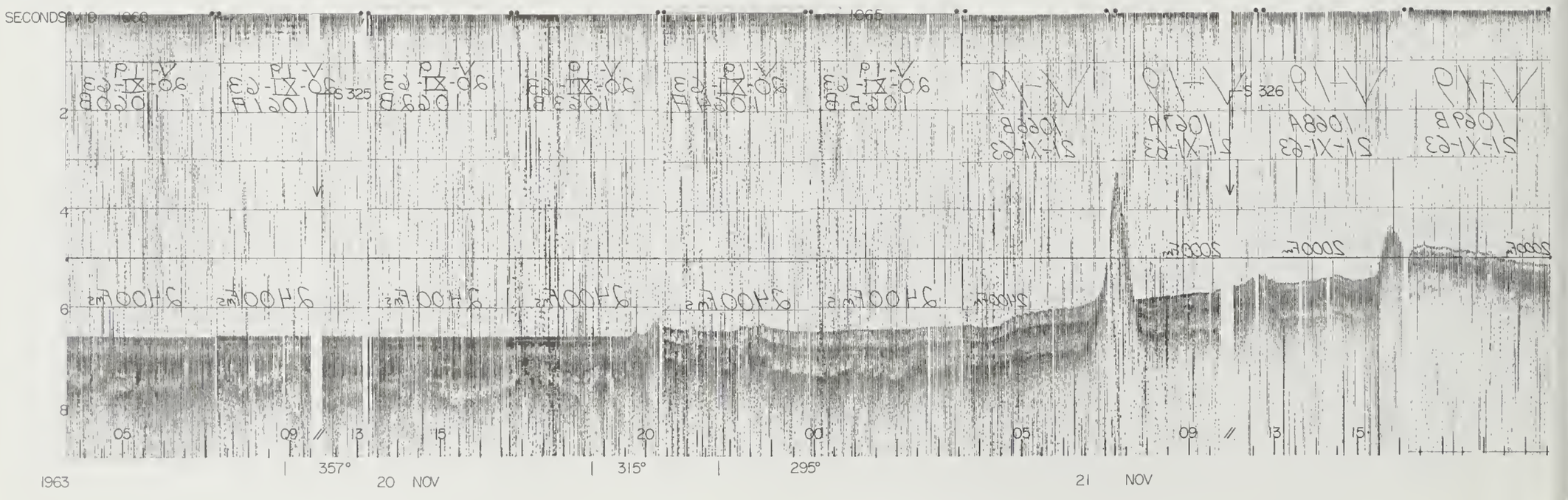

SECONDS V19 1000
1005
S 313
S 314
2
4
6
8
20
23
02
05
09
13
15
20
00
05
304°
304° 180°
210° 300° 240°
290°
210°
265°
180° 090° 180°
265°
1963
15 OCT
16 OCT
17 OCT

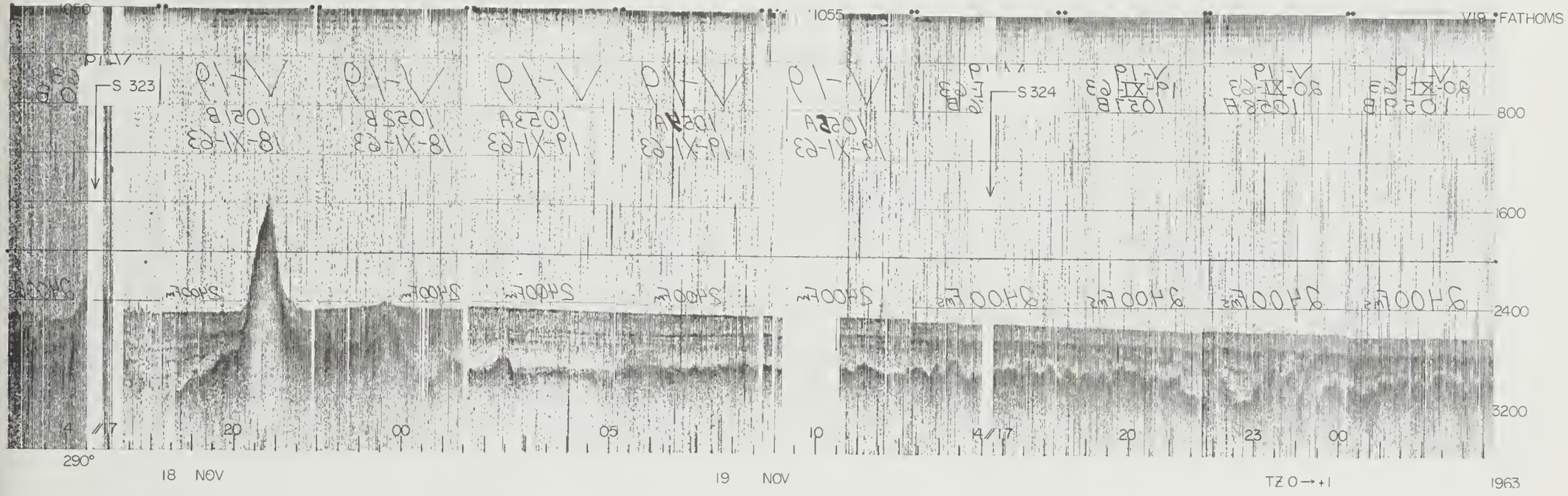

SECONDS V19 1020
1025
S 317
S 318
2
4
6
8
00
05
10
14
20
00
05
10
15
310°
000°
007°
000°
005°
005°
000°
004°
350°
003°
1963
19 OCT
22 OCT
23 OCT

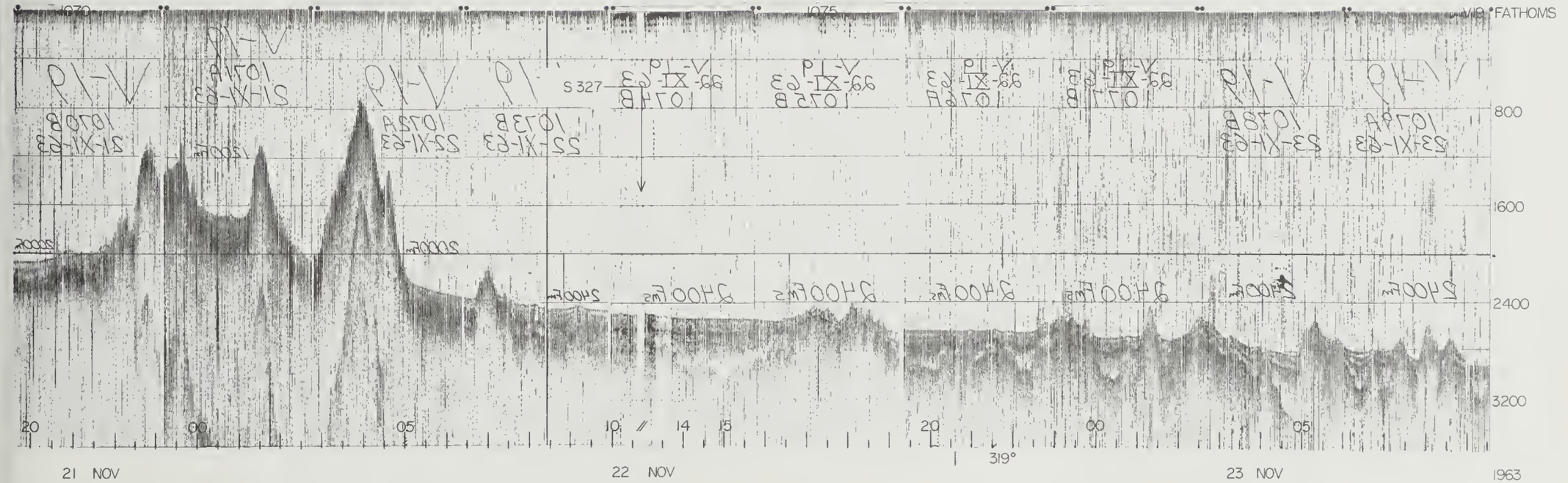

1010
1015
V19
FATHOMS
S 315
S 316
800
1600
2400
3200
295°
270°
17 OCT
290°
18 OCT
250°
1963

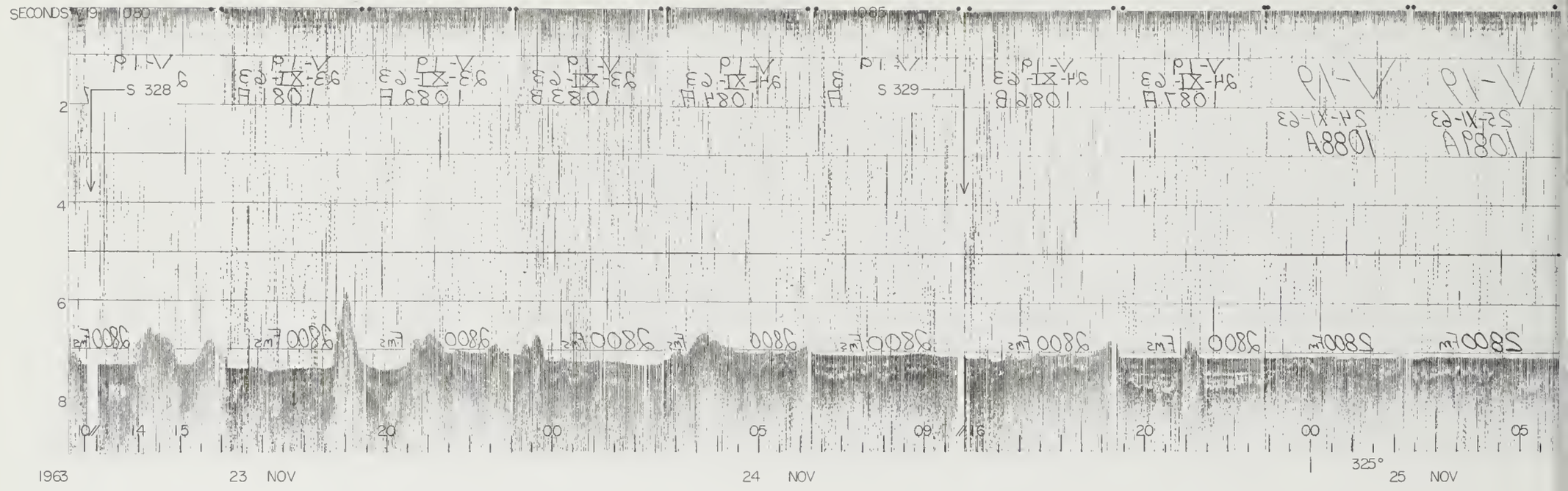

1030
1035
V19
FATHOMS
S 319
S 320
S 321
ABIDJAN
800
1600
2400
3200
23 OCT
1015°
1014°
180°
24 OCT
010°
320°
15 NOV
240°
16 NOV
1963

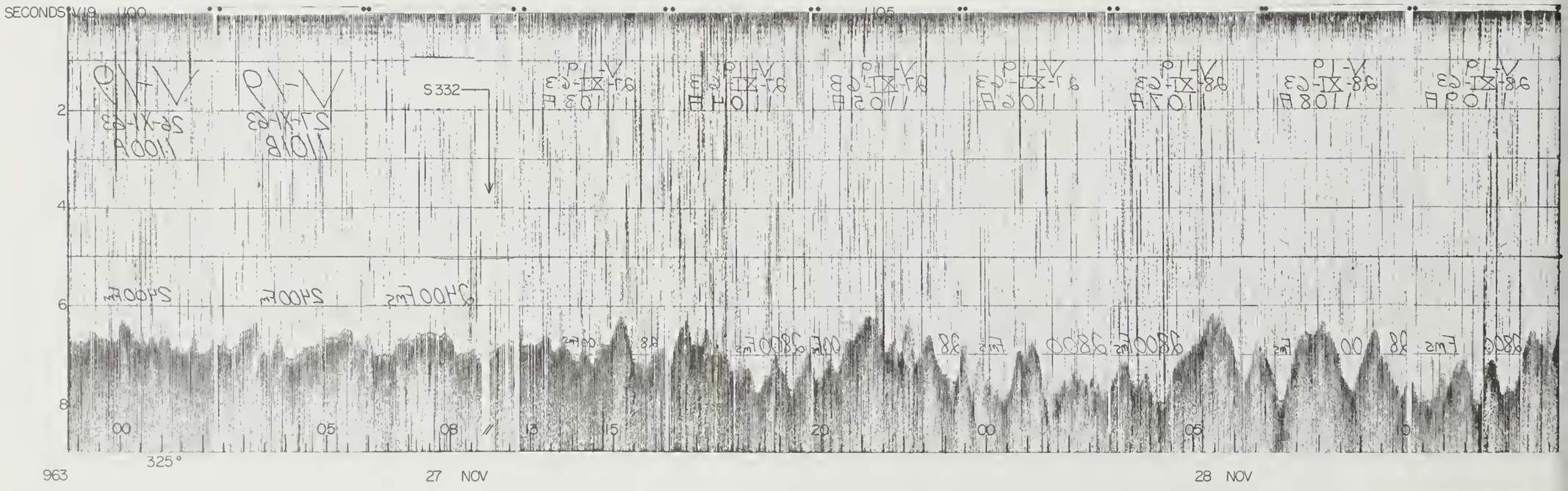

SECONDS
1040
1045
S 322
2
4
6
8
00
05
10
15
16
19
20
00
05
08
10
1963
17 NOV
290°
18 NOV

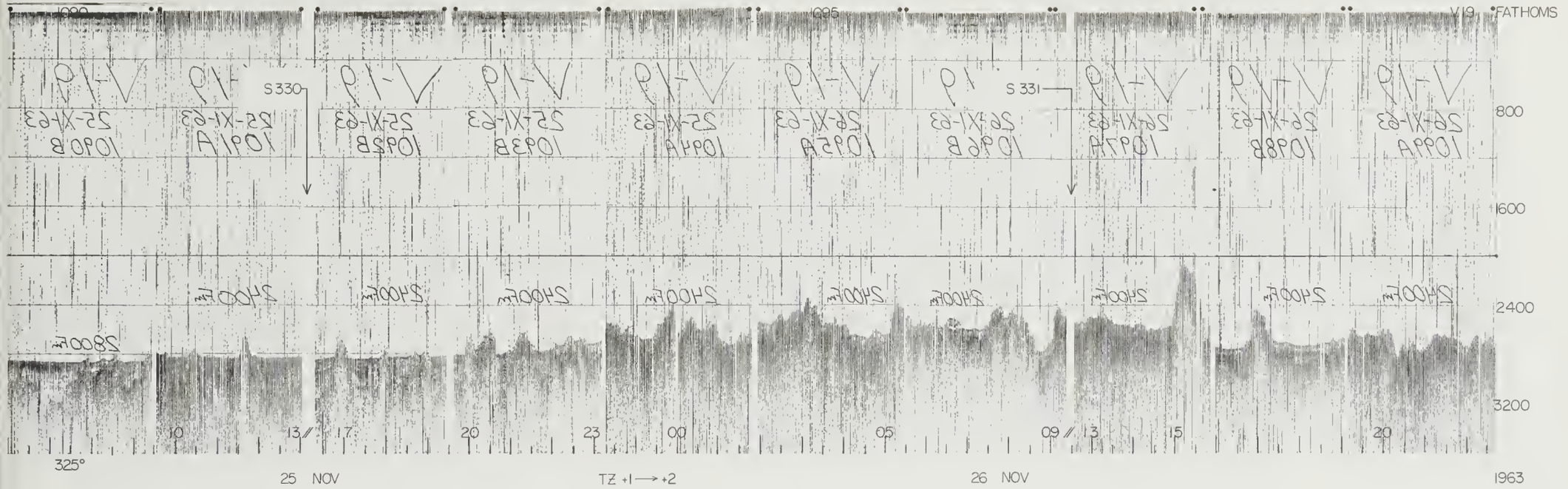

SECONDS
1060
1065
S 325
S 326
2
4
6
8
05
09
13
15
20
00
05
09
13
15
1963
357°
20 NOV
315°
295°
21 NOV

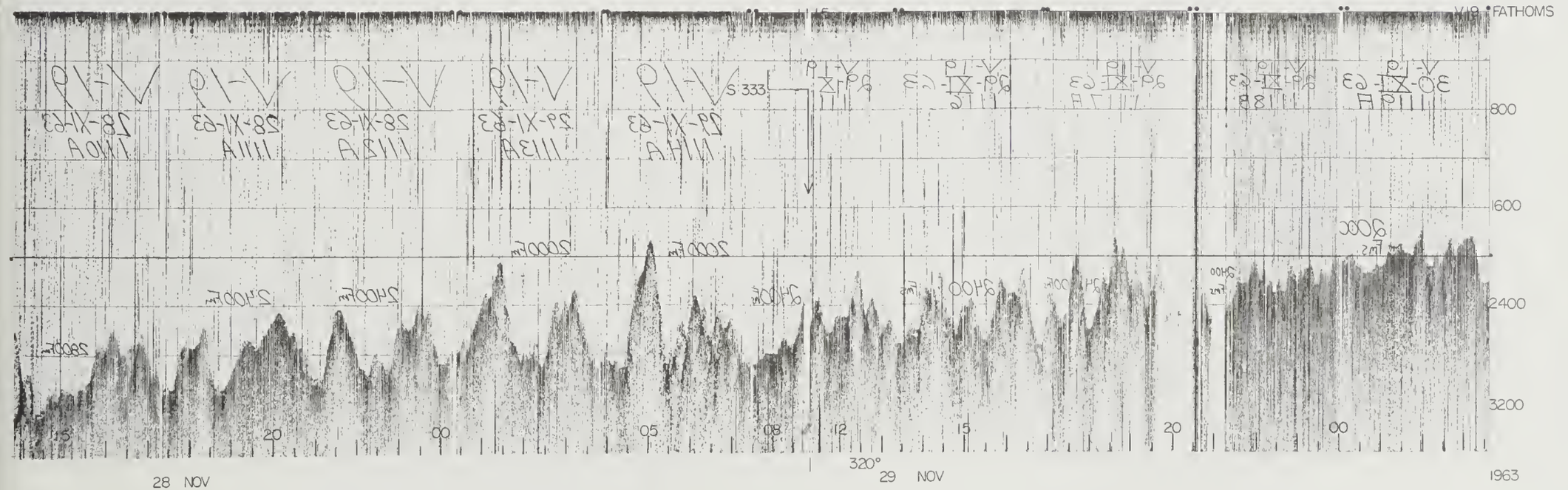

1050
1055
V19 FATHOMS
S 323
S 324
800
1600
2400
3200
14 17
20
00
05
10
14 17
20
23
00
290°
18 NOV
19 NOV
TZ 0 → +1
1963

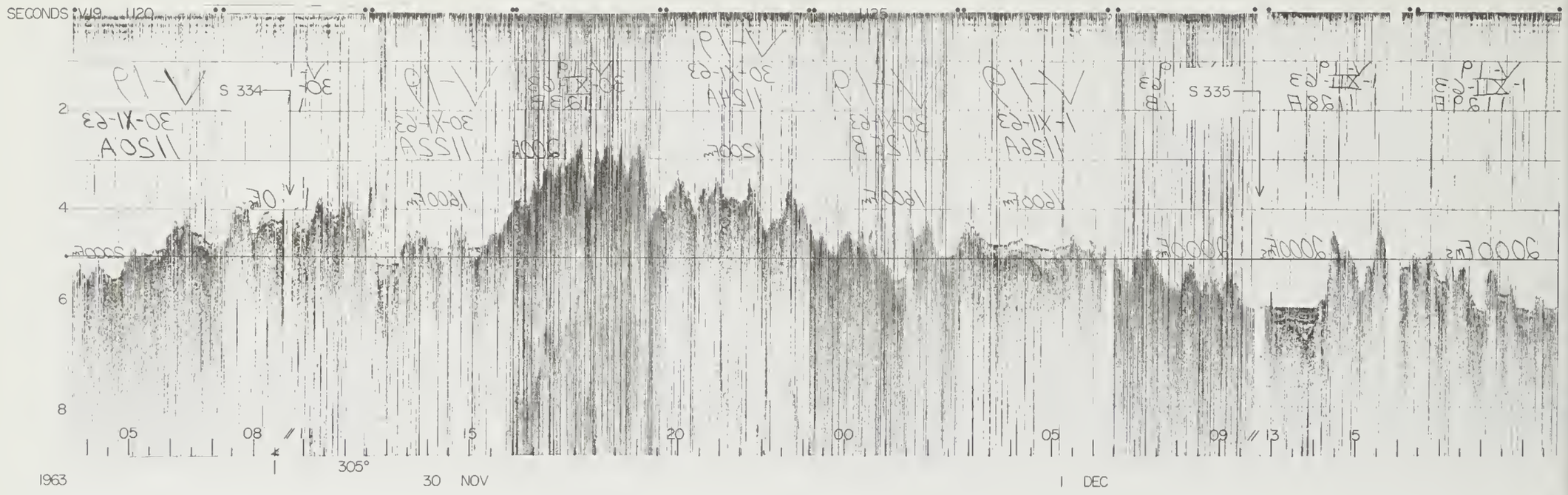

1070
1075
V19 FATHOMS
S 327
800
1600
2400
3200
20
00
05
10
14
15
20
00
05
319°
21 NOV
22 NOV
23 NOV
1963

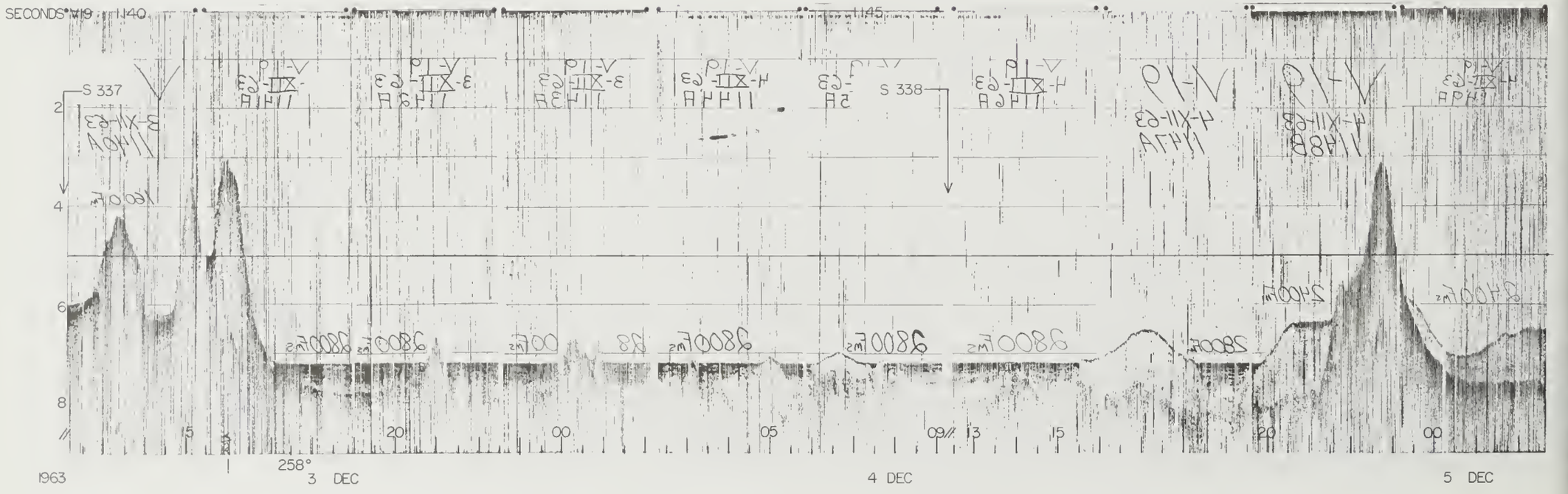

SECONDS
S 328
S 329
2
4
6
8
1963
23 NOV
24 NOV
25 NOV
325°

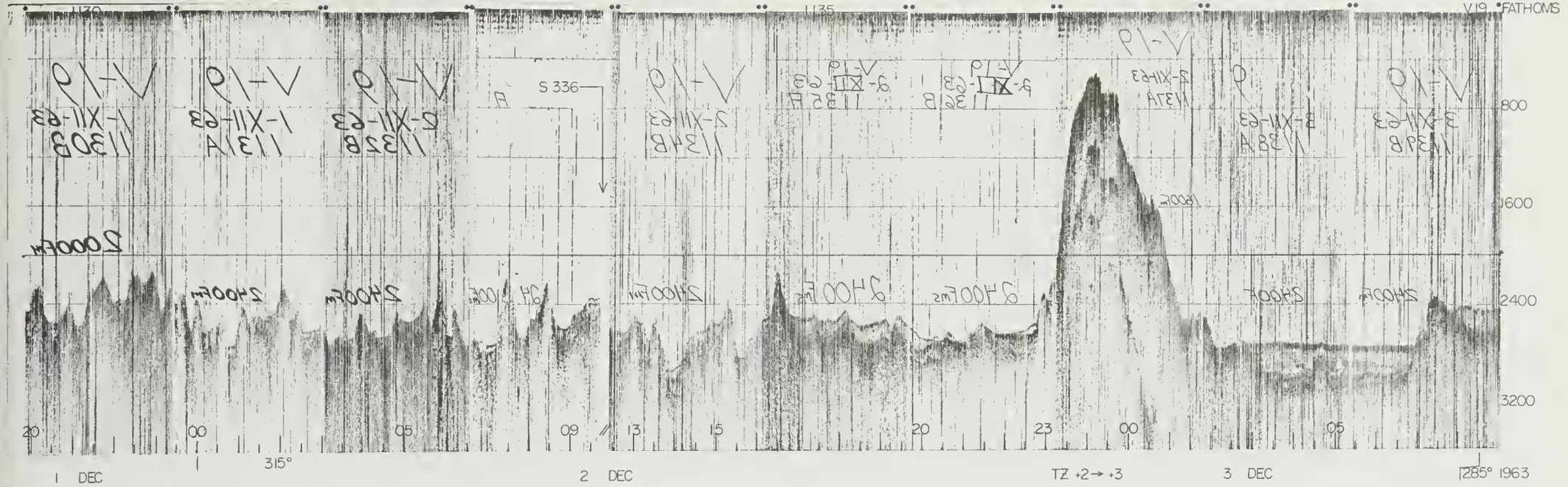

SECONDS
S 332
2
4
6
8
963
325°
27 NOV
28 NOV

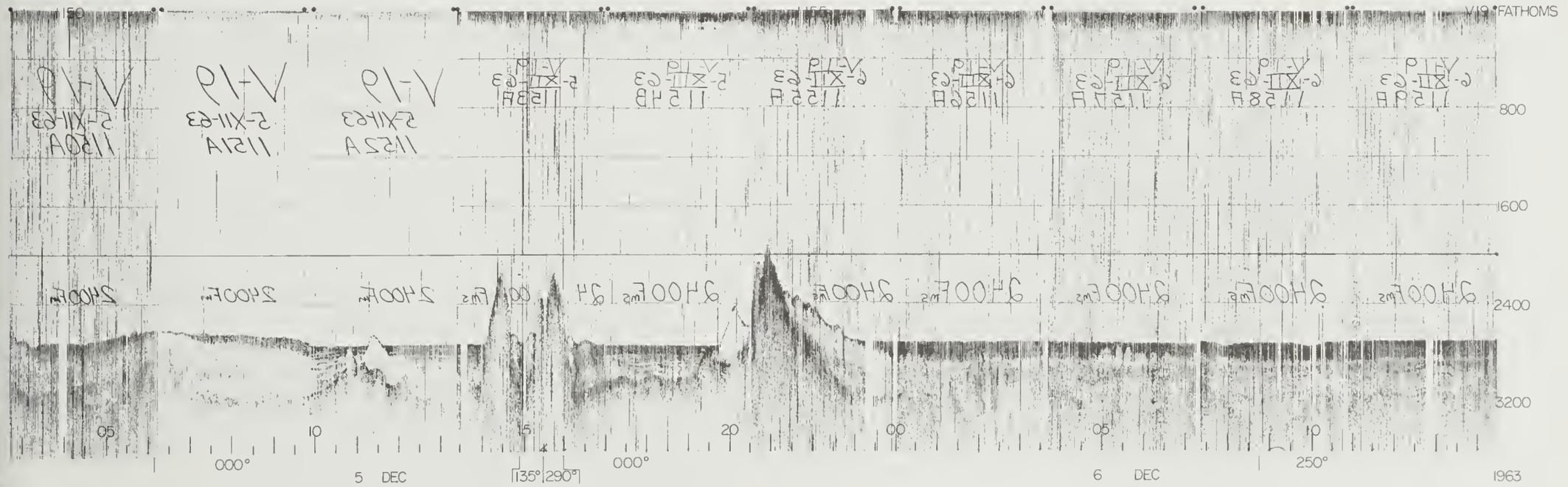

FATHOMS
800
1600
2400
3200
S 330
S 331
10
13
17
20
23
00
05
09
13
15
20
325°
25 NOV
TZ +1 → +2
26 NOV
1963

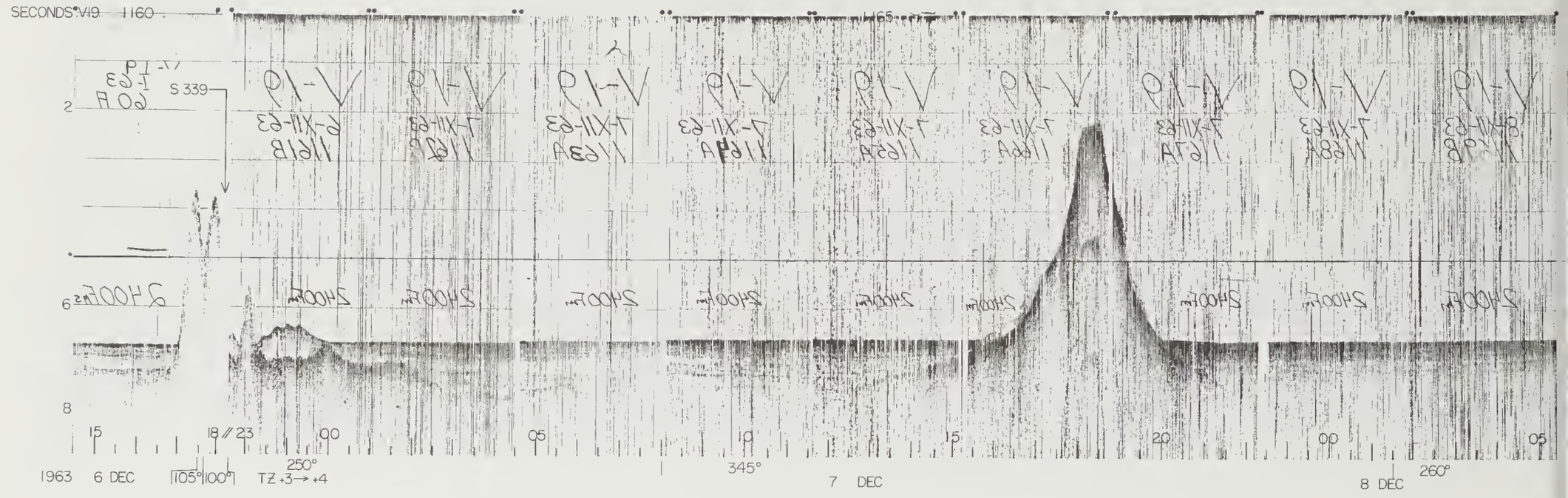

FATHOMS
800
1600
2400
3200
S 333
15
20
00
05
08
12
15
20
00
320°
28 NOV
29 NOV
1963

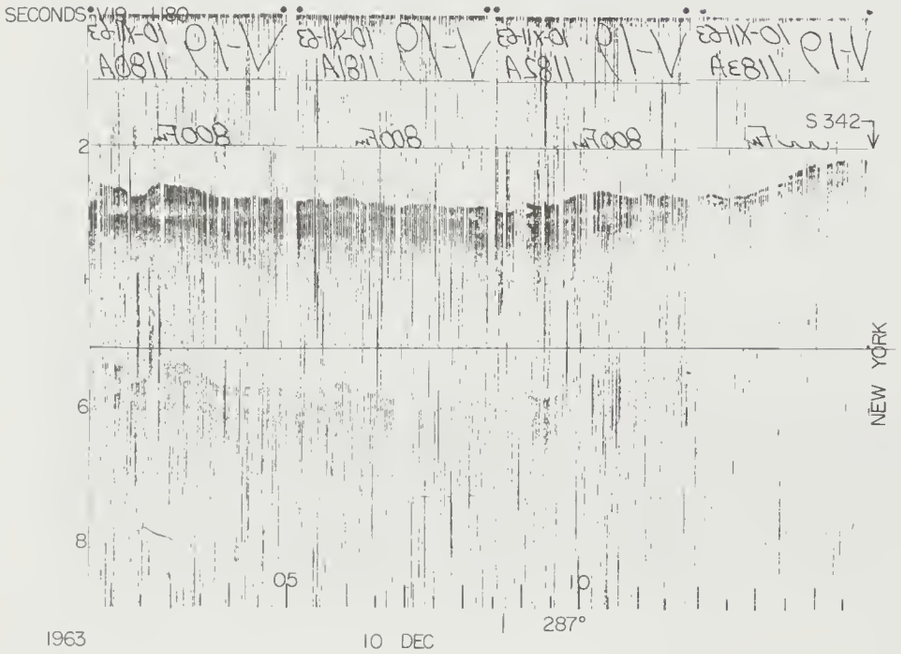

SECONDS
S 334
S 335
05
08
15
20
00
05
09
13
15
305°
1963
30 NOV
1 DEC

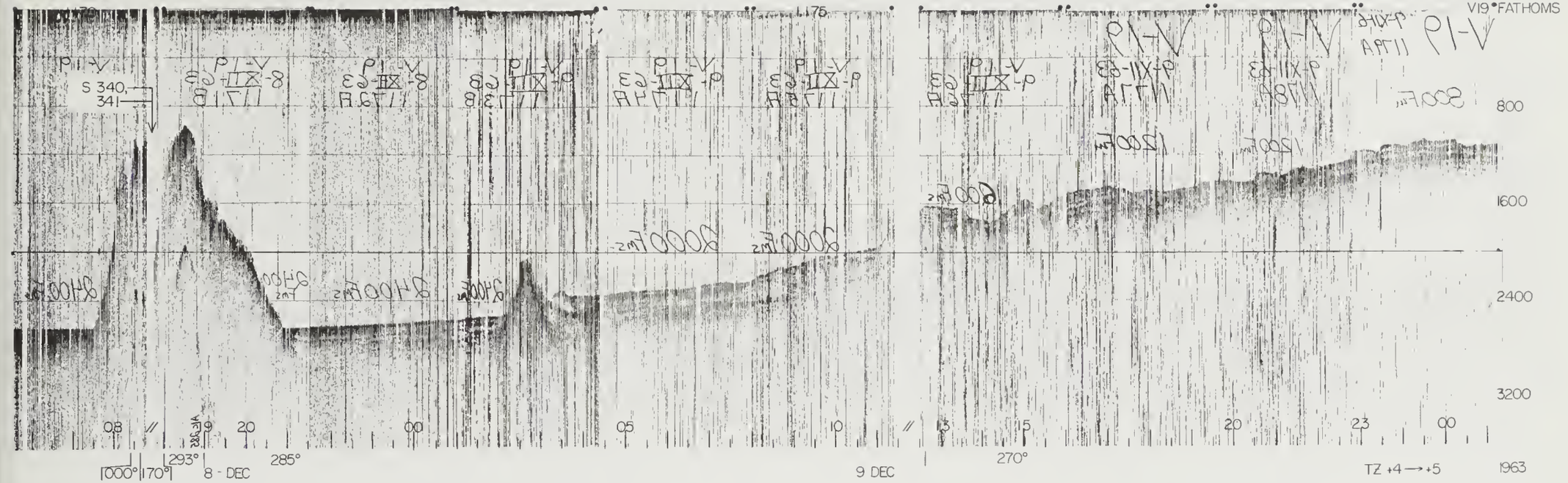

SECONDS
S 337
S 338
05
09
13
15
20
00
258°
1963
3 DEC
4 DEC
5 DEC

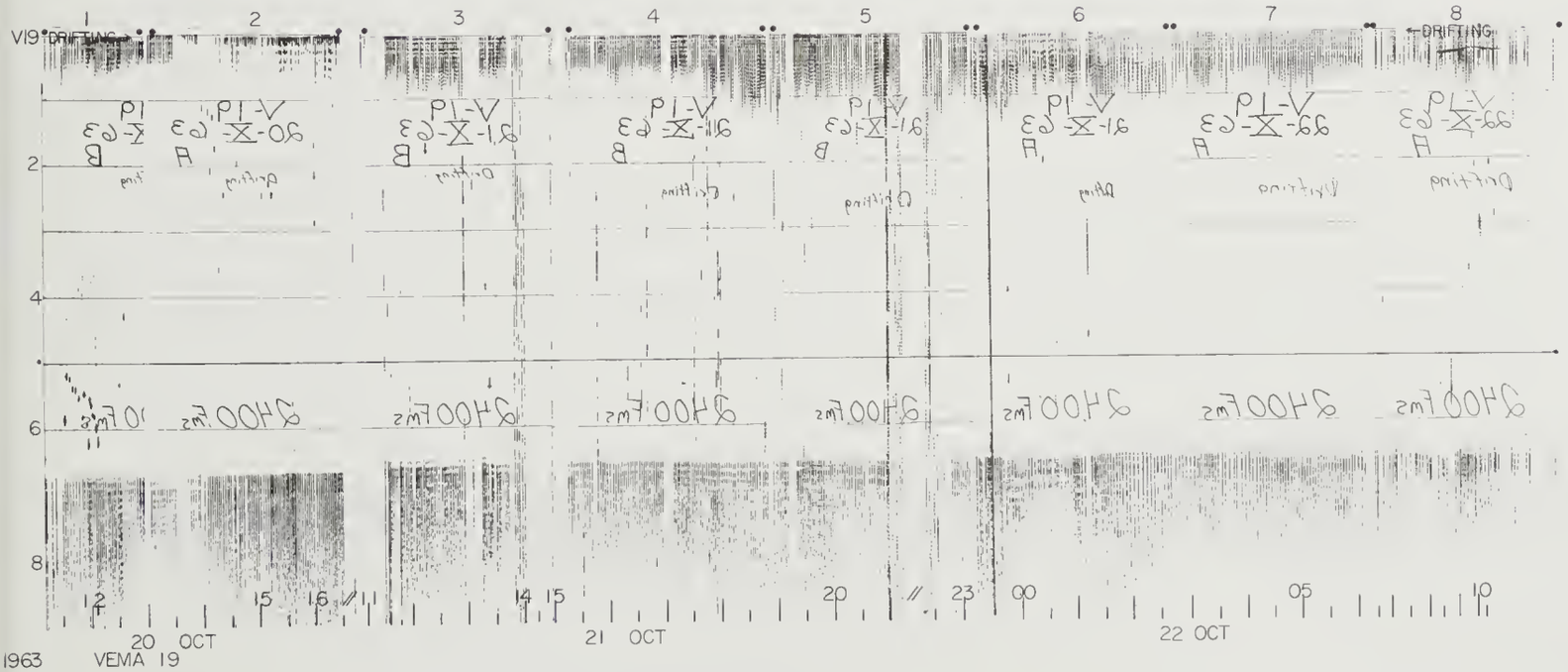

V19
FATHOMS
800
1600
2400
3200
S 336
1 DEC
315°
2 DEC
TZ +2→ +3
3 DEC
285° 1963

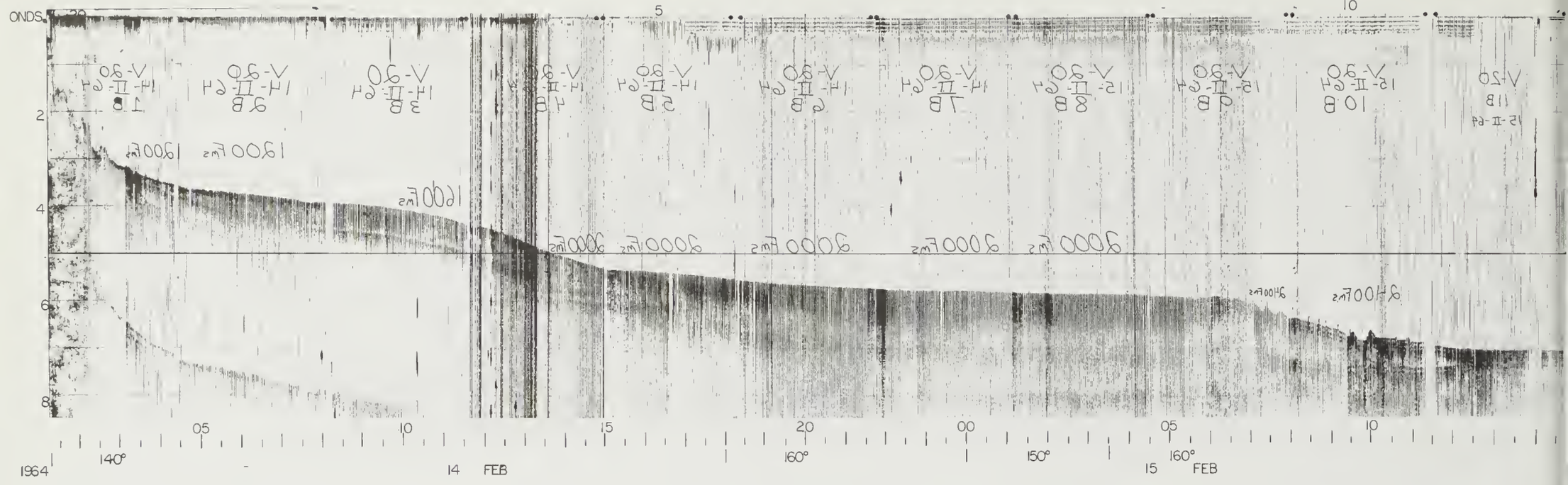

V19
FATHOMS
800
1600
2400
3200
5 DEC
000°
135° 290°
000°
6 DEC
250°
1963

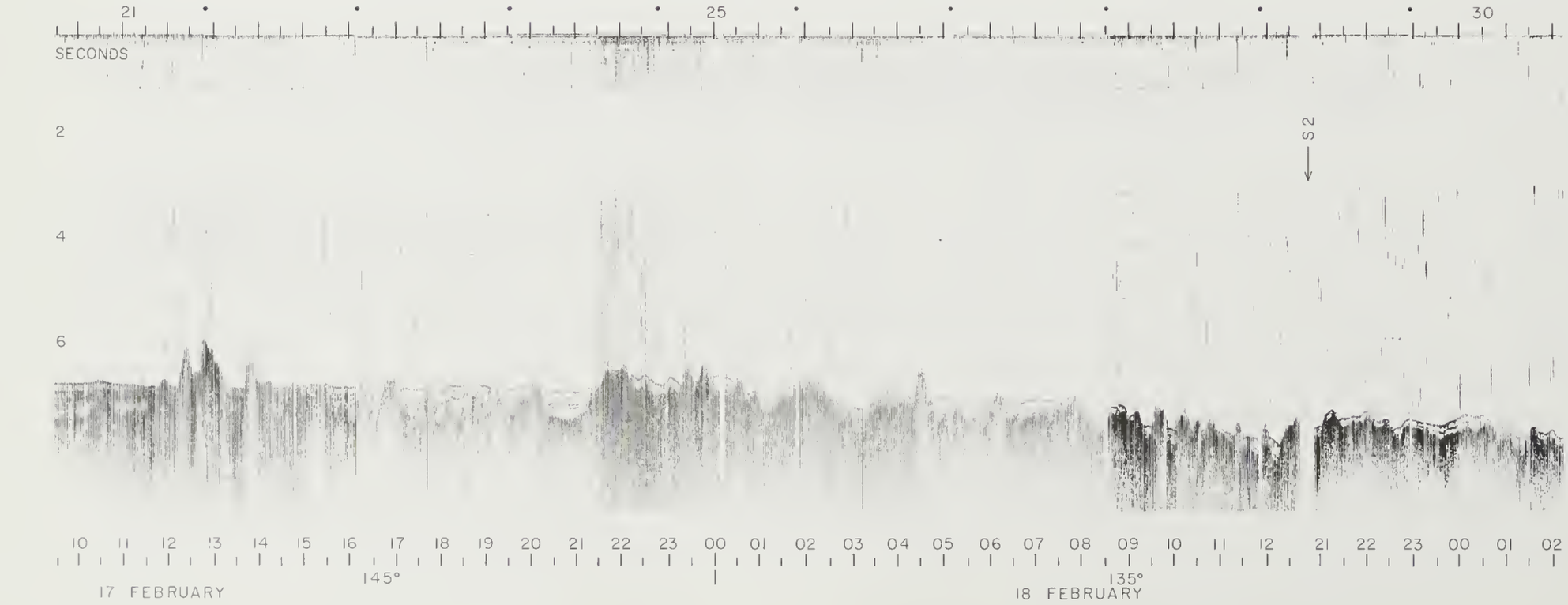

SECONDS
S 339
15
18 // 23
00
05
10
15
20
00
05
250°
345°
260°
1963 6 DEC
TZ +3 → +4
7 DEC
8 DEC

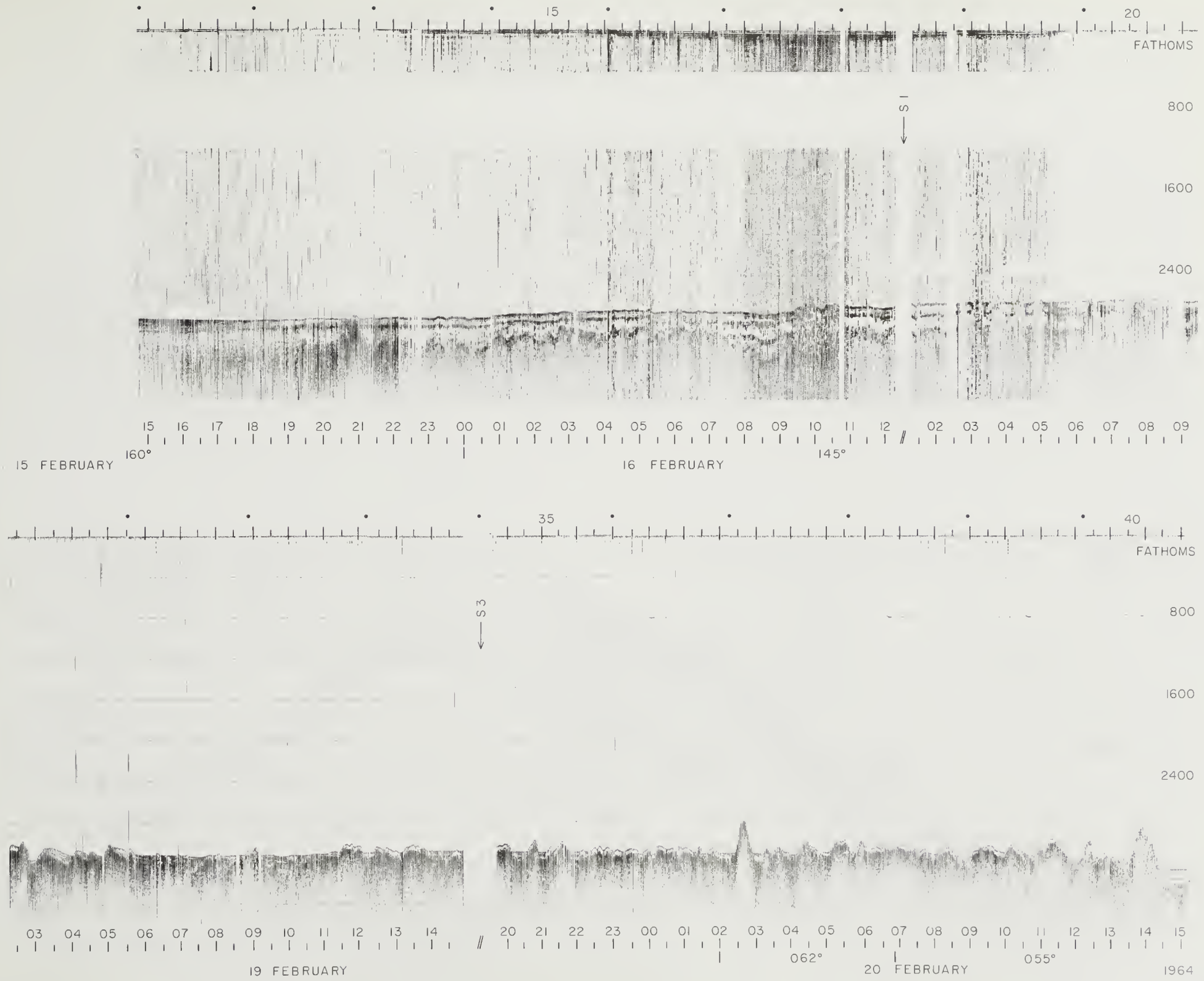

SECONDS
S 342
NEW YORK
05
10
287°
1963
10 DEC

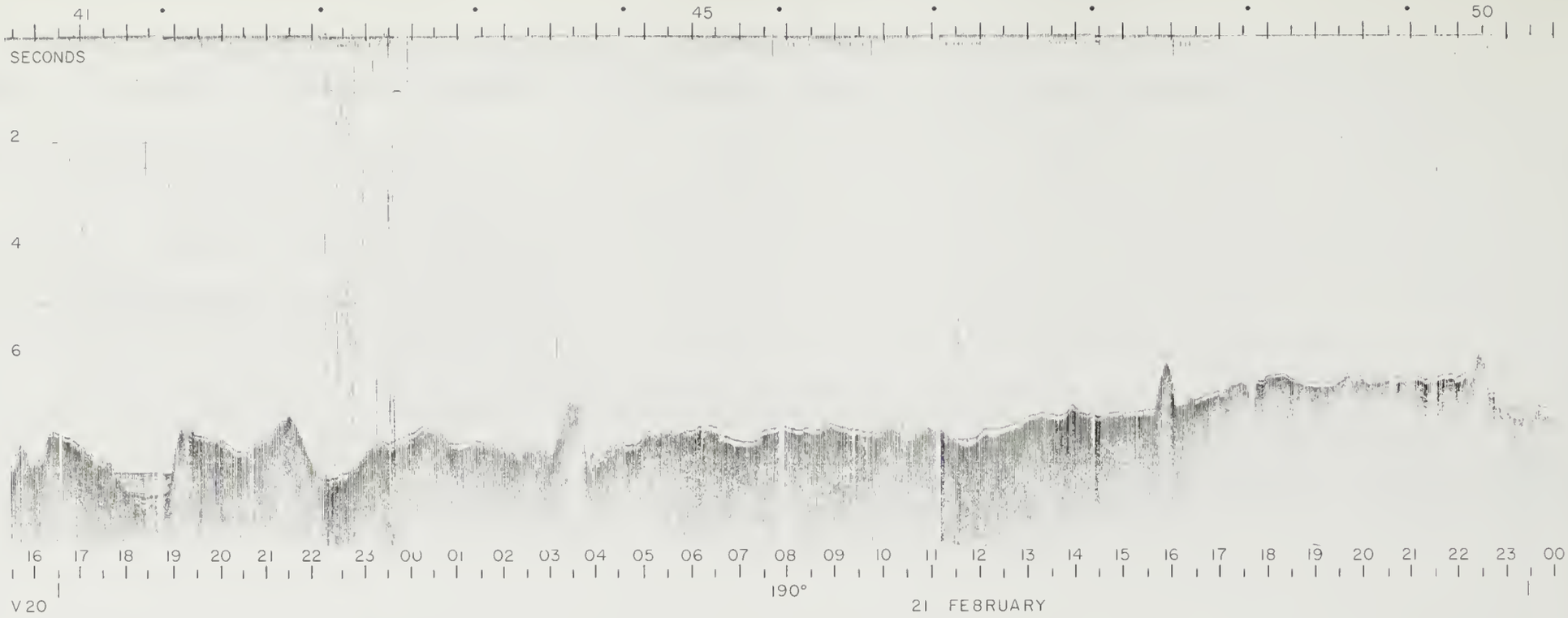

V19 FATHOMS
800
1600
2400
3200
S 340,
341
08
09
20
00
05
10
13
15
20
23
00
293°
285°
270°
8 - DEC
9 DEC
TZ +4 → +5
1963

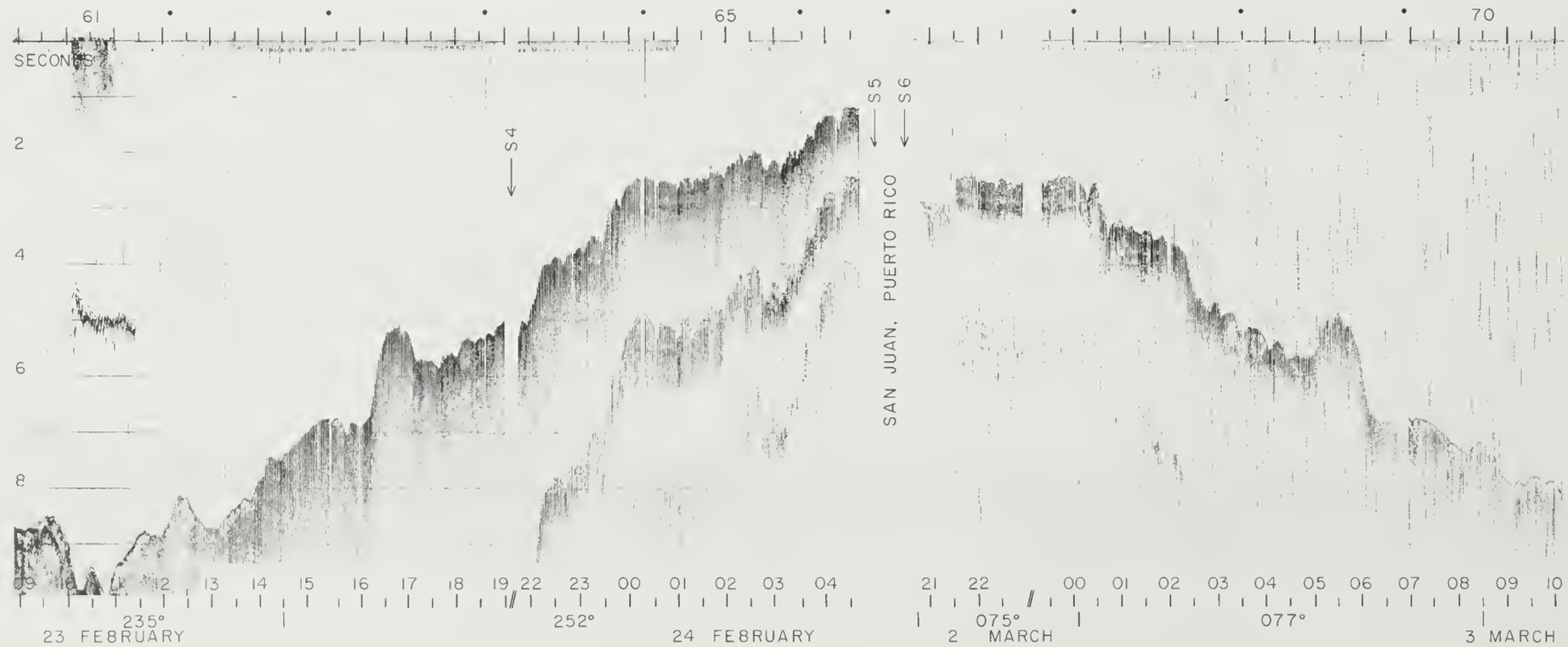

V19 DRIFTING
DRIFTING
1
2
3
4
5
6
7
8
2
4
6
8
12
15
16
11
14
15
20
23
00
05
10
20 OCT
21 OCT
22 OCT
1963 VEMA 19

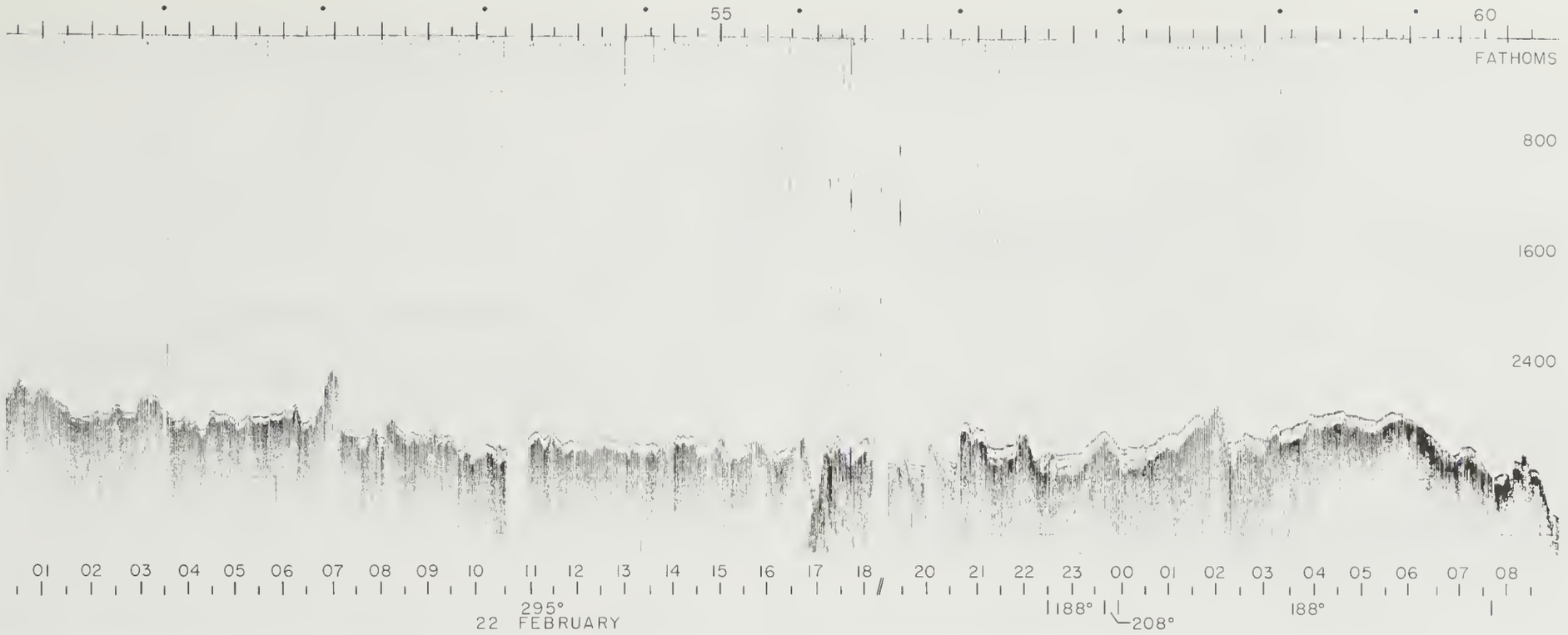

SECONDS
1964
140°
14 FEB
160°
150°
15 FEB
160°

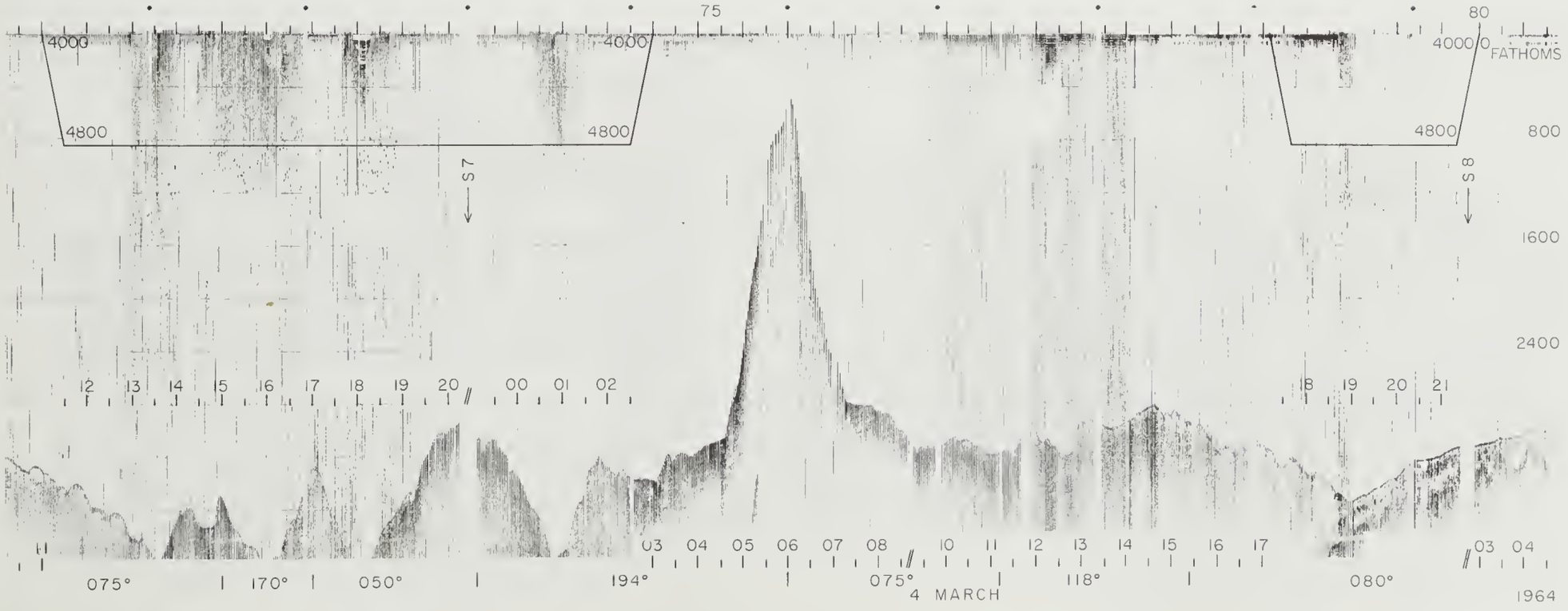

SECONDS
S2
17 FEBRUARY
145°
135°
18 FEBRUARY

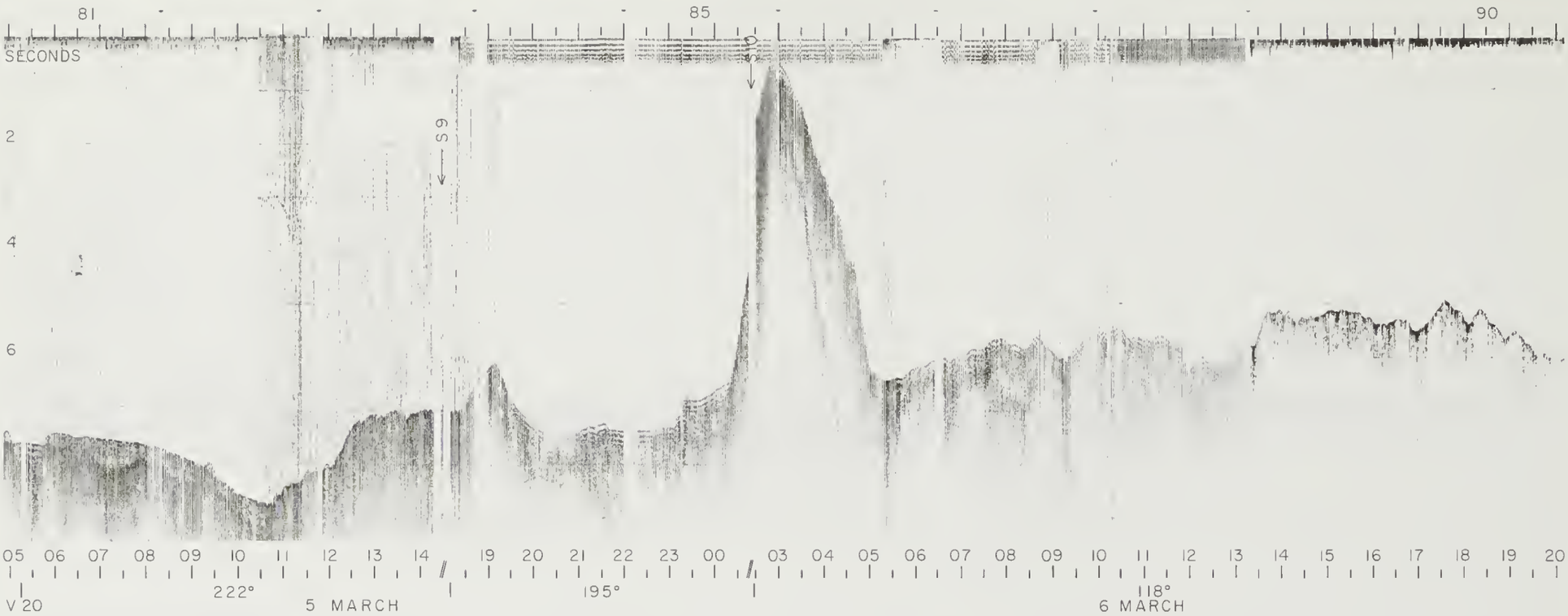

15
20
FATHOMS
S1
800
1600
2400
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 02 03 04 05 06 07 08 09
160°
145°
15 FEBRUARY
16 FEBRUARY
35
40
FATHOMS
S3
800
1600
2400
03 04 05 06 07 08 09 10 11 12 13 14
20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
062°
055°
19 FEBRUARY
20 FEBRUARY
1964

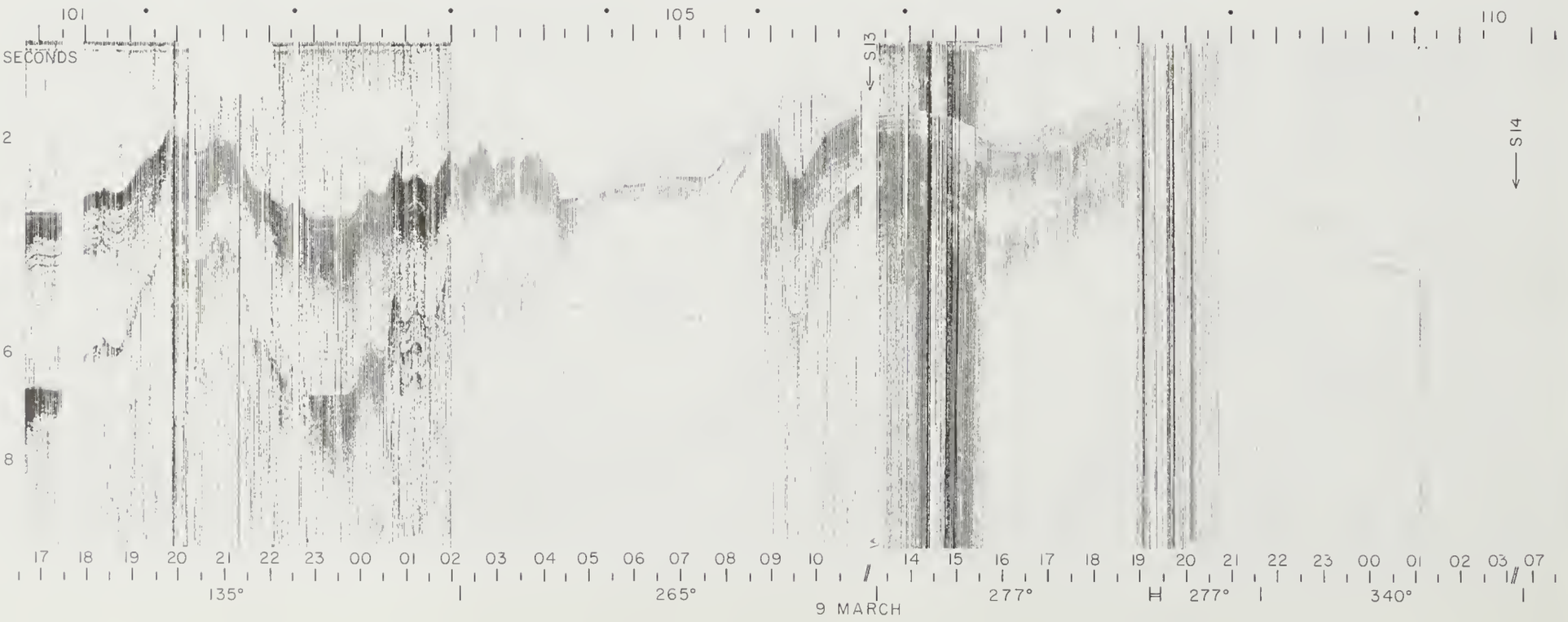

41
45
50
SECONDS
2
4
6
16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00
V 20
190°
21 FEBRUARY

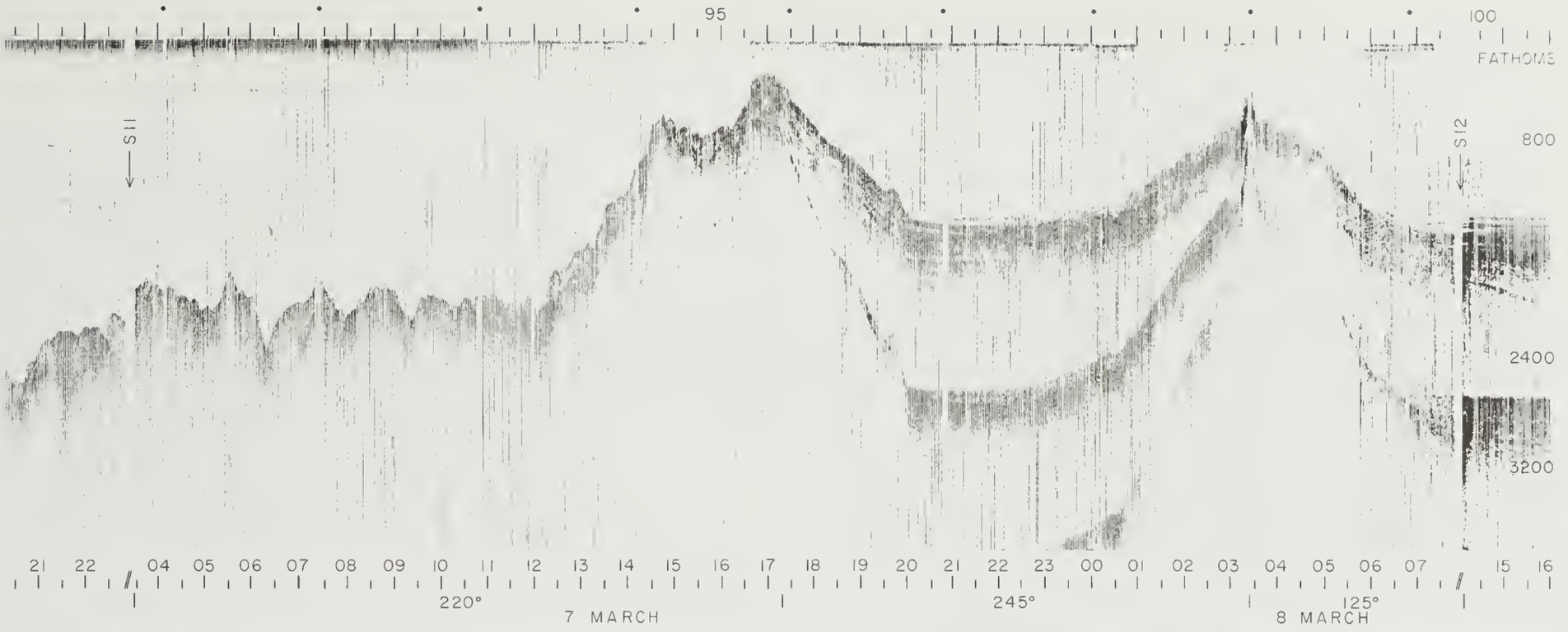

61
65
70
SECONDS
2
4
6
8
S4
S5
S6
SAN JUAN, PUERTO RICO
09 10 11 12 13 14 15 16 17 18 19 22 23 00 01 02 03 04
21 22 00 01 02 03 04 05 06 07 08 09 10
235°
252°
075°
077°
23 FEBRUARY
24 FEBRUARY
2 MARCH
3 MARCH

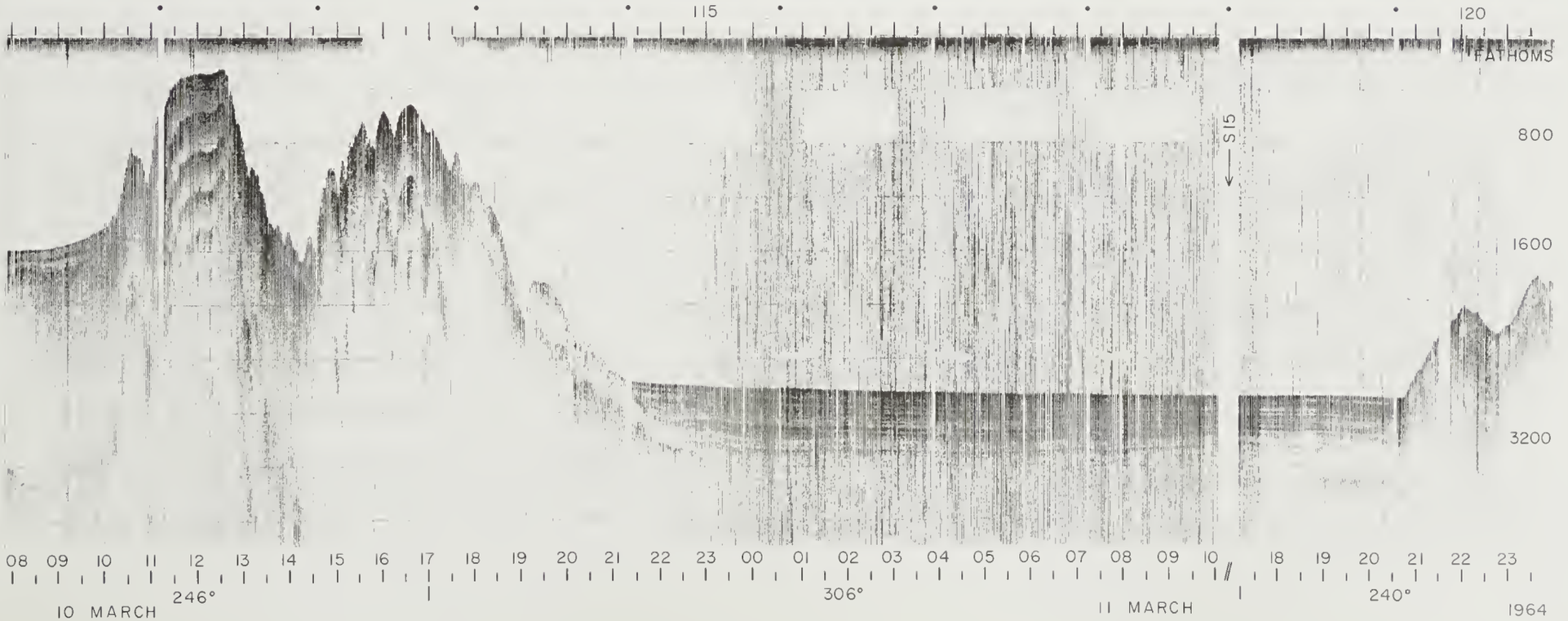

55
60
FATHOMS
800
1600
2400
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 20 21 22 23 00 01 02 03 04 05 06 07 08
295°
22 FEBRUARY
188°
208°
188°


75
80
4000
4000
4000
0
FATHOMS
4800
4800
4800
S 7
S 8
800
1600
2400
12 13 14 15 16 17 18 19 20 00 01 02
18 19 20 21
03 04 05 06 07 08 10 11 12 13 14 15 16 17
03 04
075°
170°
050°
194°
075°
118°
080°
4 MARCH
1964

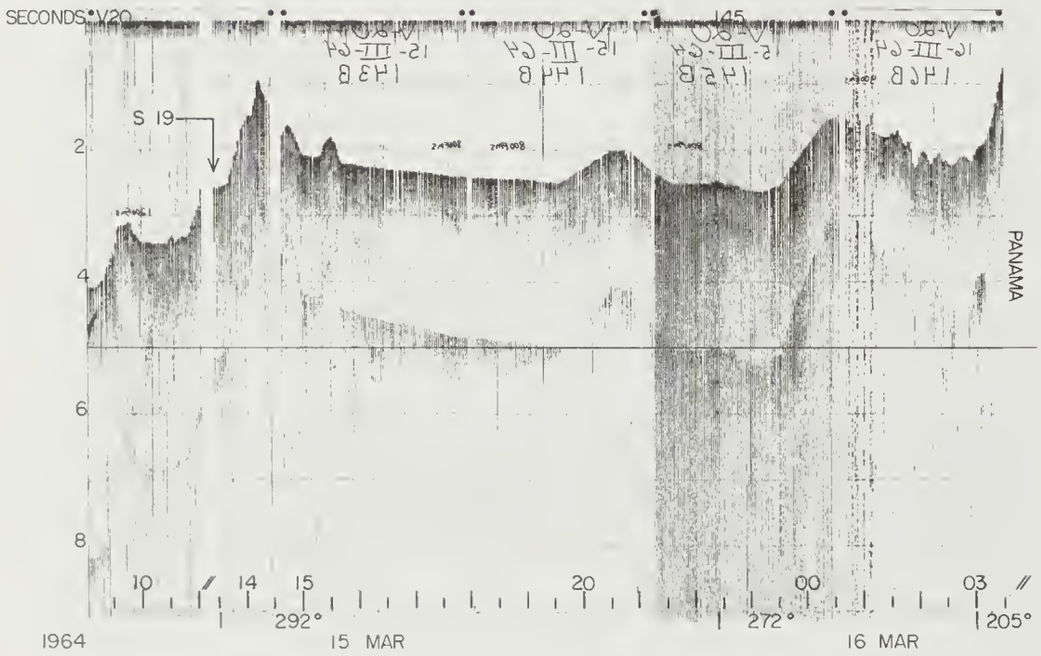

81
85
90
SECONDS
2
4
6
S9
05 06 07 08 09 10 11 12 13 14 19 20 21 22 23 00 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20
V 20
222°
5 MARCH
195°
118°
6 MARCH


101
105
110
SECONDS
2
6
8
S13
S14
17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 14 15 16 17 18 19 20 21 22 23 00 01 02 03 07
135°
265°
9 MARCH
277°
277°
340°

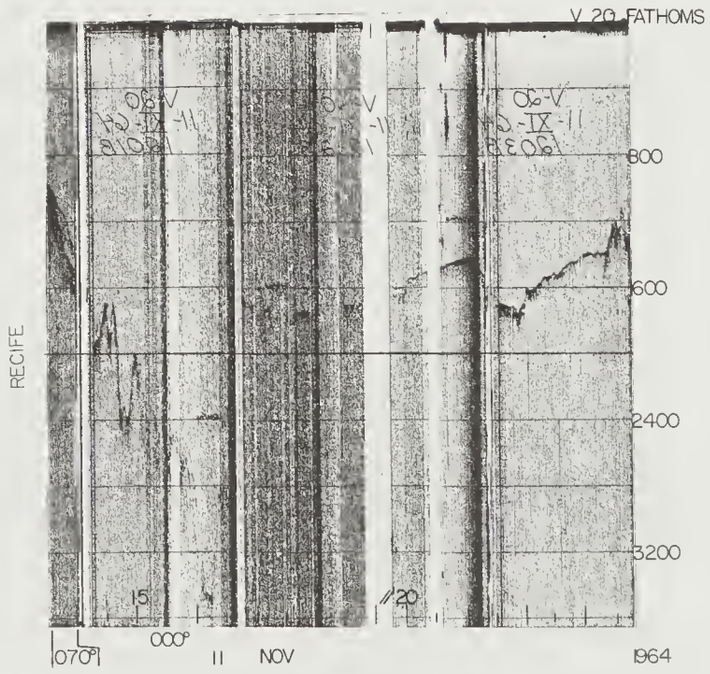

95
100
FATHOMS
S11
S12
800
2400
3200
21 22 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 15 16
220°
245°
125°
7 MARCH
8 MARCH

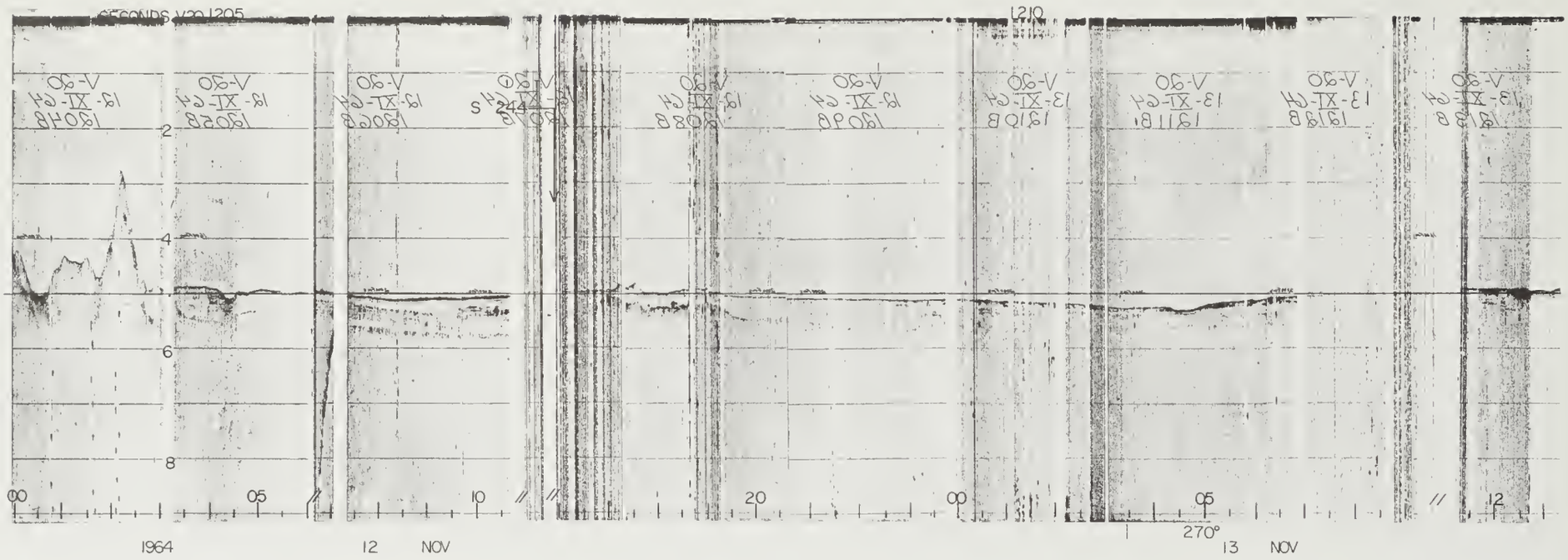

115
120
FATHOMS
S15
800
1600
3200
08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 18 19 20 21 22 23
246°
306°
240°
10 MARCH
11 MARCH
1964

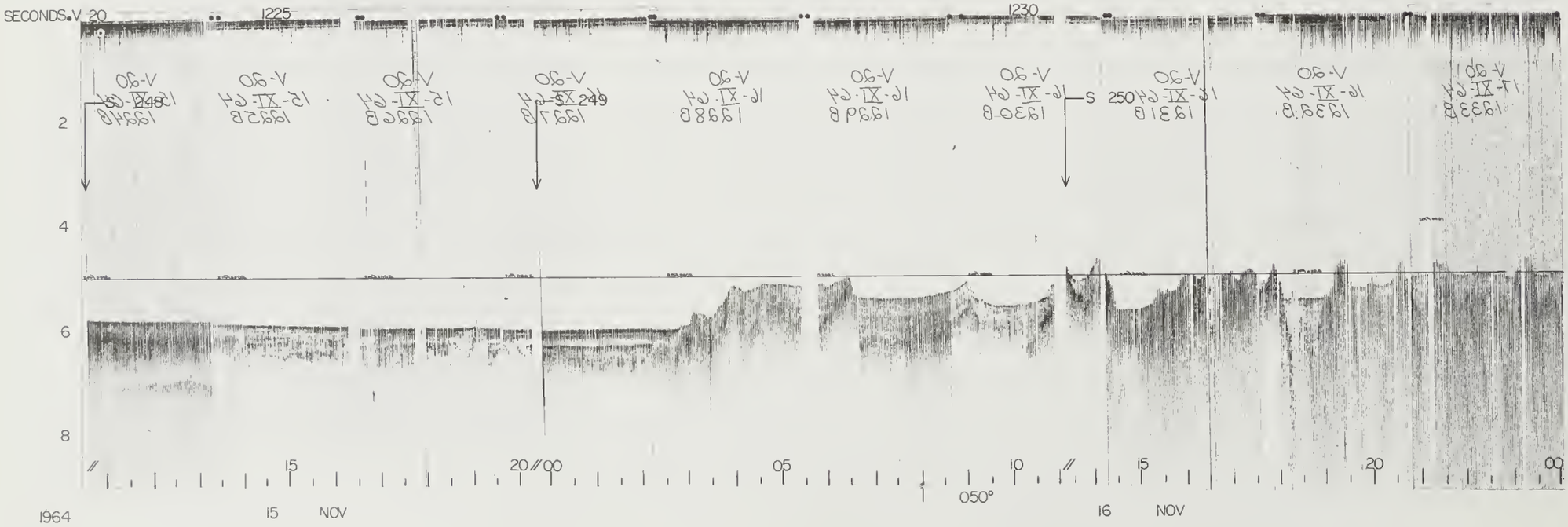

125
130
SECONDS
2
4
8
S 16
24 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12
340°
210°
V 20
12 MARCH
13 MARCH

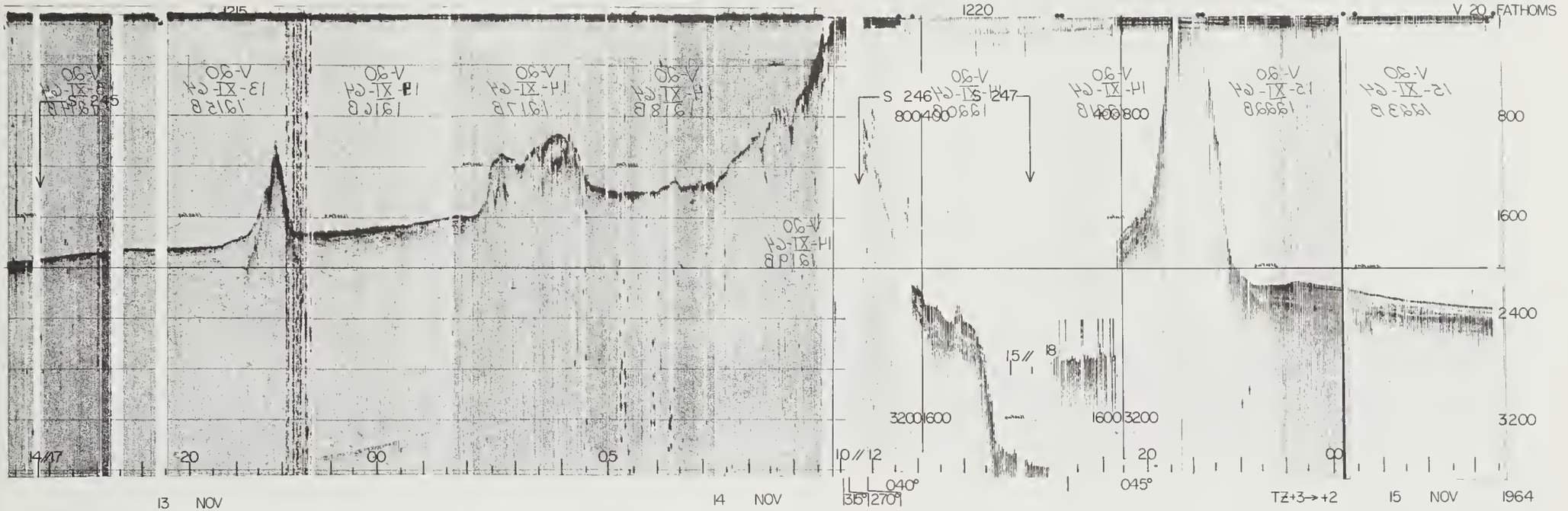

SECONDS
V20
S 19
2
4
6
8
PANAMA
10 14 15 20 00 03
292°
272°
205°
1964
15 MAR
16 MAR

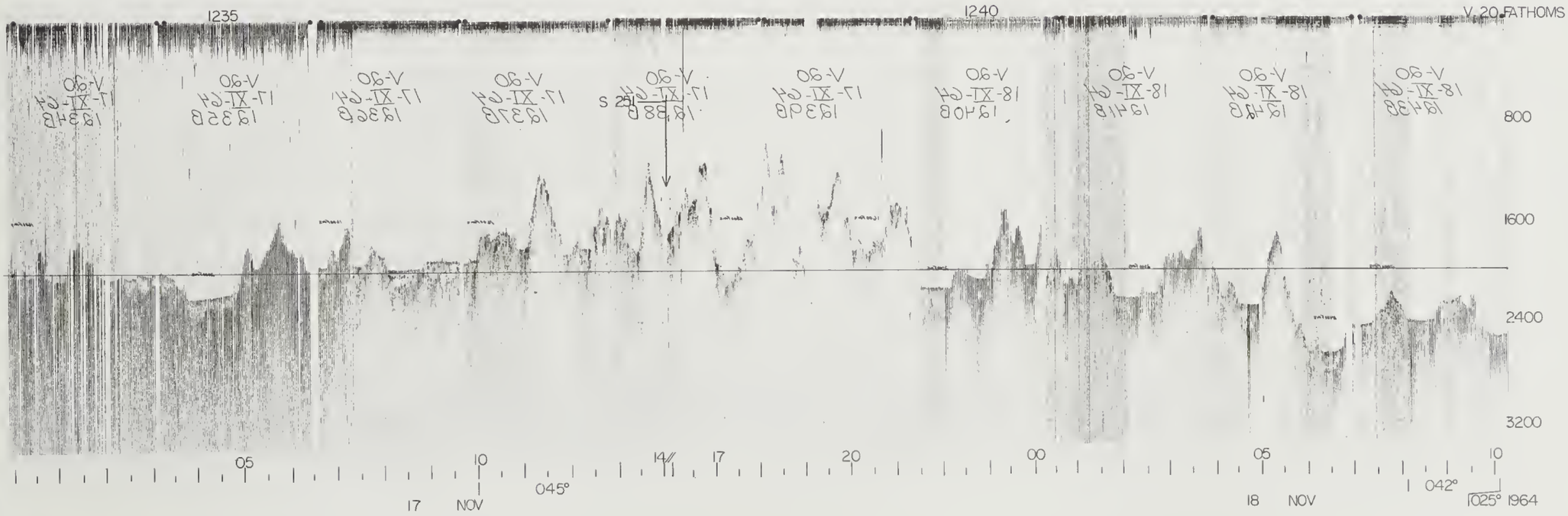

135
140
SECONDS
FATHOMS
0
1
2
3
4
0
2
4
6
8
800
2400
3200
S17
S18
13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 09 10 11 12 13 14 15 16 17 18 19 20 00 01 02 03 04 05
290°
210°
235°
185°
14 MARCH


V 20 FATHOMS
800
600
2400
3200
RECIFE
15
20
000°
070°
11 NOV
1964


SECONDS V 20
1205
1210
A-90
13-XI-64
1964
12 NOV
13 NOV
270°

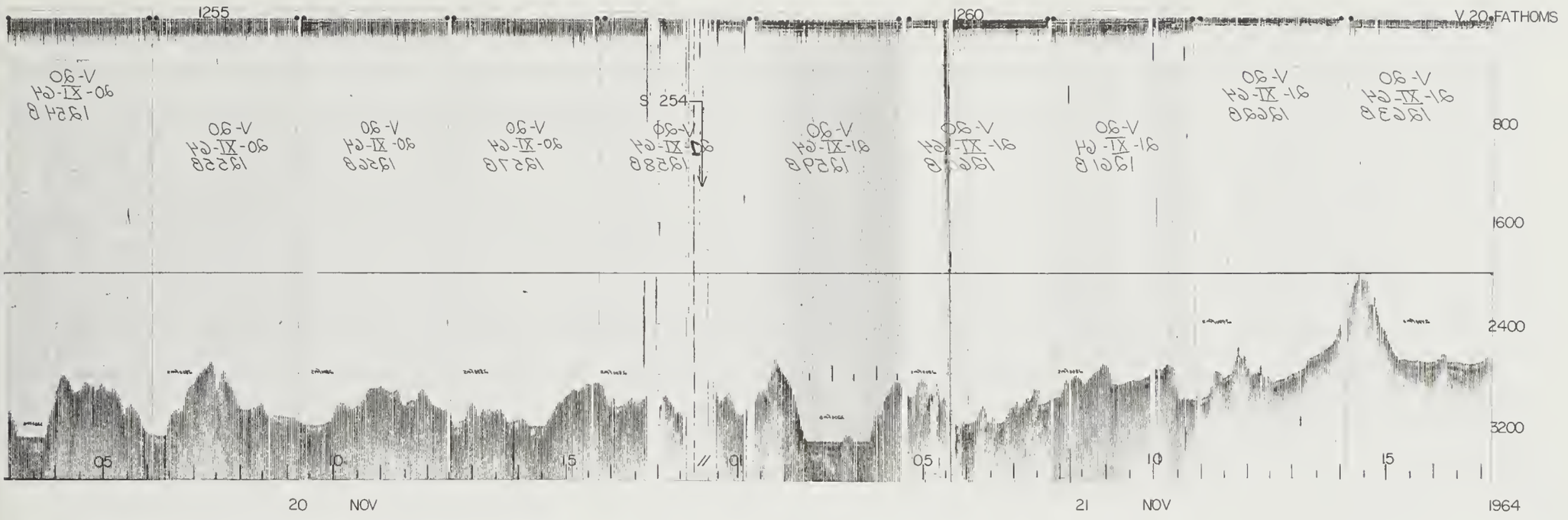

SECONDS V 20
1225
1230
A-90
15-XI-64
1964
15 NOV
16 NOV
050°

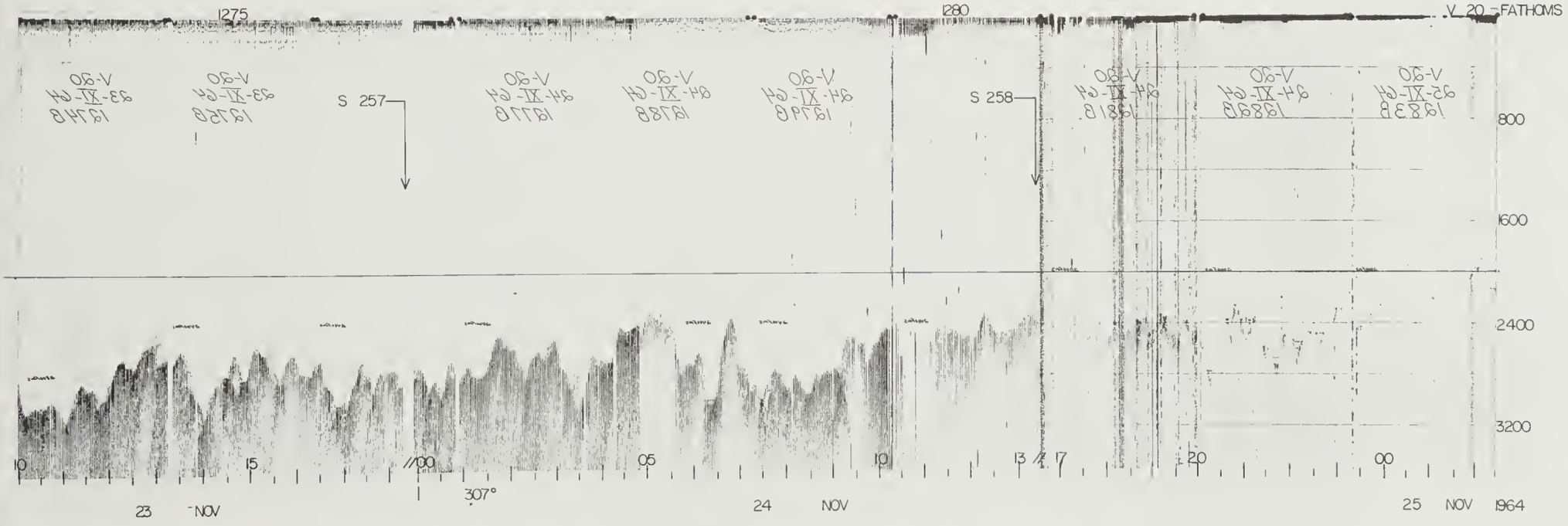

1215
1220
V 20 FATHOMS
A-90
S 245
S 246
S 247
800
1600
2400
3200
14 17
20
00
05
10 // 12
15 // 18
040°
045°
13 NOV
14 NOV
15 NOV
1964
TZ+3→+2

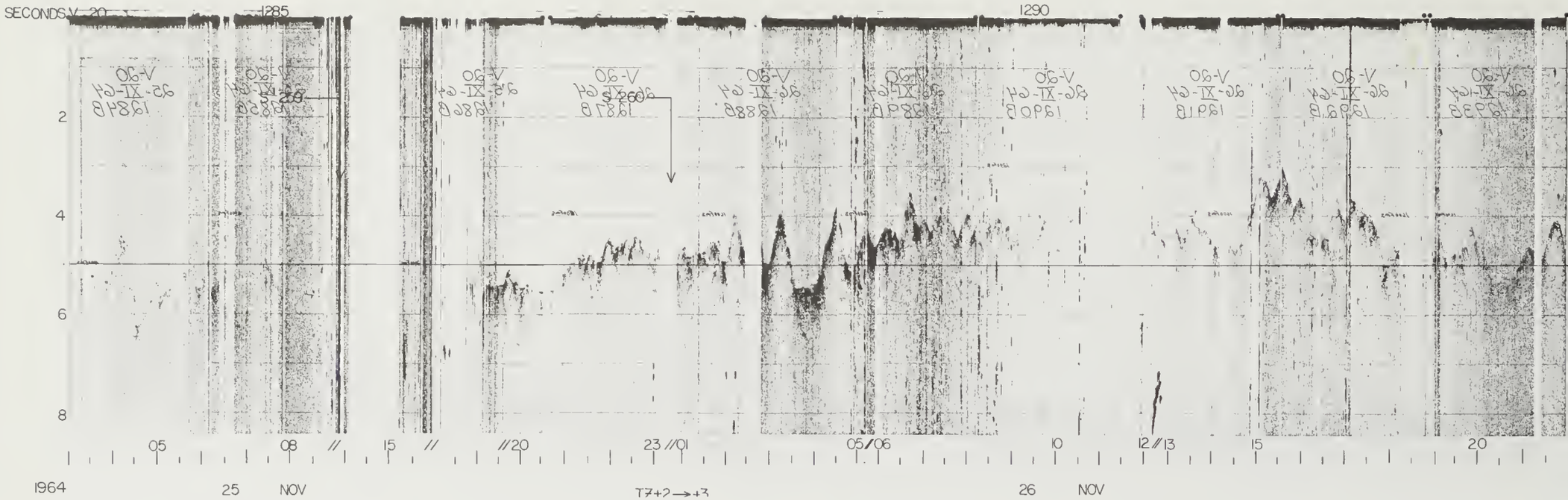

1235
1240
V 20 FATHOMS
A-90
S 251
800
1600
2400
3200
05
10
14 // 17
20
00
042°
045°
17 NOV
18 NOV
1025° 1964

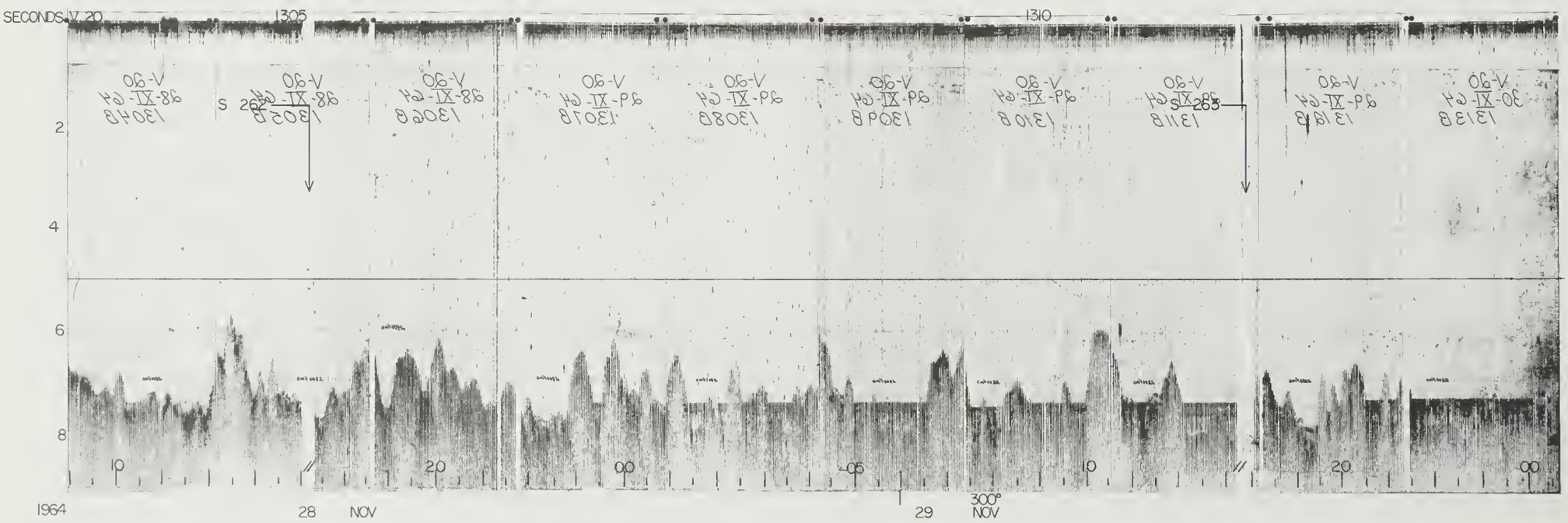
SECONDS V 20
1245
1250
2
4
6
8
13 // 16
20
00
05
10
15
01
325°
1964
18 NOV
19 NOV
20 NOV

SECONDS V 20
1265
1270
2
4
6
8
18 //
00
05
10
15
18 //
01
05
10
330°
325°
1964
21 NOV
22 NOV
23 NOV


1255
1260
V 20 FATHOMS
S 254
800
1600
2400
3200
05
10
15
01
05
10
15
20 NOV
21 NOV
1964

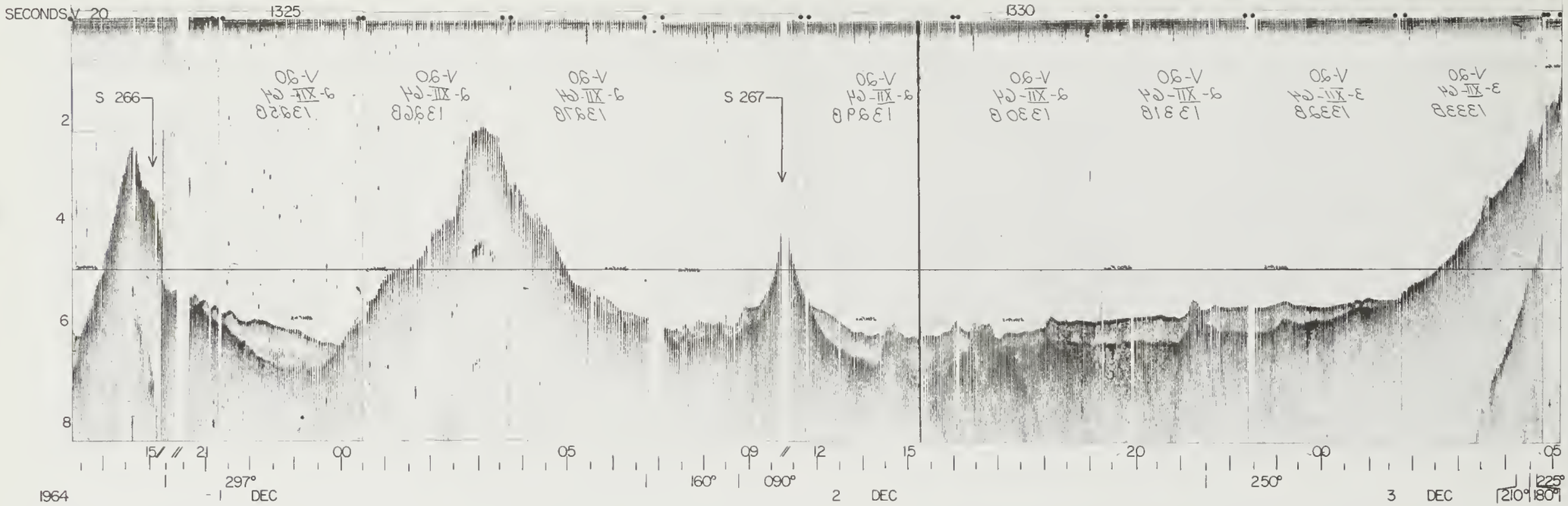

1275
1280
V 20 FATHOMS
S 257
S 258
800
1600
2400
3200
10
15
00
05
10
13
17
20
00
307°
23 NOV
24 NOV
25 NOV 1964

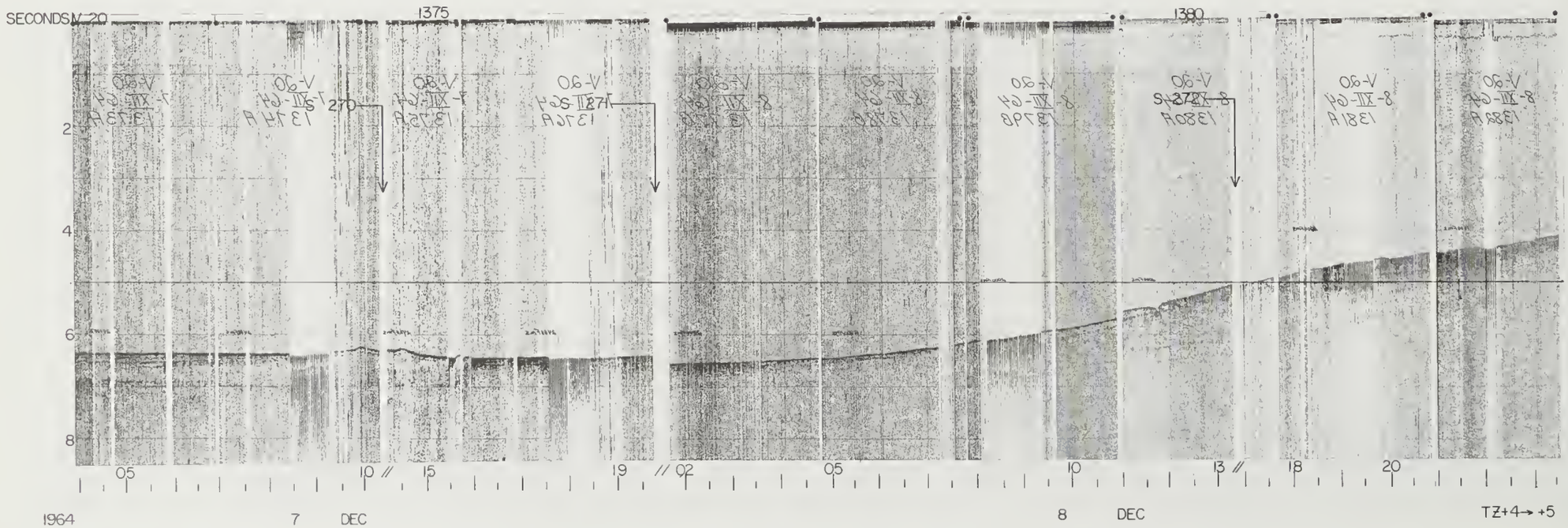

SECONDS V 20
1285
1290
2
4
6
8
05
08
//
15
//
//20
23 //01
05/06
10
12//13
15
20
1964
25 NOV
T7+2→+3
26 NOV

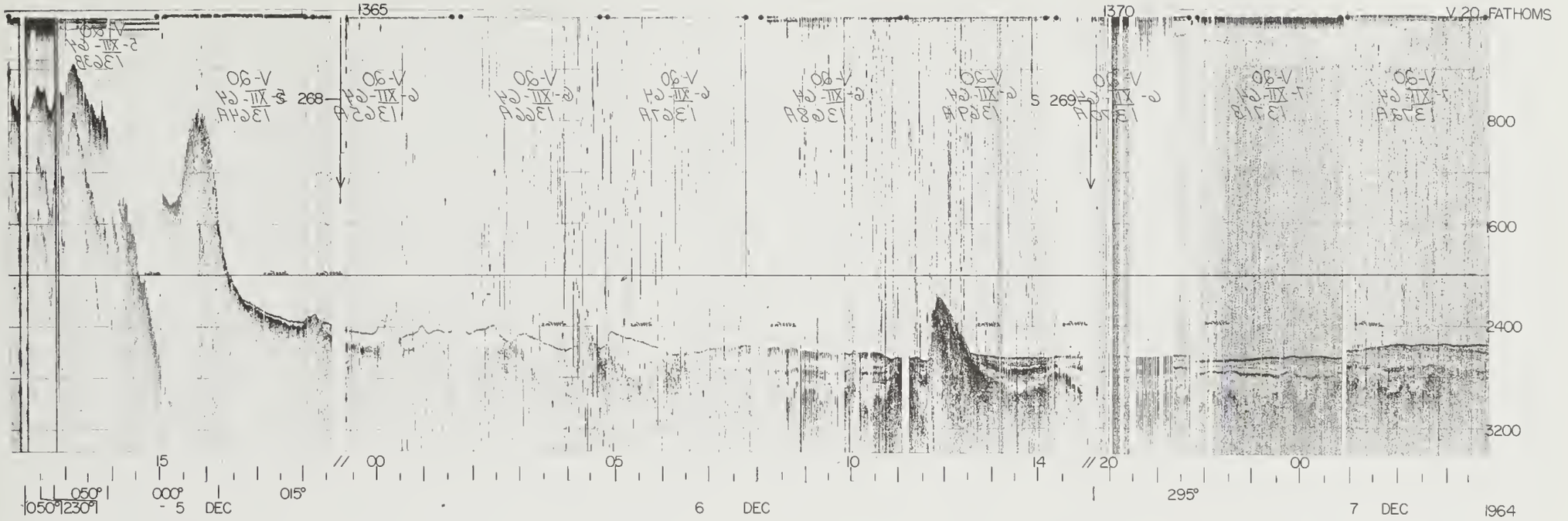

SECONDS V 20
1305
1310
2
4
6
8
10
//
20
00
05
10
//
20
00
1964
28 NOV
29
300°
NOV

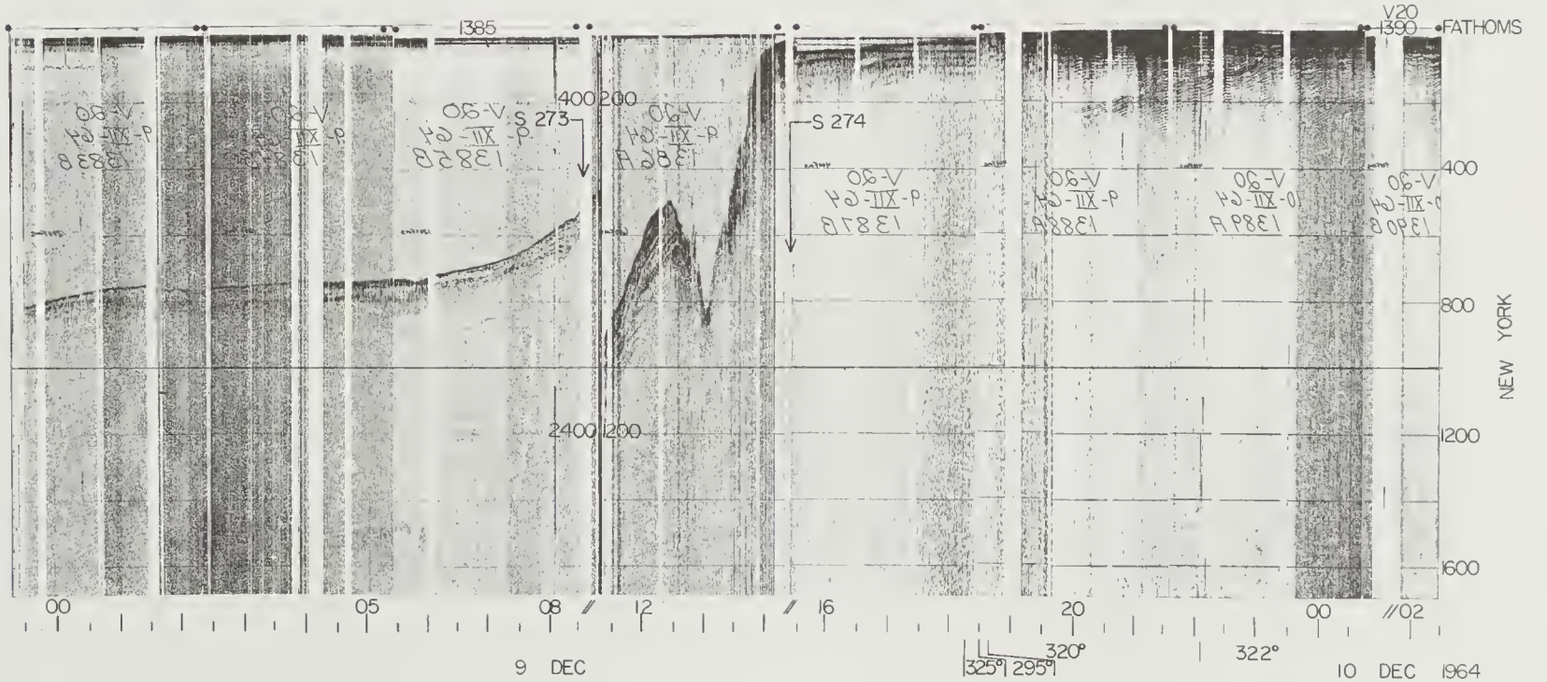
1295
1300
V 20 FATHOMS
S 261
800
1600
2400
3200
00
05
15
20
00
05
27 NOV
312°
28 NOV
335°
312°
1964

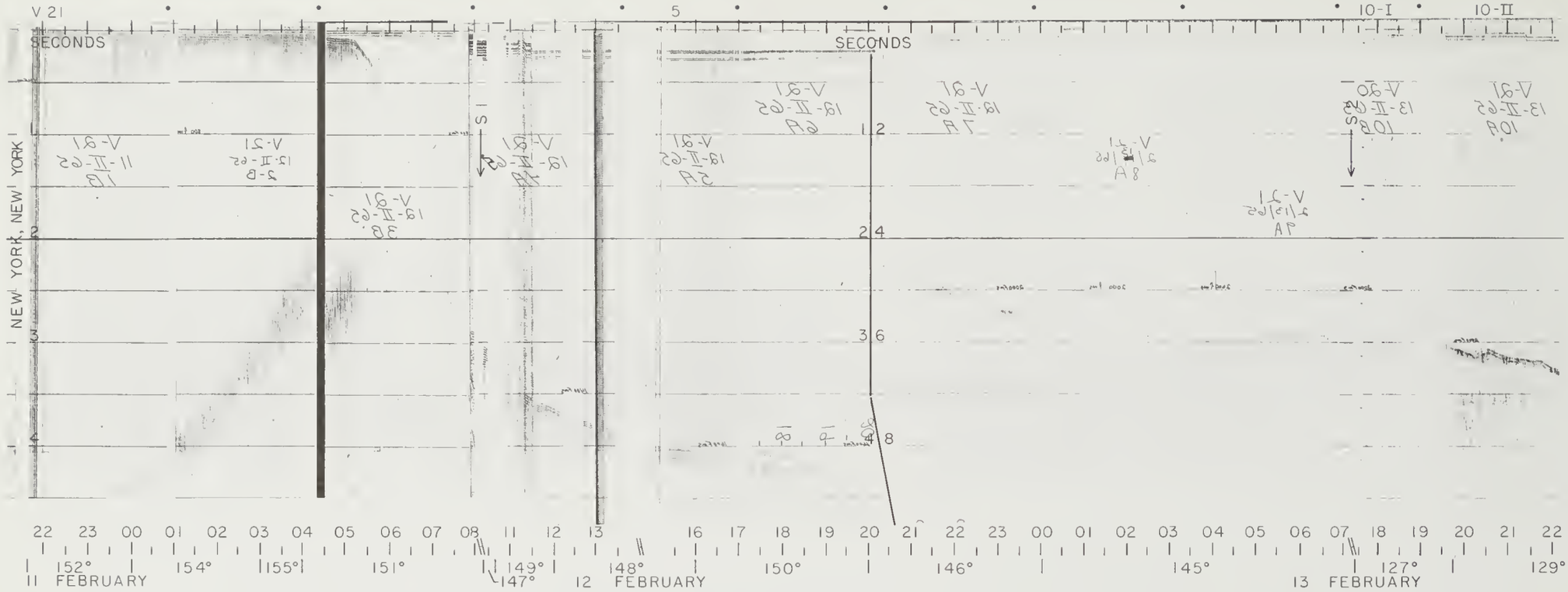
1315
1320
V 20 FATHOMS
S 264
S 265
800
600
2400
3200
05
10
17
00
05
10
000°
292°
TZ+3→+4
30 NOV
1 DEC
1964

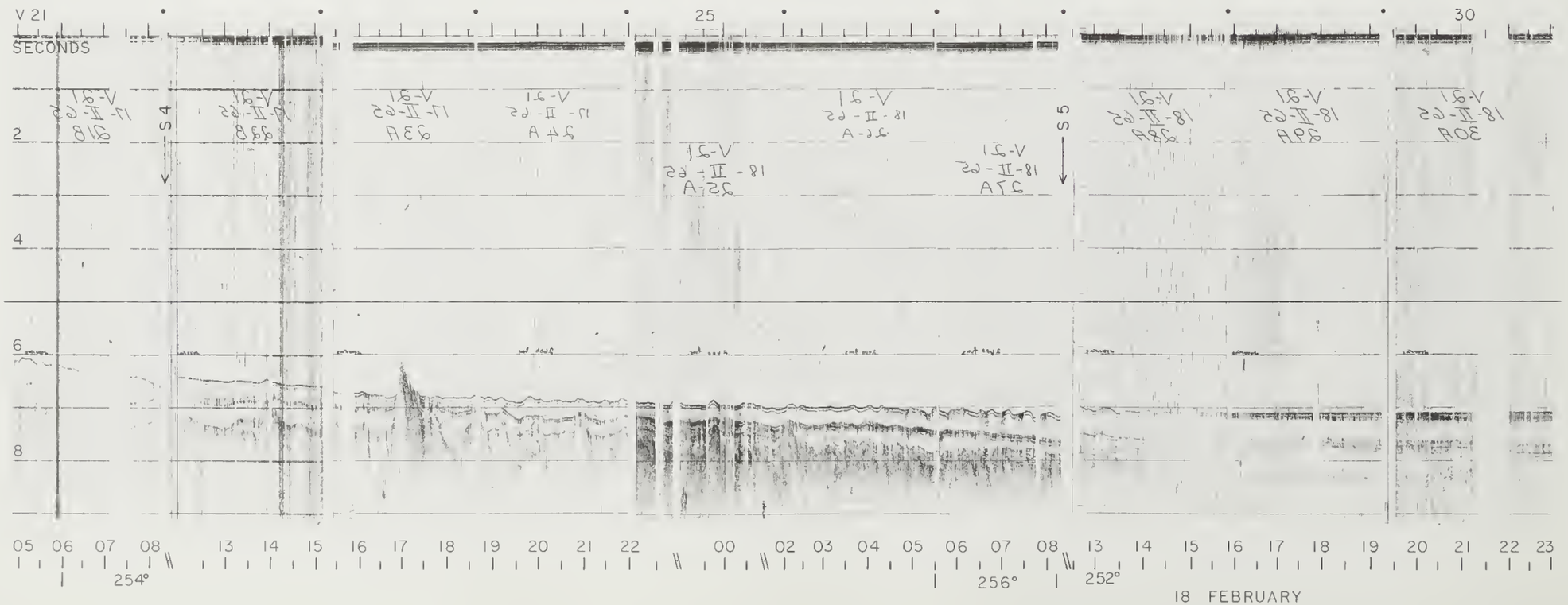

SECONDS V 20
1325
1330
S 266
S 267
2
4
6
8
15 // 21
00
05
09 // 12
15
20
00
05
1964
1 DEC
297°
160°
090°
2 DEC
250°
3 DEC
210°
180°
225°
BERMUDA

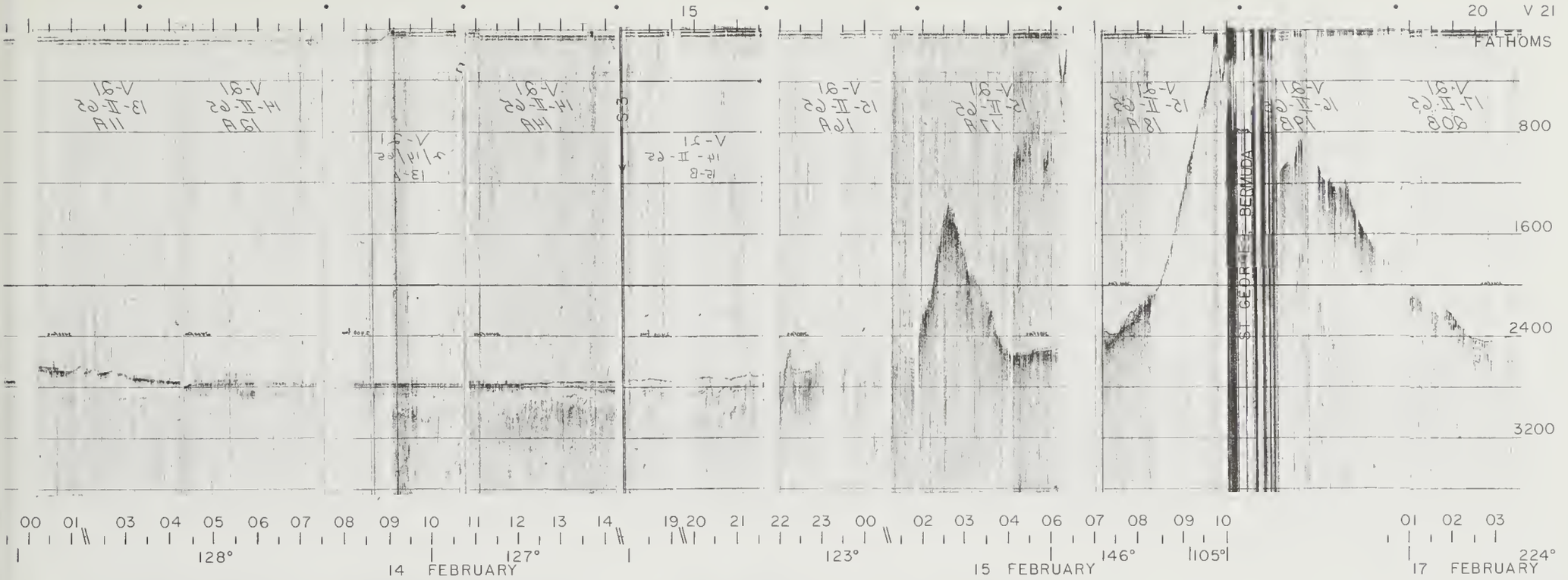

SECONDS V 20
1375
1380
270
2
4
6
8
05
10 // 15
19 // 02
05
10
13 // 18
20
1964
7 DEC
8 DEC
TZ+4→+5

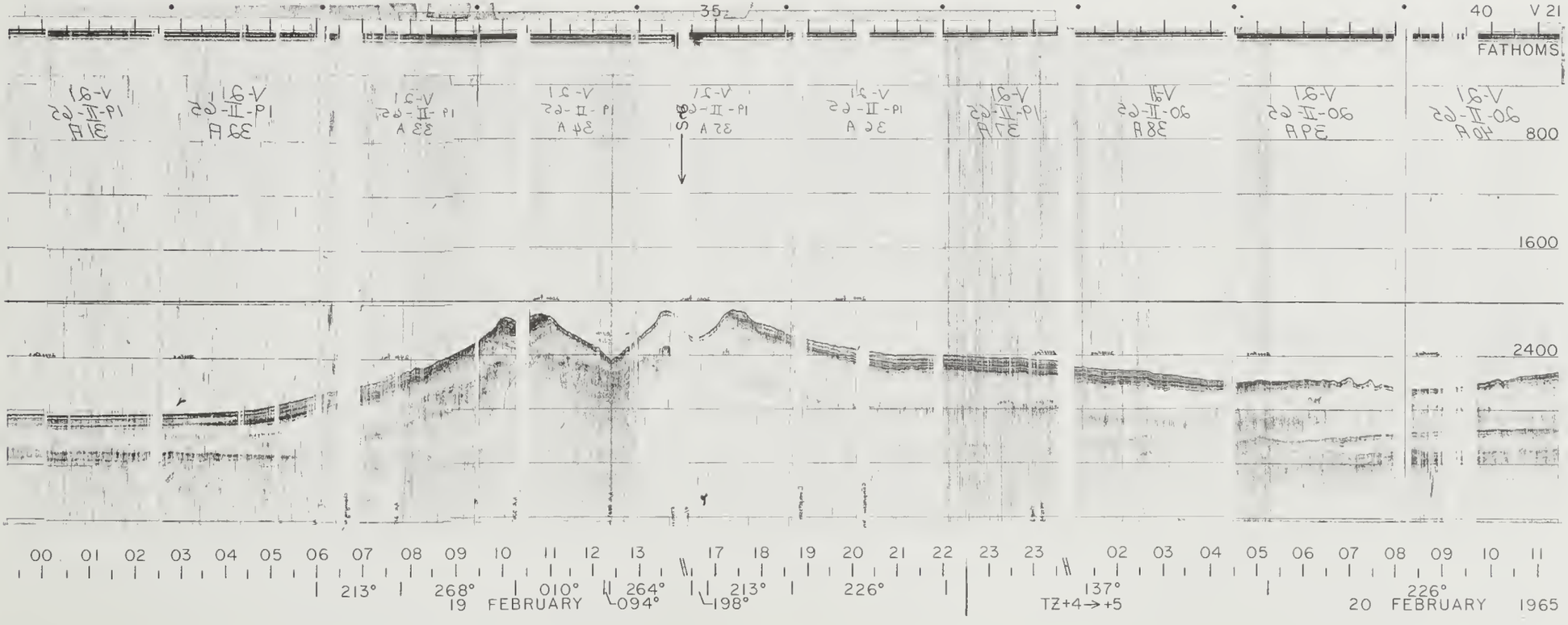

1365
1370
V 20 FATHOMS
S 268
S 269
800
1600
2400
3200
15
00
05
10
14
20
00
050°
000°
015°
295°
050° 230°
5 DEC
6 DEC
7 DEC
1964

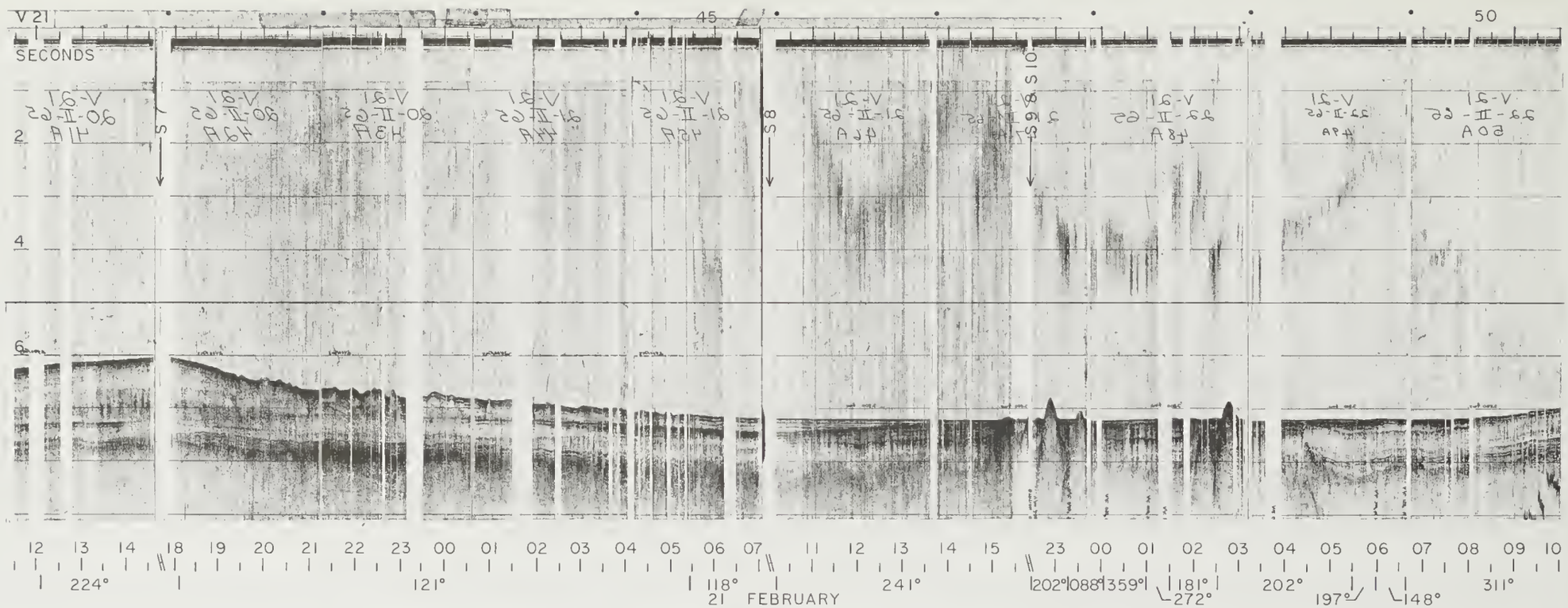

1385
1390
V20 FATHOMS
S 273
S 274
400 200
2400 1200
400
800
1200
1600
00
05
08
12
16
20
00
02
320°
322°
325° 295°
9 DEC
10 DEC 1964
NEW YORK

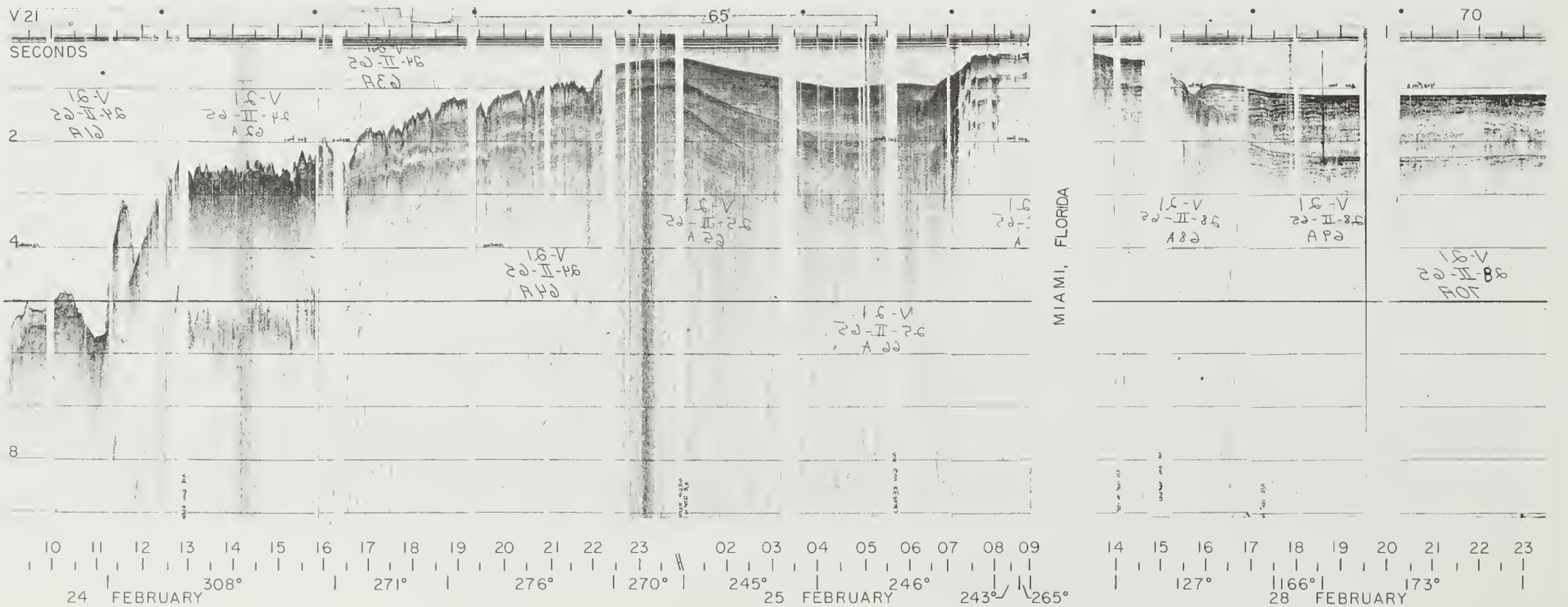

V 21
SECONDS
NEW YORK, NEW YORK
S 1
S 2
S 3
11 FEBRUARY
12 FEBRUARY
13 FEBRUARY


V 21
SECONDS
S 4
S 5
18 FEBRUARY


15
20
V 21
FATHOMS
800
1600
2400
3200
ST GEORGE
BERMUDA
00 01 03 04 05 06 07 08 09 10 11 12 13 14 19 20 21 22 23 00 02 03 04 06 07 08 09 10 01 02 03
128° 127° 123° 146° 105° 224°
14 FEBRUARY
15 FEBRUARY
17 FEBRUARY


35
40
V 21
FATHOMS
800
1600
2400
00 01 02 03 04 05 06 07 08 09 10 11 12 13 17 18 19 20 21 22 23 23 02 03 04 05 06 07 08 09 10 11
213° 268° 010° 264° 213° 226° 137° 226°
19 FEBRUARY 094° 198°
TZ+4→+5
20 FEBRUARY 1965

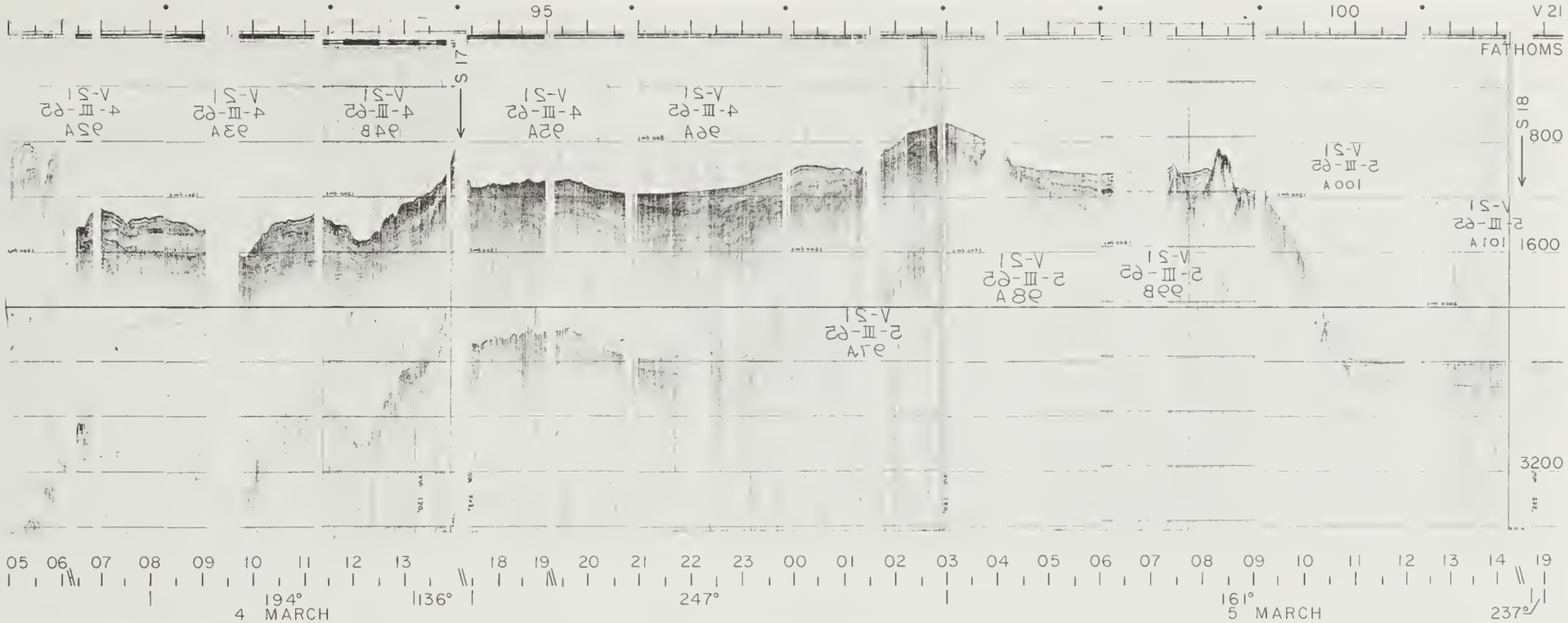

V 21
SECONDS
45
50
2
4
6
12 13 14 18 19 20 21 22 23 00 01 02 03 04 05 06 07
11 12 13 14 15 23 00 01 02 03 04 05 06 07 08 09 10
224°
121°
118°
21 FEBRUARY
241°
202°
088°
359°
181°
272°
202°
197°
148°
311°

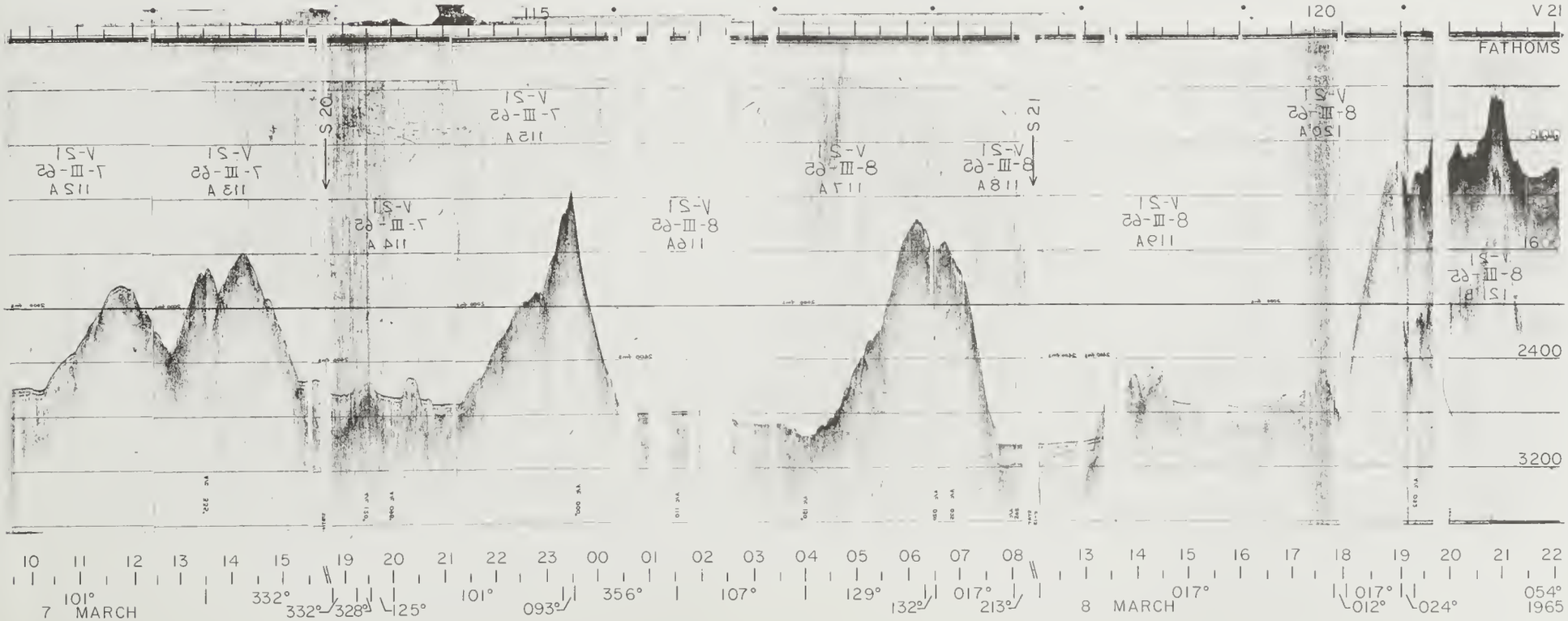

V 21
SECONDS
65
70
2
4
8
10 11 12 13 14 15 16 17 18 19 20 21 22 23 02 03 04 05 06 07 08 09
14 15 16 17 18 19 20 21 22 23
308°
271°
276°
270°
245°
246°
243°
265°
127°
166°
173°
24 FEBRUARY
25 FEBRUARY
28 FEBRUARY
MIAMI, FLORIDA

55
60
V 21
FATHOMS
800
1600
2400
3200
14 15 16 21 22 23 00 04 05 06 07 08 09 10 11 12 13 14 15 16 17 22 23 00 01 02 03 04 06 07 08
312° 22 FEBRUARY 295° 294° 116° 294° 207° 205° 257° 23 FEBRUARY 003° 198° 005° 262° 252° 243°
75
80
V 21
FATHOMS
800
2400
3200
00 01 02 03 04 05 06 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08
264° 224° 296° 274° 221° 268° 269° 286° 279° 257° 256°
1 MARCH
1965

V21
SECONDS
85
90
2
6
8
S
09 10 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 22 23 00 03 04
256°
273°
291°
054°
248°
054°
063°
077°
068°
193°
2 MARCH
3 MARCH

V21
SECONDS
105
110
2
4
6
8
S
20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 16 17 18 21 22 23 00 01 02 03 04 05 06 07 08 09
238°
233°
150°
155°
155°
155°
298°
357°
6 MARCH

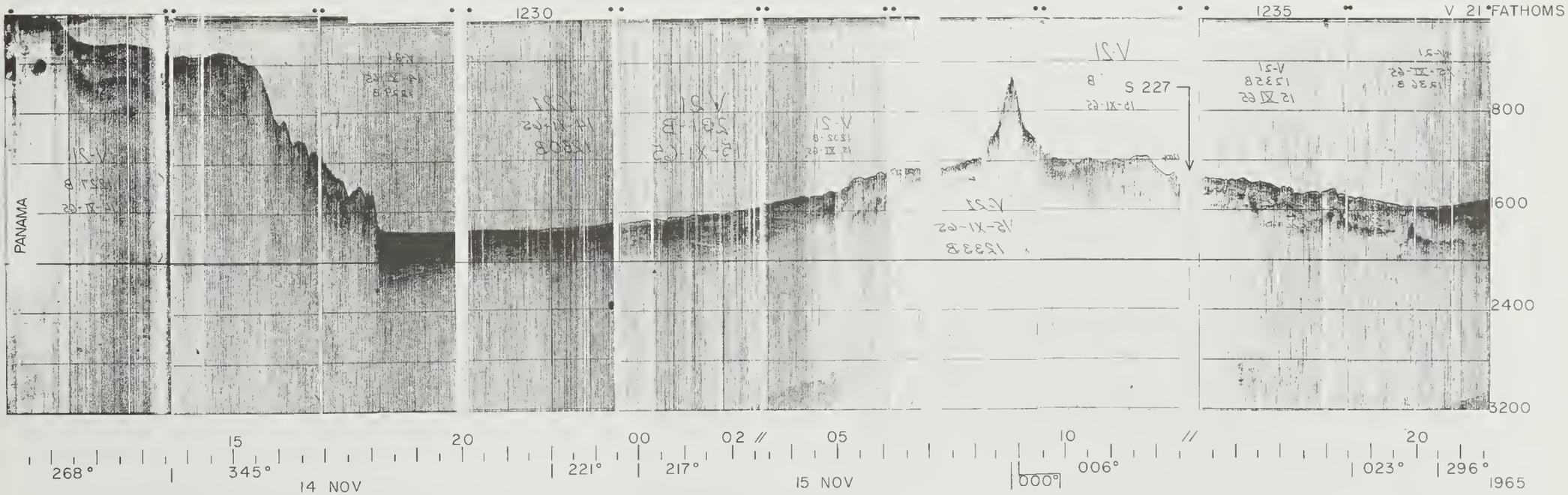

95
100
V 21
FATHOMS
S 17
S 18
800
1600
3200
4-III-62 A-21
3-III-62 A-21
2-III-62 A-21
05 06 07 08 09 10 11 12 13 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 19
194°
136°
247°
161°
237°
4 MARCH
5 MARCH

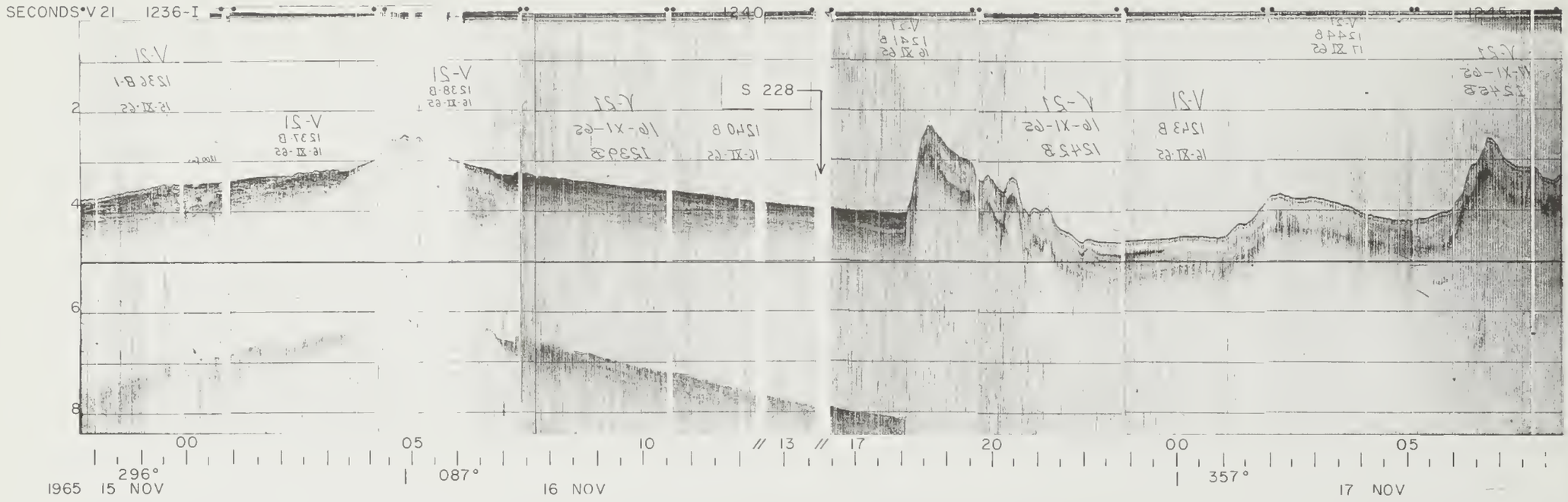

115
120
V 21
FATHOMS
S 20
S 21
7-III-62 A-21
8-III-62 A-21
2400
3200
10 11 12 13 14 15 19 20 21 22 23 00 01 02 03 04 05 06 07 08 13 14 15 16 17 18 19 20 21 22
101°
332°
332°
328°
125°
101°
093°
356°
107°
129°
132°
213°
017°
017°
012°
024°
054°
1965
7 MARCH
8 MARCH

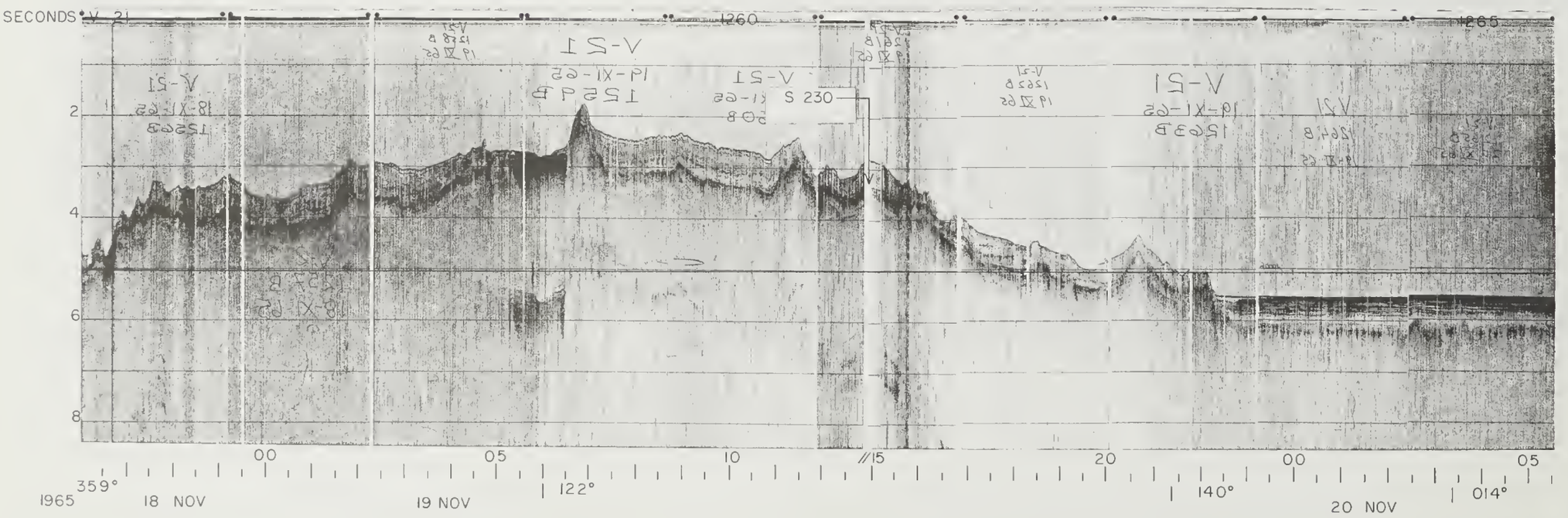
V 21
SECONDS
125
130
S 22
S 23
A-21
9-III-65
152 B
153 B
154 B
155 A
156 A
157 A
158 A
159 A
10-III-65
130 A
131 A
2
4
6
8
23 00 01 02 03 04 08 09 10 11 13 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11
1965
150°
147°
9 MARCH
146°
323°
147°
152°
163°
152°
163°
164°

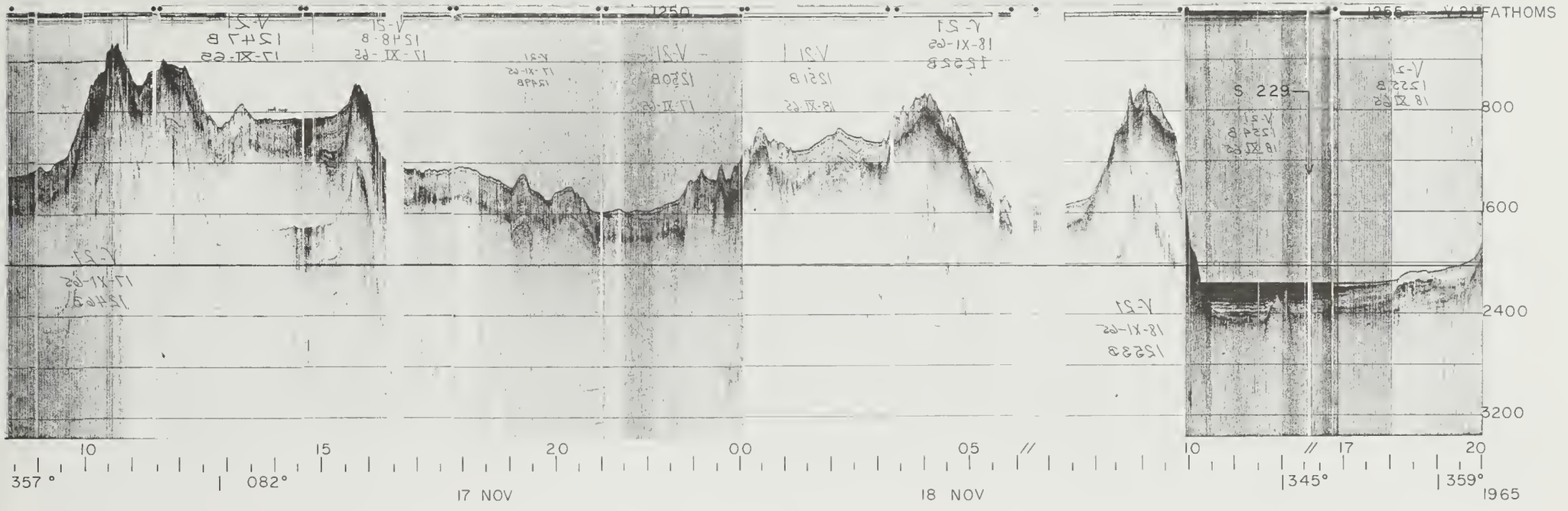
V 21
SECONDS
A-21
12-III-65
142 A
143 A
CRISTOBAL, PANAMA
2
4
6
8
00 01 02 03 04 05 06
185°
12 MARCH
1965
195°
175°
192°
221°
211°

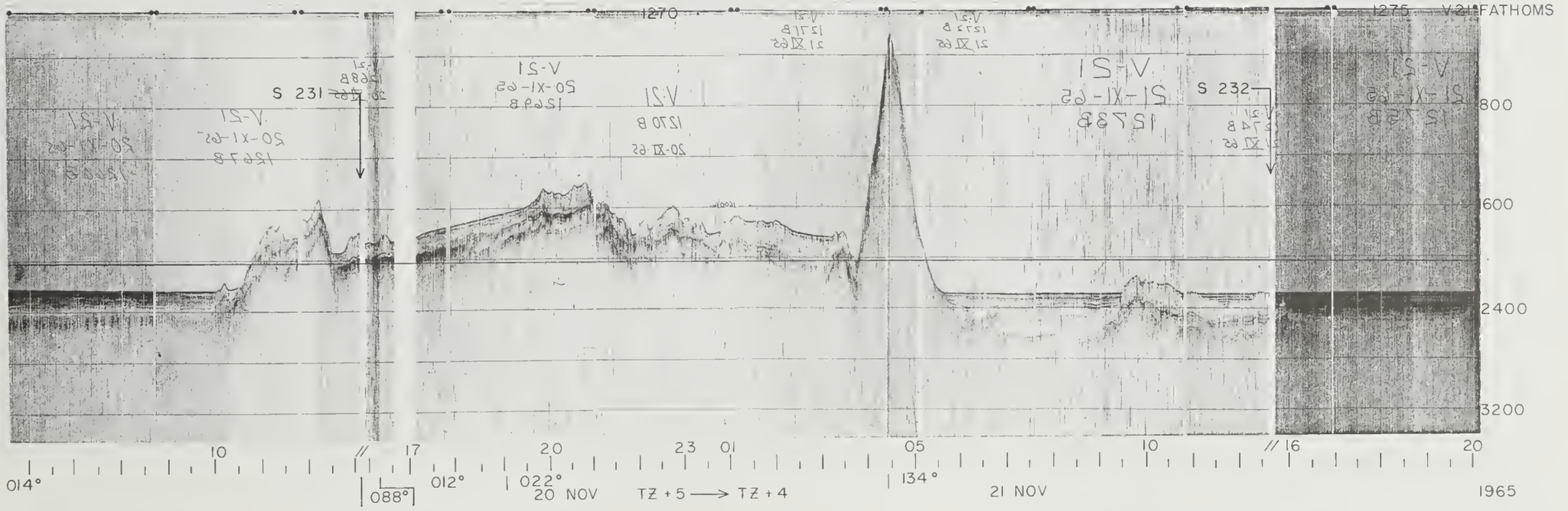
135
140
V 21
FATHOMS
800
1600
3200
S 24
S 25
A-21
11-III-62
140 A
12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 09 10 11 12 13 14 15 16 17 18 21 22 23
148°
146°
189°
192°
10 MARCH
11 MARCH

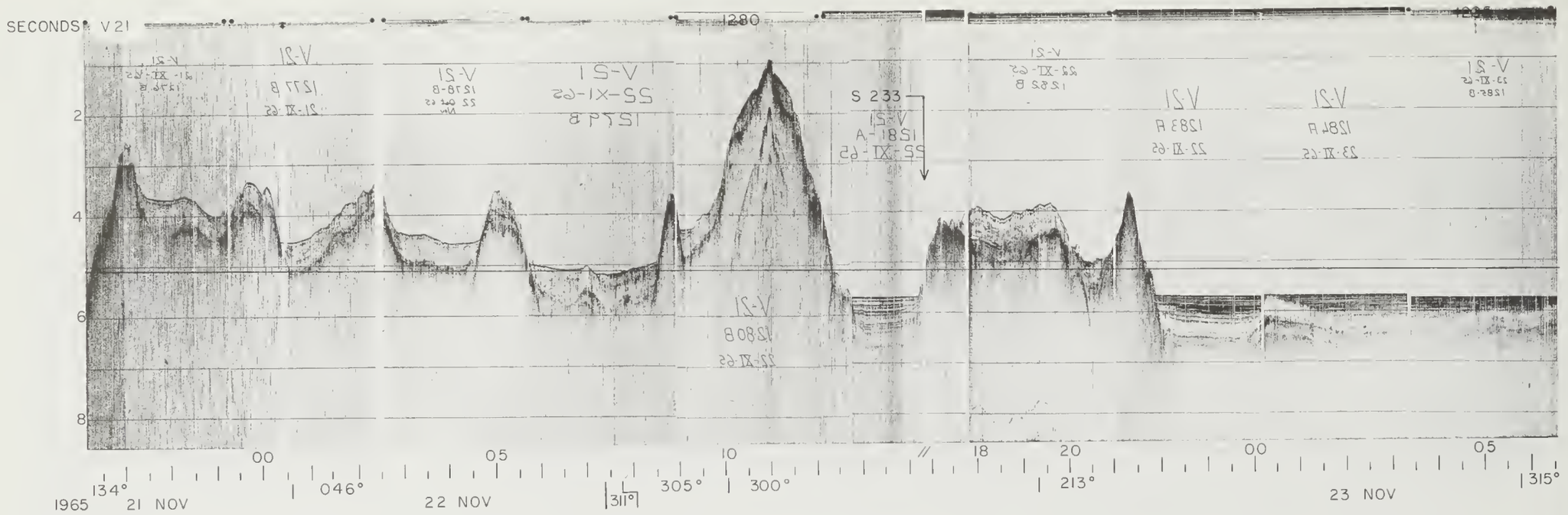

1230
1235
V 21
FATHOMS
800
1600
2400
3200
PANAMA
S 227
15
20
00
02
05
10
20
268°
345°
221°
217°
006°
000°
023°
296°
14 NOV
15 NOV
1965

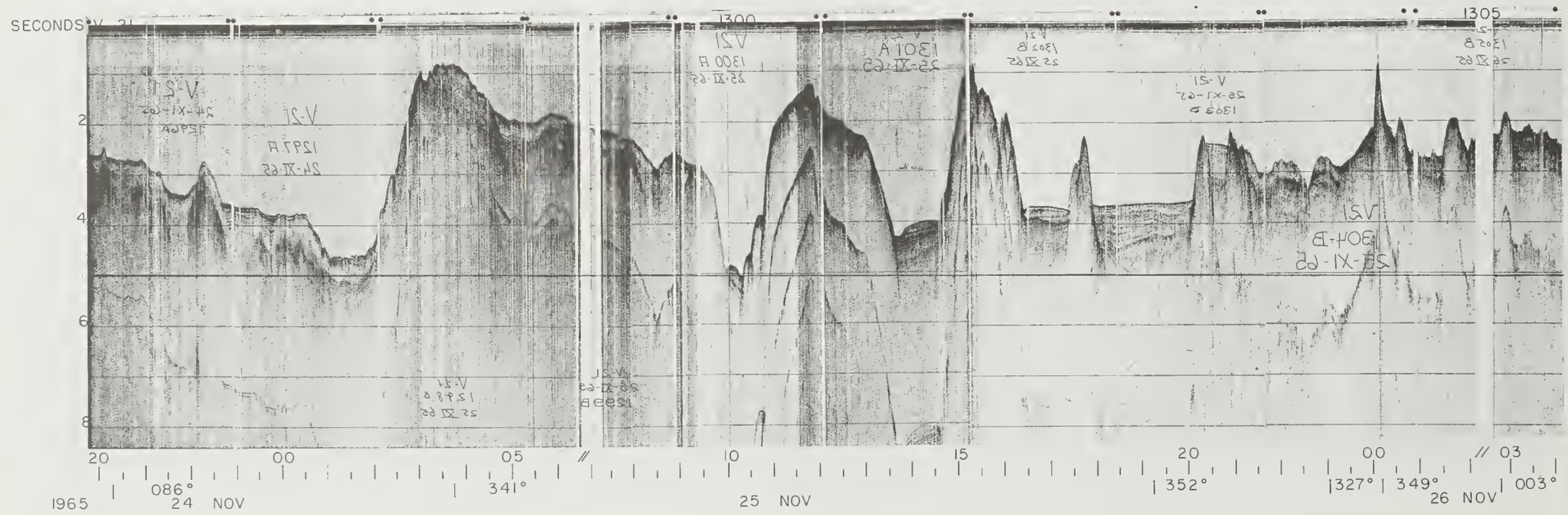

SECONDS
V 21
1236-I
1240
1245
S 228
A-21
15 XI 65
16 XI 65
17 XI 65
00
05
10
// 13
// 17
20
296°
087°
357°
1965 15 NOV
16 NOV
17 NOV

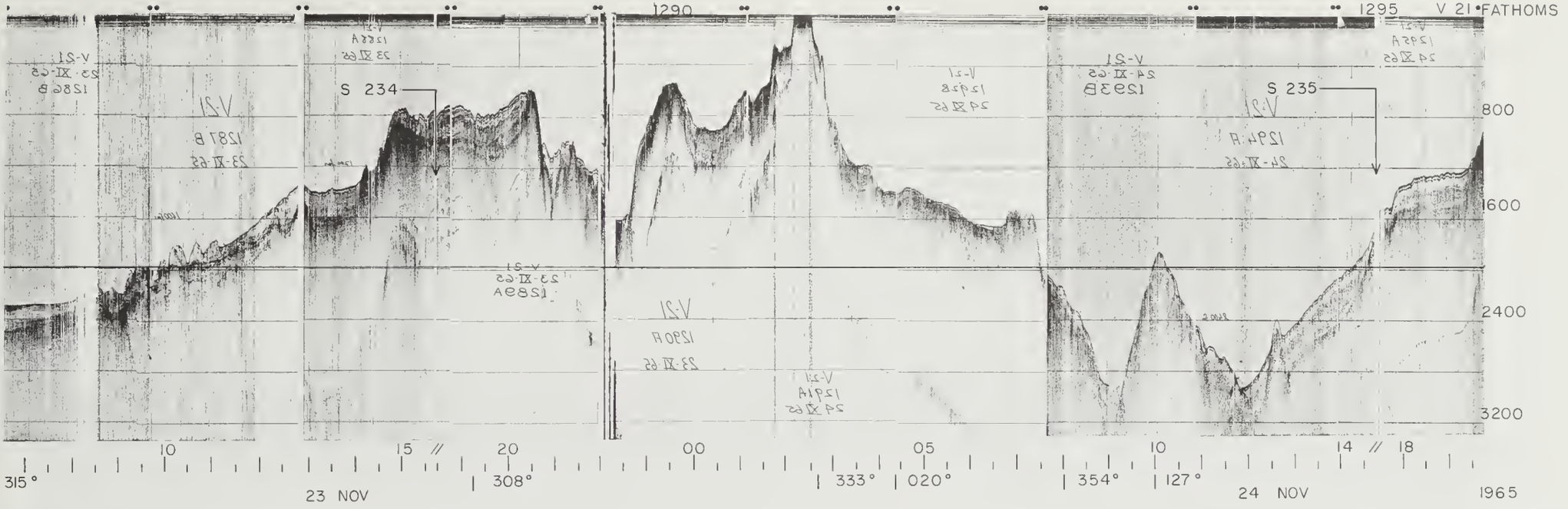

SECONDS
V 21
1260
1265
S 230
A-21
14 XI 65
00
05
10
//15
20
359°
122°
140°
014°
1965
18 NOV
19 NOV
20 NOV

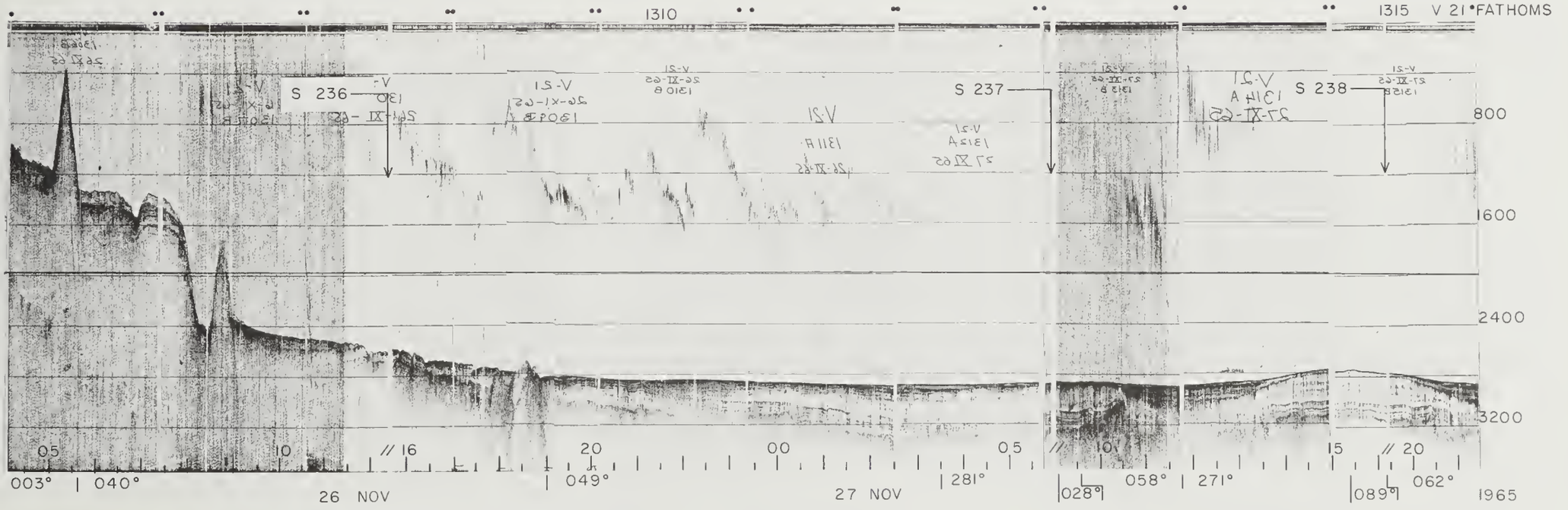

FATHOMS
800
1600
2400
3200
S 229
10
15
20
00
05
10
17
20
357°
082°
17 NOV
18 NOV
345°
359°
1965

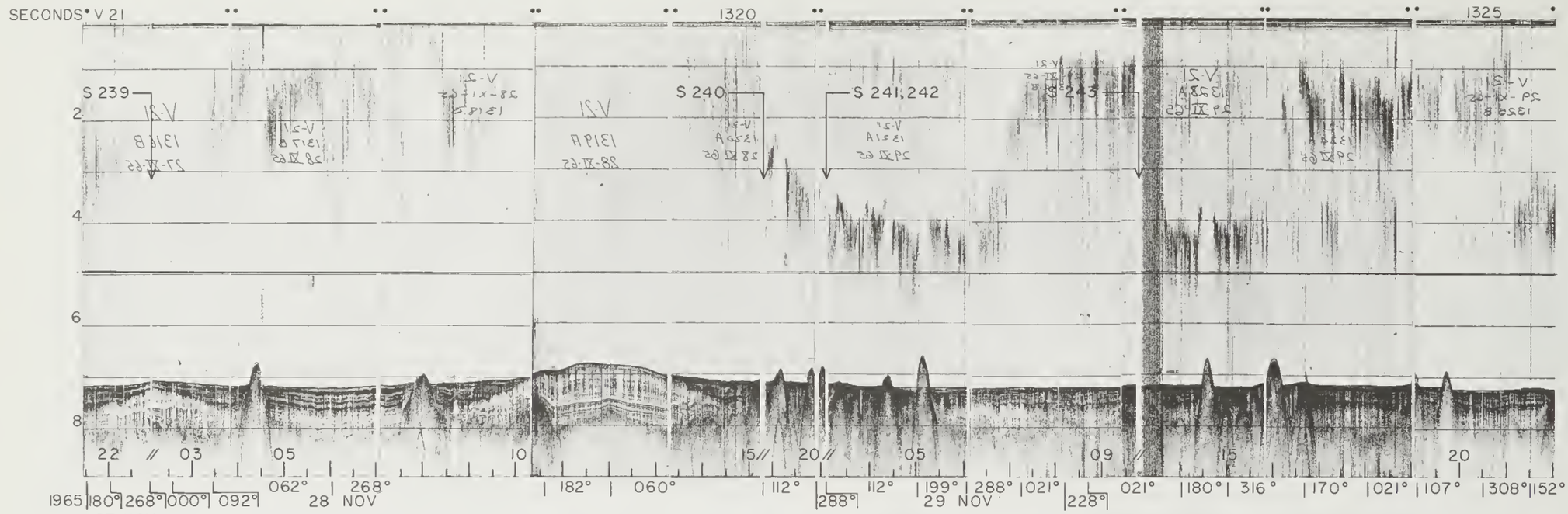

FATHOMS
800
600
2400
3200
S 231
S 232
10
17
20
23
01
05
10
16
20
014°
088°
012°
022°
20 NOV
TZ + 5 → TZ + 4
134°
21 NOV
1965

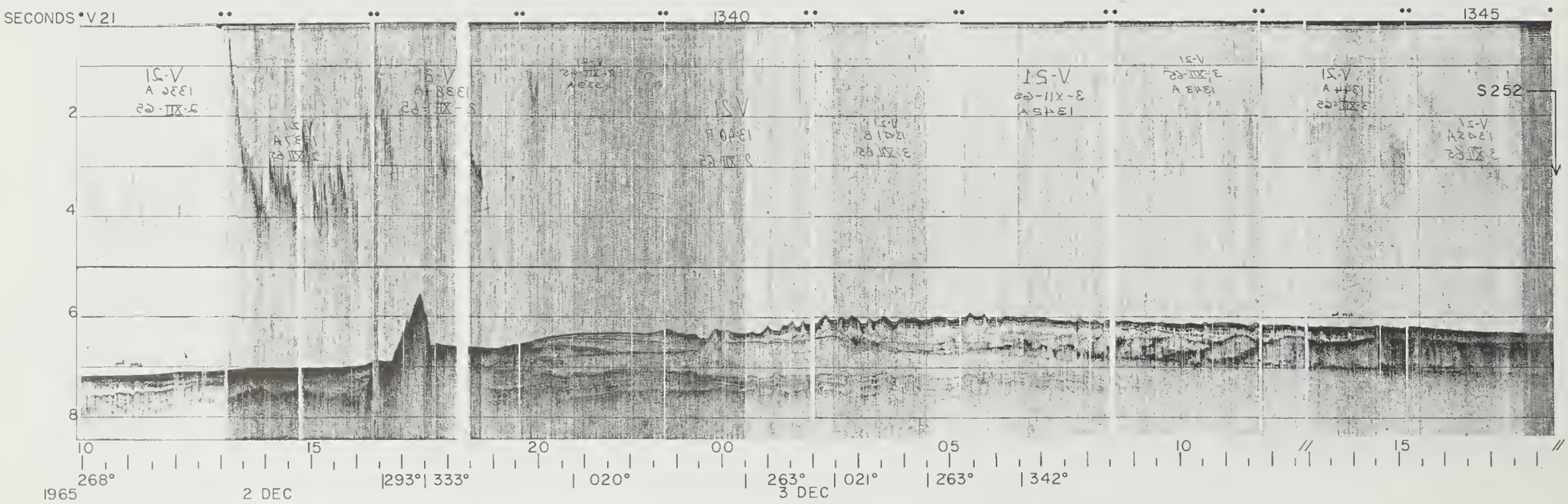

SECONDS V 21
1280
2
4
6
8
S 233
00
05
10
18
20
00
05
134°
046°
305°
300°
213°
315°
1965 21 NOV
22 NOV
23 NOV

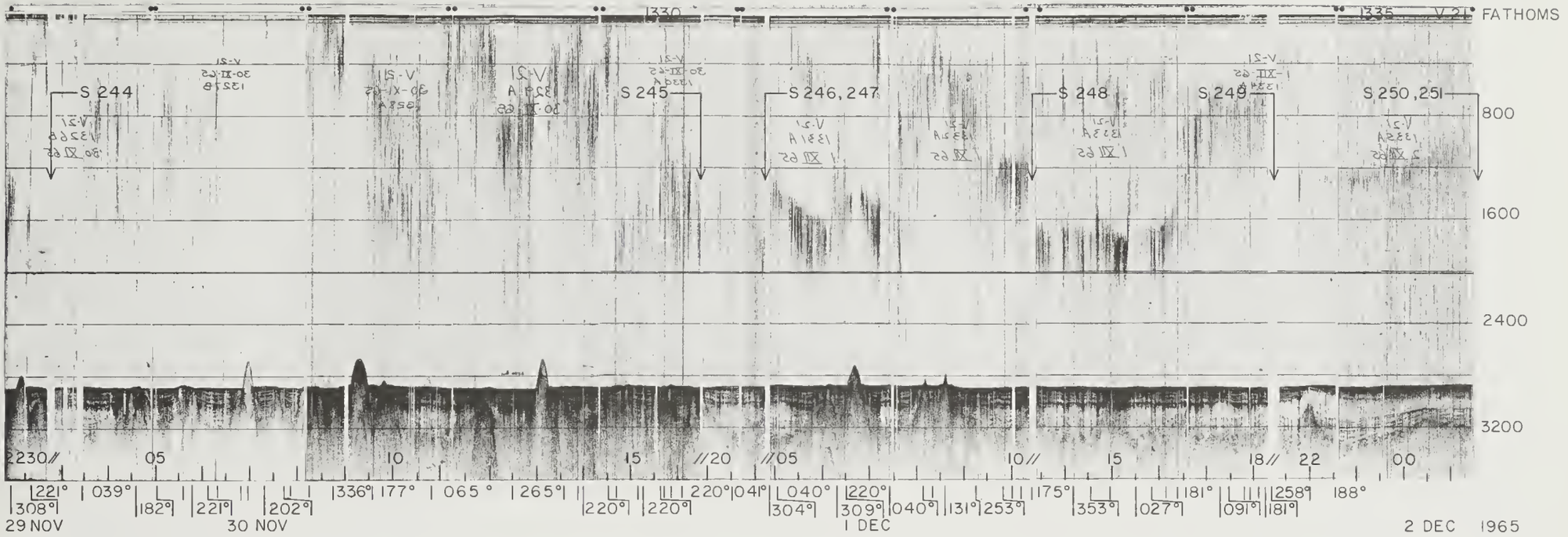

SECONDS V 21
1300
1305
2
4
6
8
20
00
05
10
15
20
00
03
086°
341°
352°
327°
349°
003°
1965 24 NOV
25 NOV
26 NOV

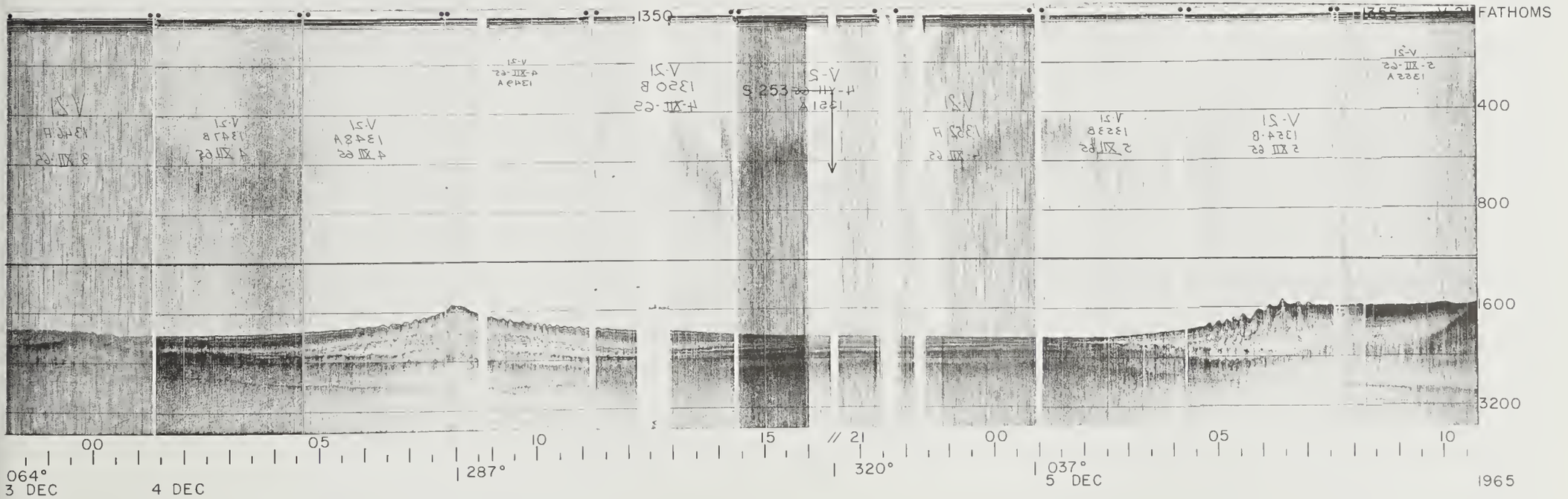

1290
1295
V 21 FATHOMS
S 234
S 235
800
1600
2400
3200
10
15
20
00
05
10
14
18
315°
308°
333°
020°
354°
127°
23 NOV
24 NOV
1965

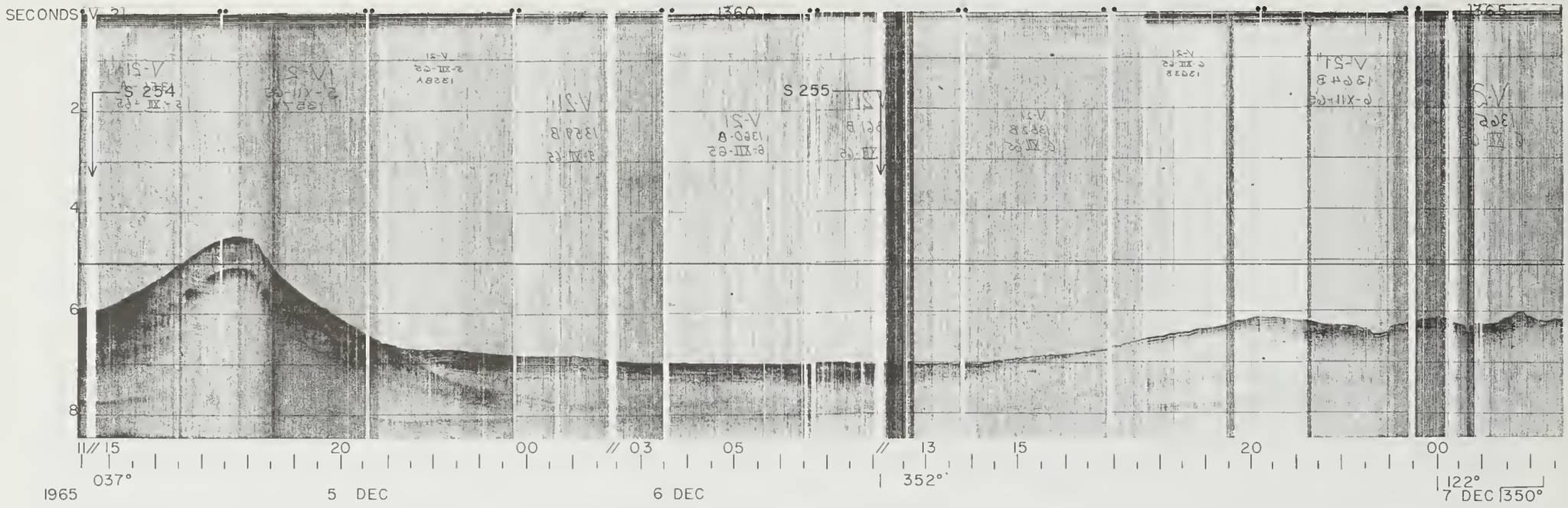

1310
1315
V 21 FATHOMS
S 236
S 237
S 238
800
1600
2400
3200
05
10
16
20
00
05
10
15
20
003°
040°
049°
281°
058°
271°
028°
062°
089°
26 NOV
27 NOV
1965

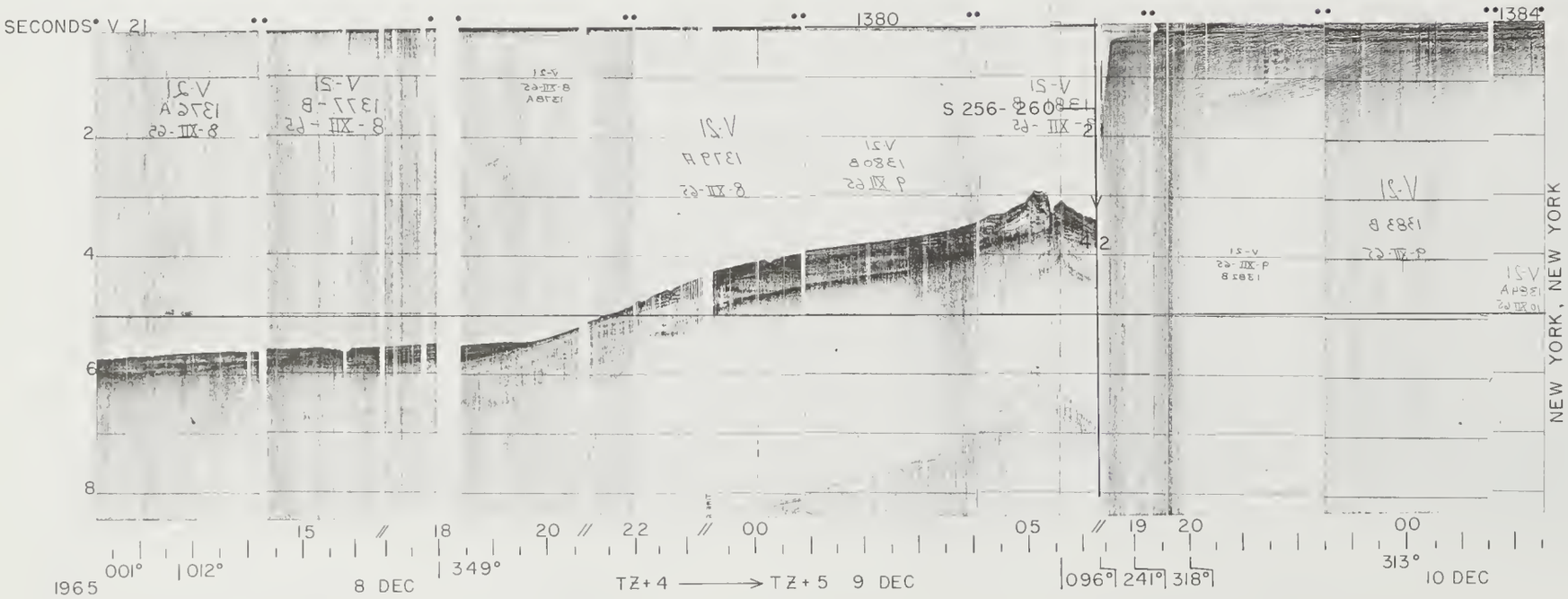

SECONDS • V 21
1320
1325
S 239
S 240
S 241,242
S 243
2
4
6
8
22 // 03 05 10 15 // 20 // 05 09 // 15 20
1965 | 80° | 268° | 000° | 092° | 062° | 268° | 182° | 060° | 112° | 288° | 112° | 199° | 288° | 021° | 228° | 021° | 180° | 316° | 170° | 021° | 107° | 308° | 152°
27 NOV
28 NOV
29 NOV

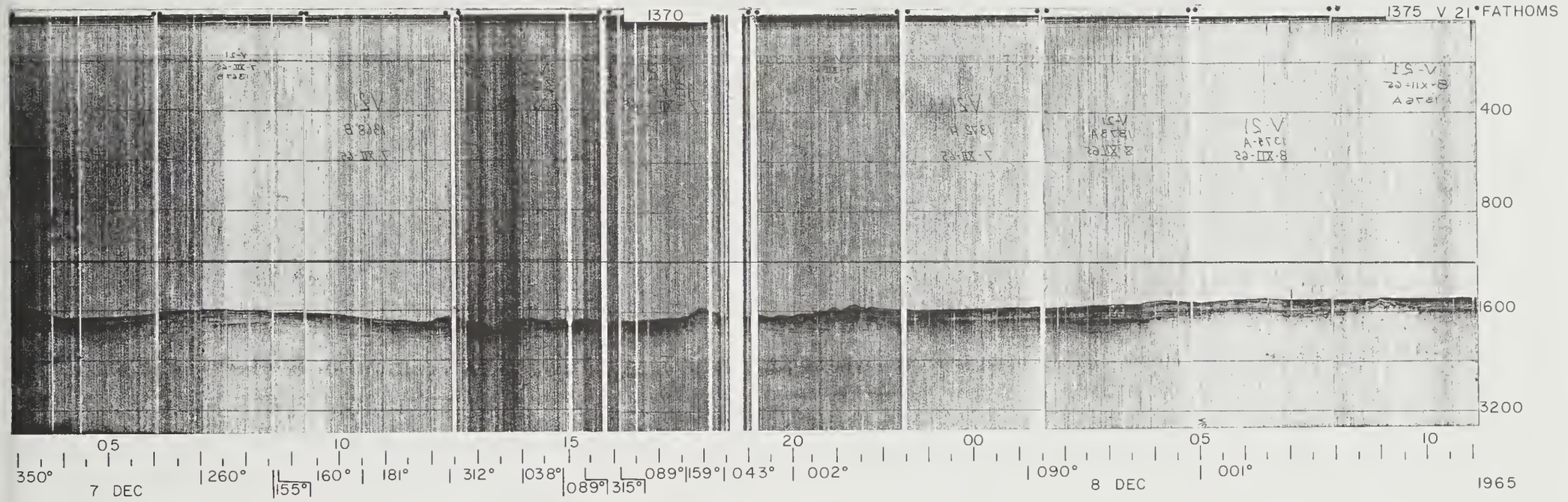

SECONDS • V 21
1340
1345
S 252
2
4
6
8
10 15 20 00 05 10 // 15 //
1965 | 268° | 293° | 333° | 020° | 263° | 021° | 263° | 342°
2 DEC
3 DEC

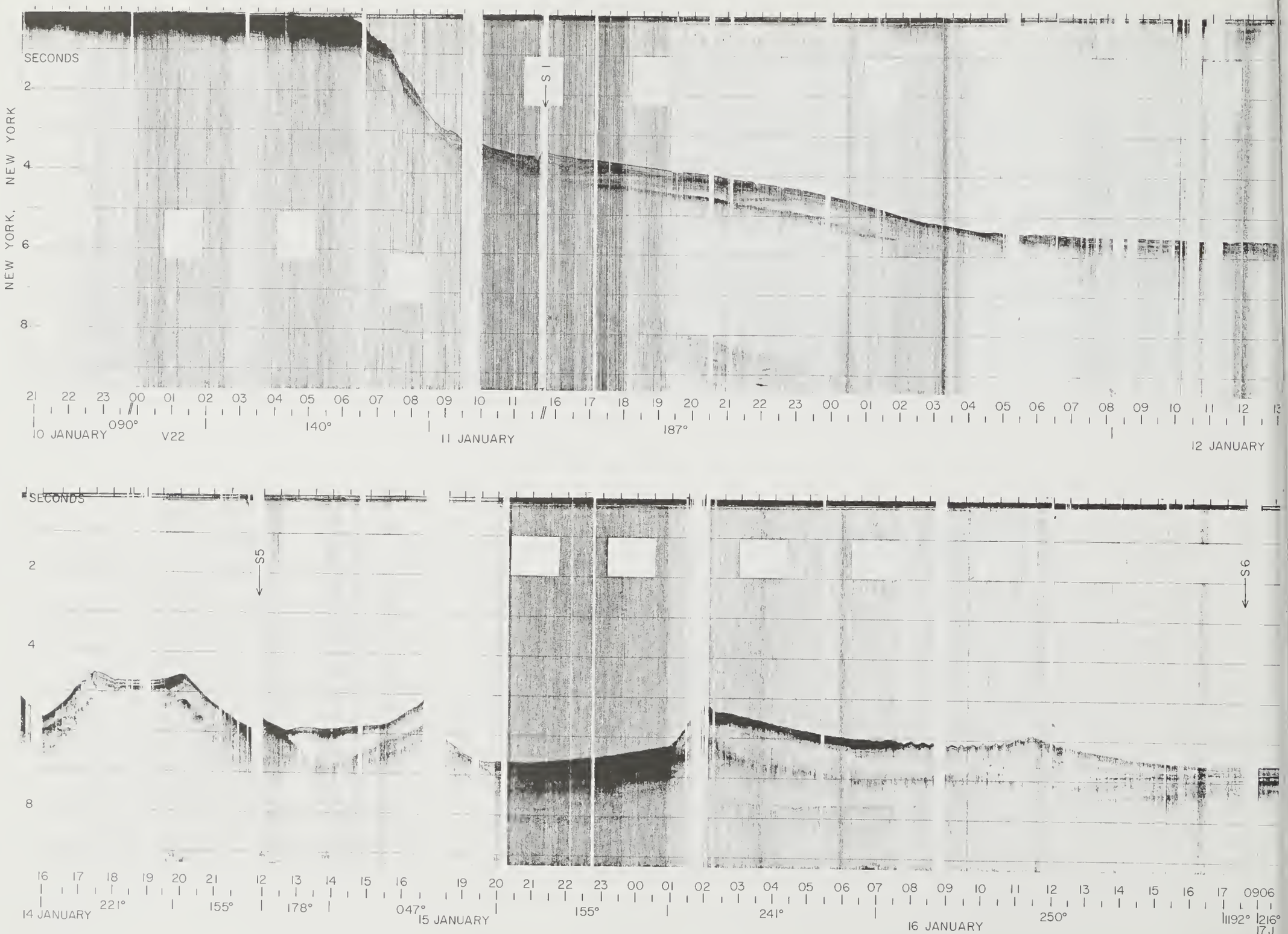

FATHOMS
1330
1335
V 21
S 244
S 245
S 246, 247
S 248
S 249
S 250, 251
800
1600
2400
3200
2230
05
10
15
20
05
10
15
18
22
00
221°
039°
182°
221°
202°
336°
177°
065°
265°
220°
220°
220°
041°
040°
304°
220°
309°
040°
131°
253°
175°
353°
027°
181°
091°
181°
258°
188°
308°
29 NOV
30 NOV
1 DEC
2 DEC
1965

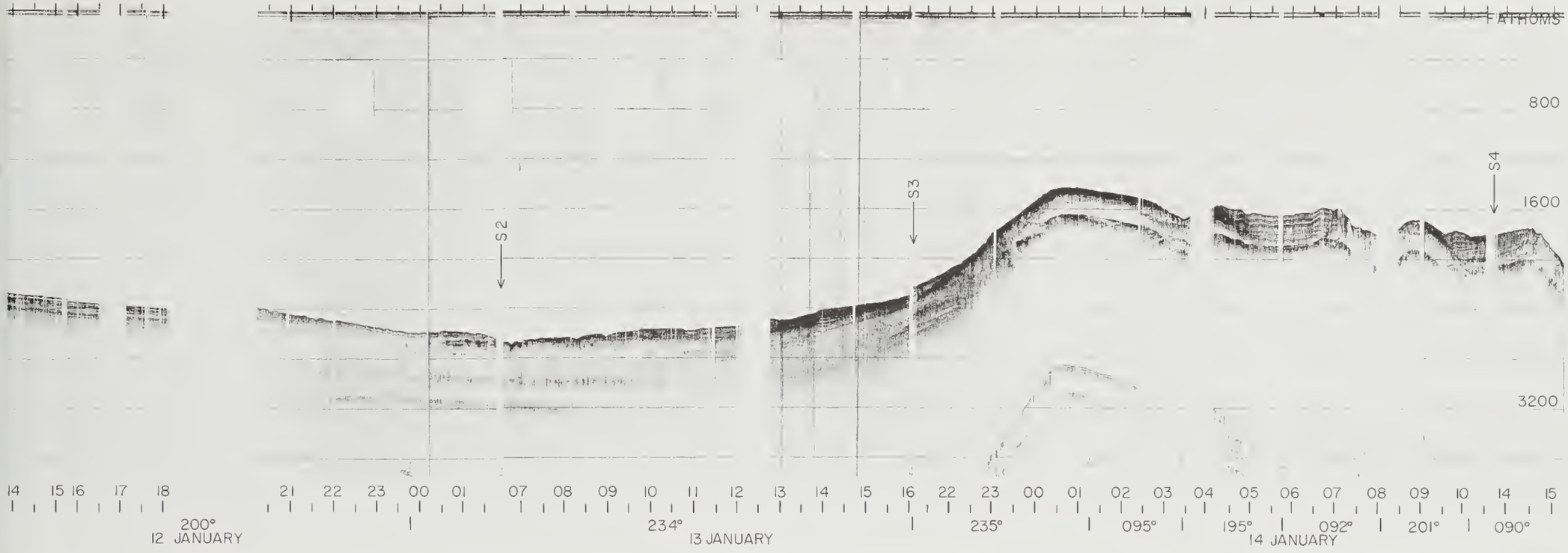

FATHOMS
1350
1355
S 253
400
800
1600
3200
00
05
10
15
21
00
05
10
064°
287°
320°
037°
3 DEC
4 DEC
5 DEC
1965

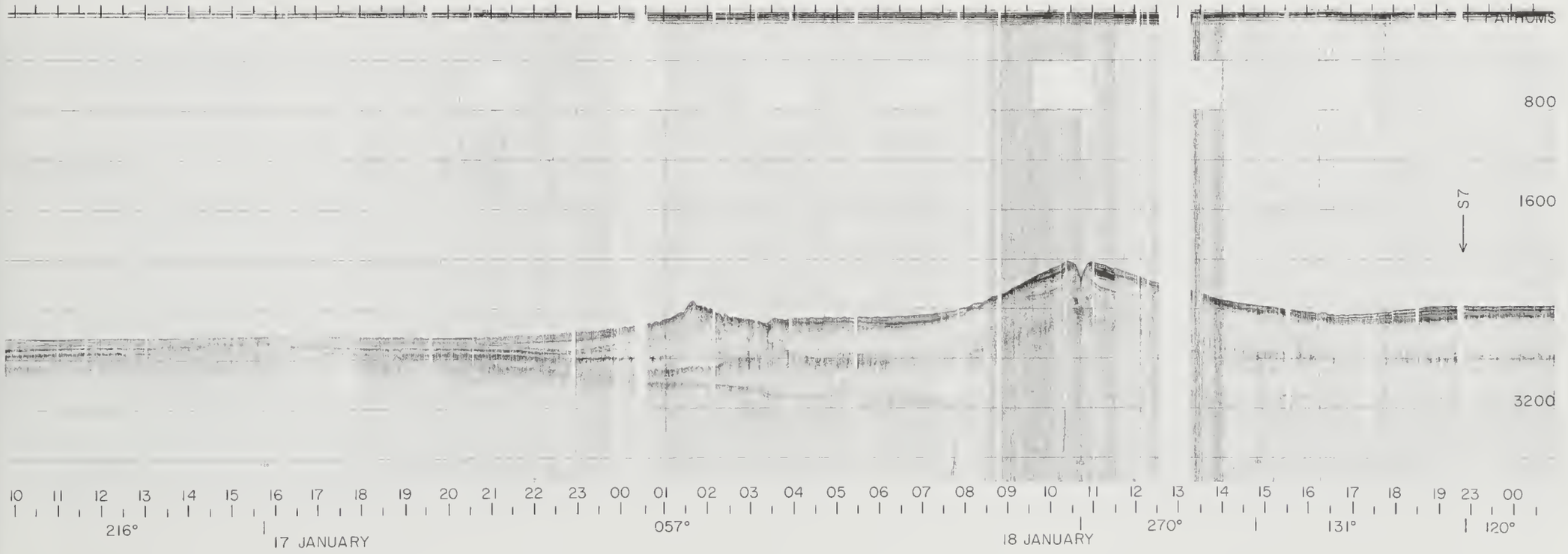

SECONDS
1360
1365
S 254
S 255
2
4
6
8
11// 15
20
00
// 03
05
// 13
15
20
00
037°
1965
5 DEC
6 DEC
352°
122°
7 DEC
350°

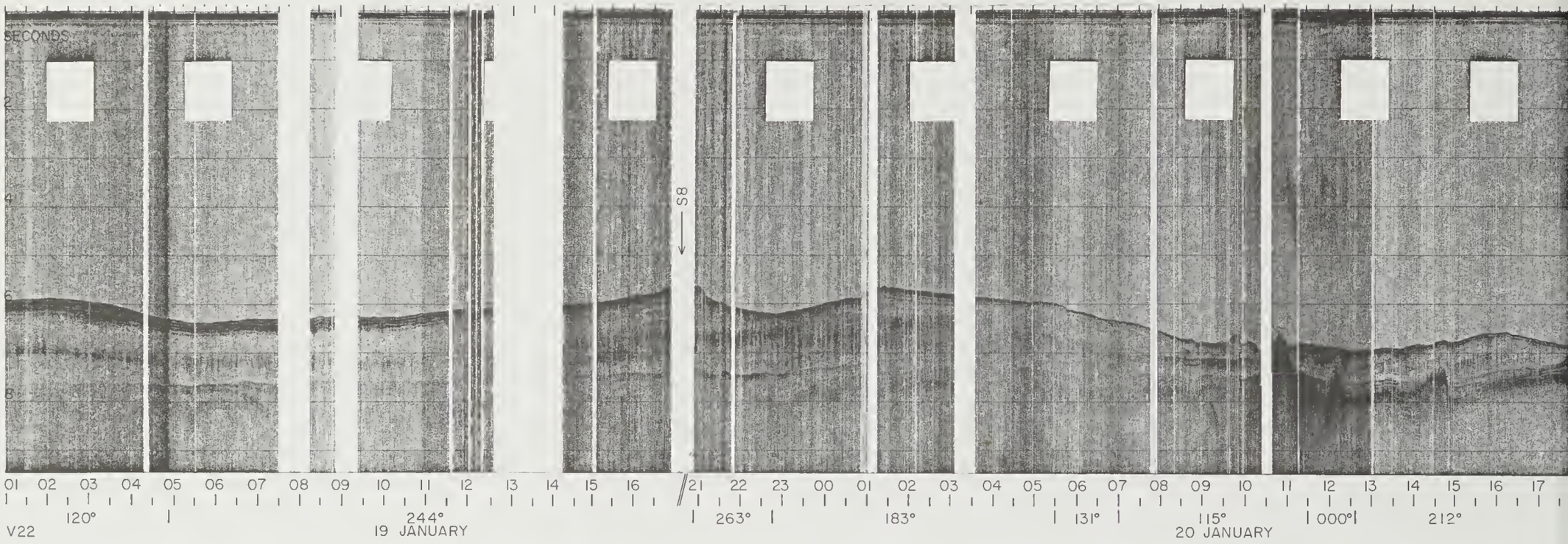

SECONDS
1380
1384
S 256
2
4
6
8
15
//
18
20
//
22
//
00
05
//
19
20
00
001°
012°
1965
8 DEC
349°
TZ+4
TZ+5
9 DEC
096°
241°
318°
313°
10 DEC
NEW YORK, NEW YORK

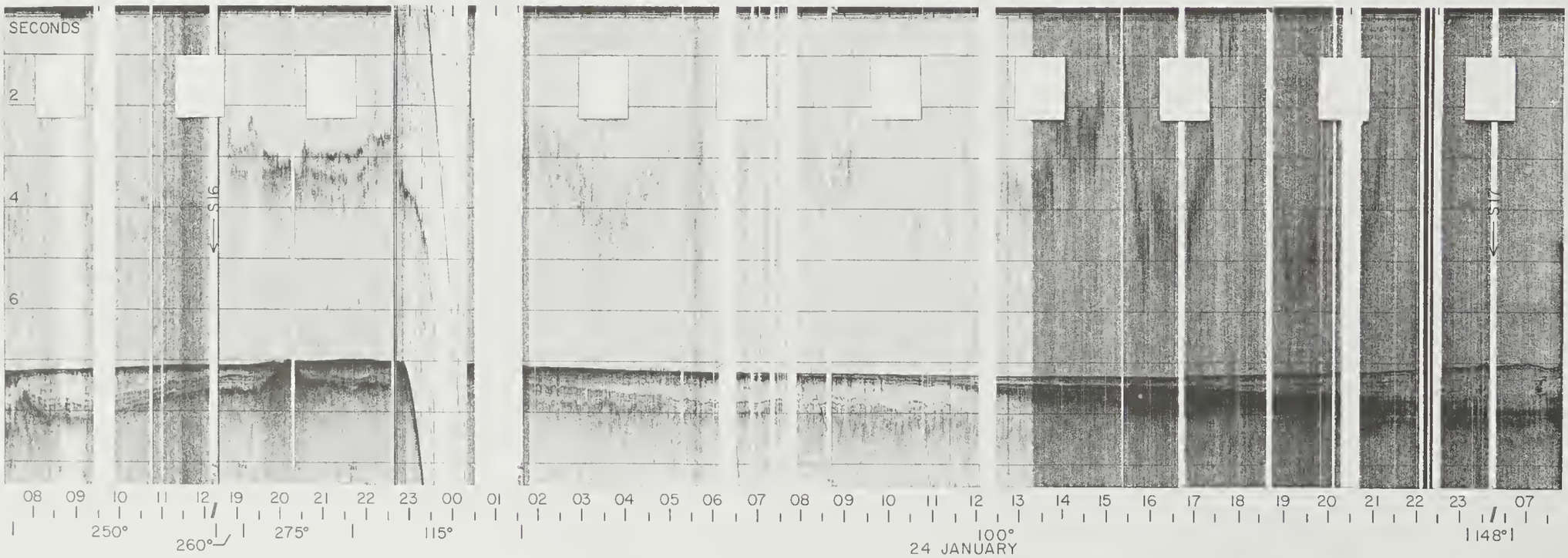

1370
1375 V 21 °FATHOMS
400
800
1600
3200
05
10
15
20
00
05
10
350°
260°
155°
160°
181°
312°
038°
089°
315°
089°
159°
043°
002°
090°
001°
7 DEC
8 DEC
1965

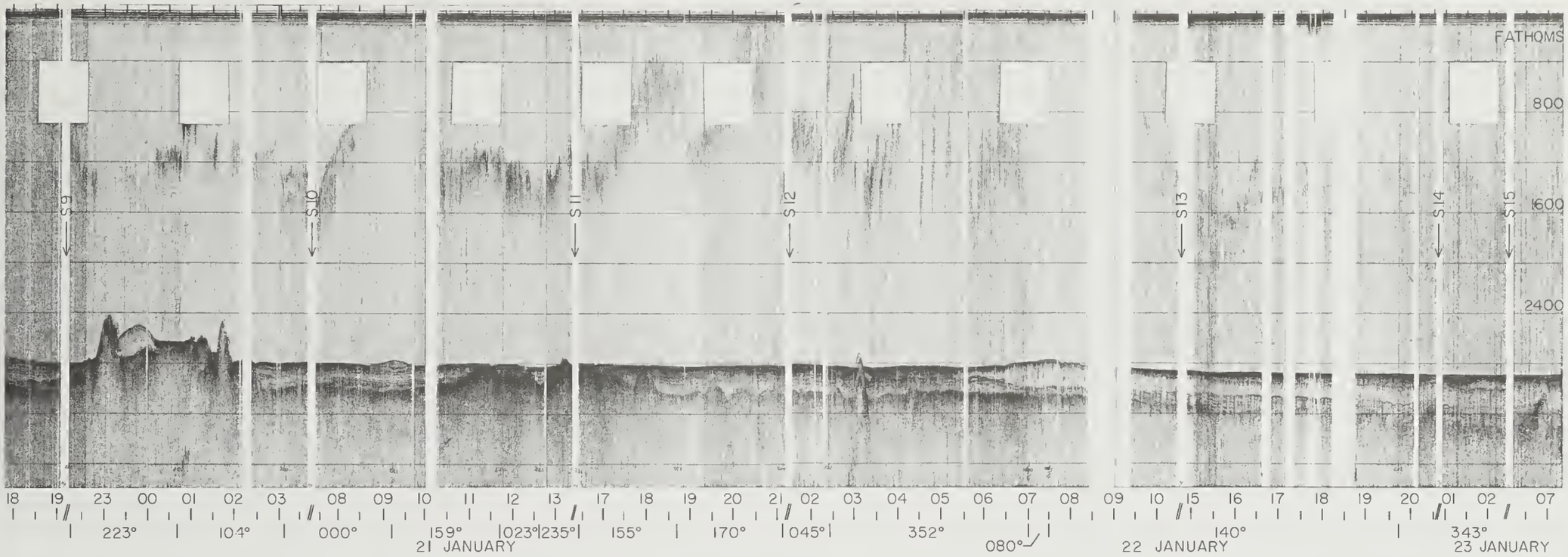

NEW YORK, NEW YORK
SECONDS
2
4
6
8
S1
21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12
090°
V22
140°
187°
10 JANUARY
11 JANUARY
12 JANUARY
SECONDS
2
4
8
S5
S6
16 17 18 19 20 21 12 13 14 15 16 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 0906
221°
155°
178°
047°
155°
241°
250°
1192°
1216°
14 JANUARY
15 JANUARY
16 JANUARY
17 J

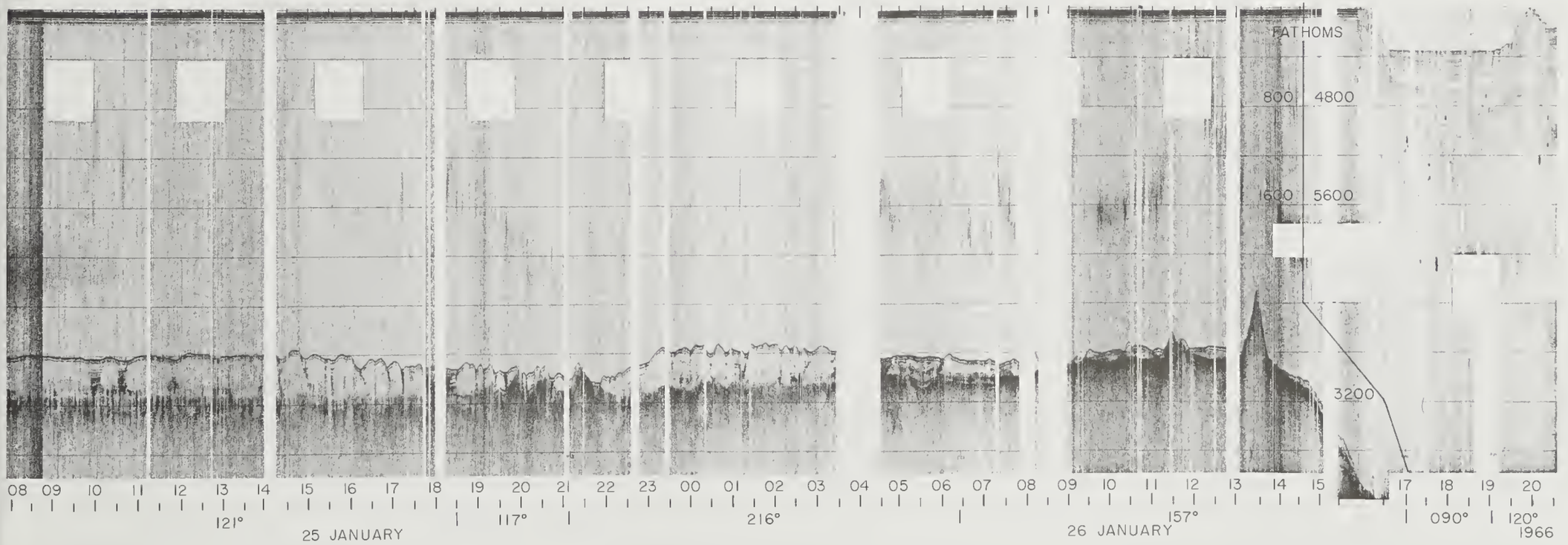

FATHOMS
800
1600
3200
S2
S3
S4
14 15 16 17 18 21 22 23 00 01 07 08 09 10 11 12 13 14 15 16 22 23 00 01 02 03 04 05 06 07 08 09 10 14 15
200°
12 JANUARY
234°
13 JANUARY
235°
095°
195°
092°
201°
090°
14 JANUARY

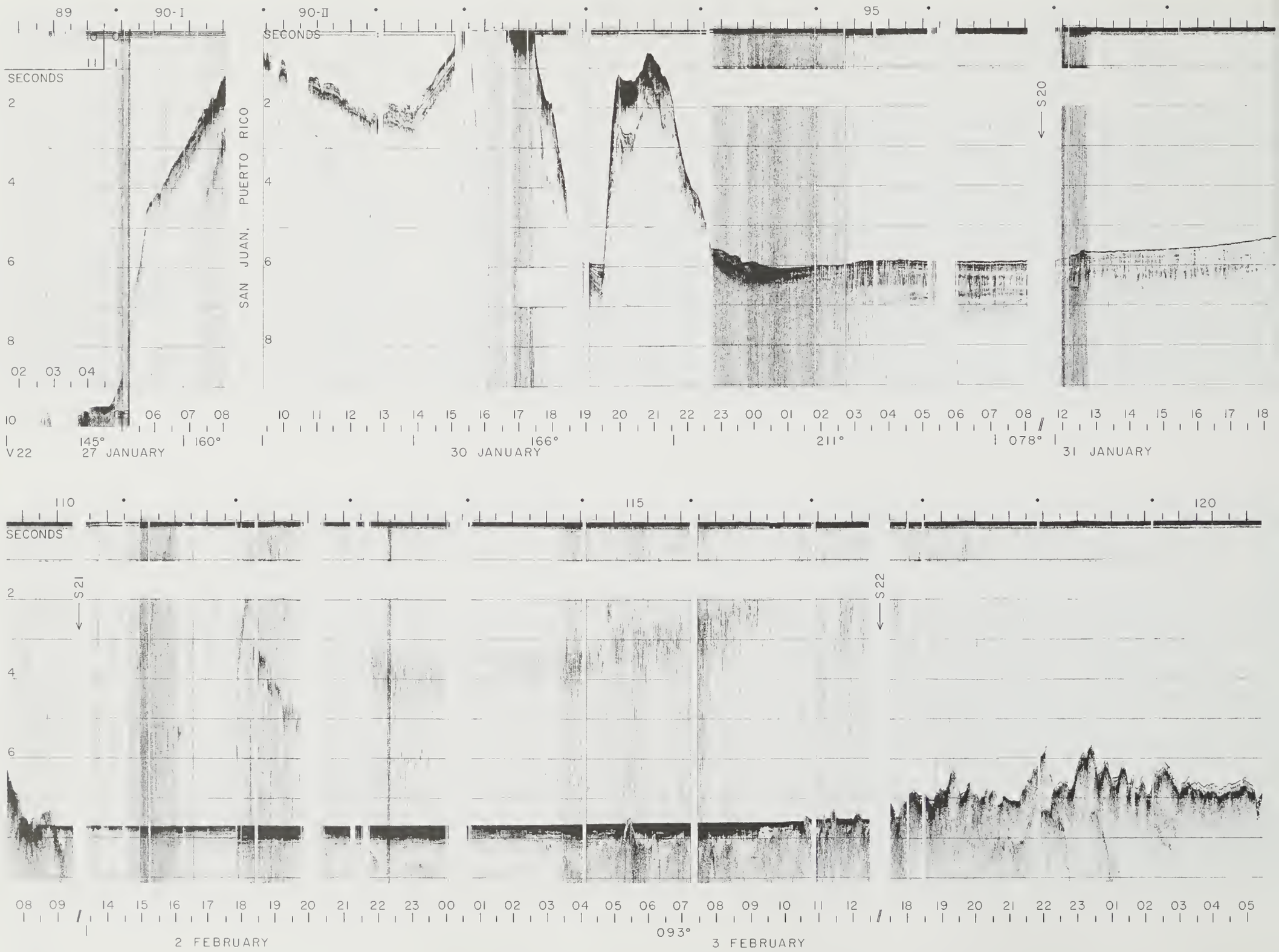

FATHOMS
800
1600
3200
S7
10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 23 00
216°
17 JANUARY
057°
18 JANUARY
270°
131°
120°

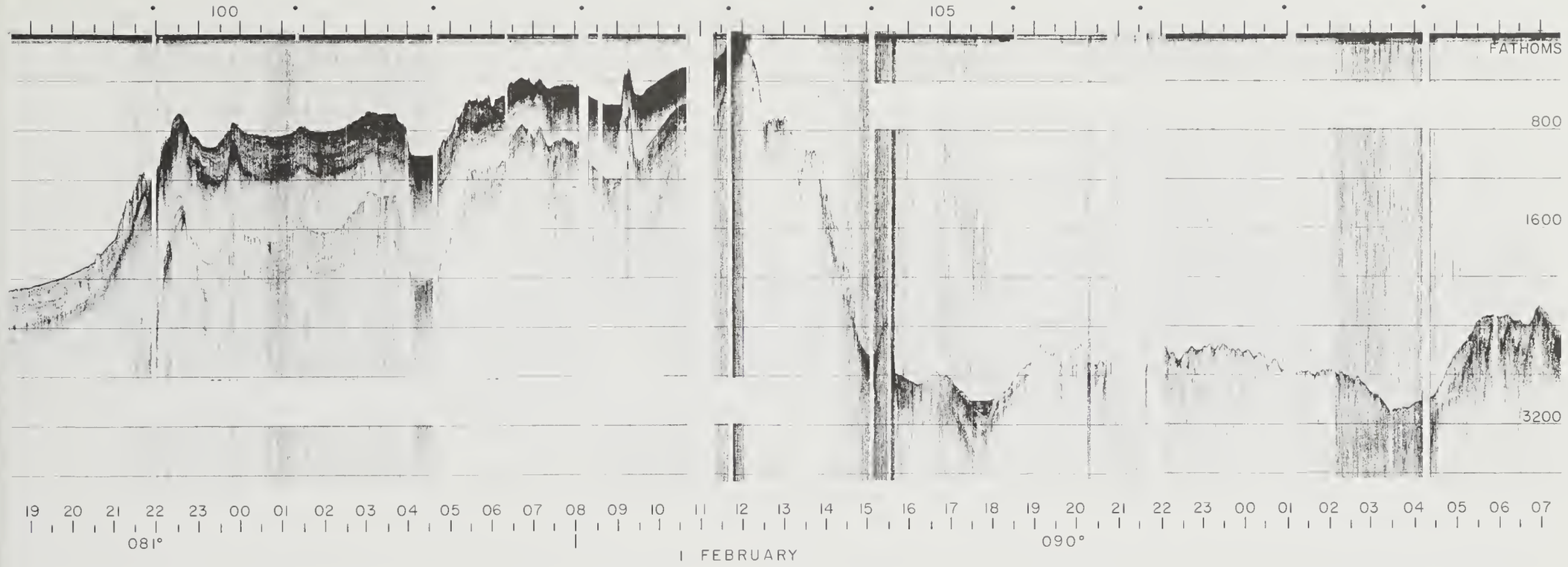

SECONDS
2
4
6
8
S8
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17
120°
244°
263°
183°
131°
115°
000°
212°
V22
19 JANUARY
20 JANUARY

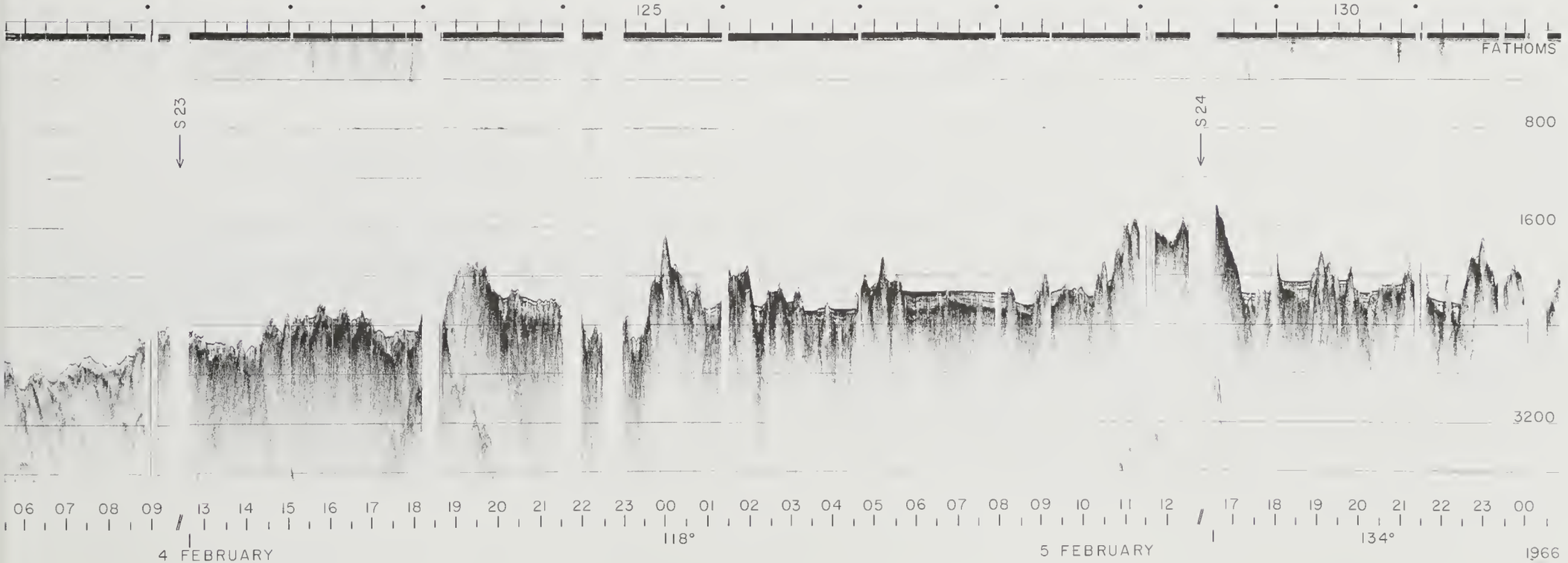

SECONDS
2
4
6
S16
S17
08 09 10 11 12 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 07
250°
260°
275°
115°
100°
148°
24 JANUARY


FATHOMS
800
1600
2400
S 9
S 10
S 11
S 12
S 13
S 14
S 15
18 19 23 00 01 02 03 08 09 10 11 12 13 17 18 19 20 21 02 03 04 05 06 07 08 09 10 15 16 17 18 19 20 01 02 07
223° 104° 000° 159° 023° 235° 155° 170° 045° 352° 080° 140° 343°
21 JANUARY
22 JANUARY
23 JANUARY

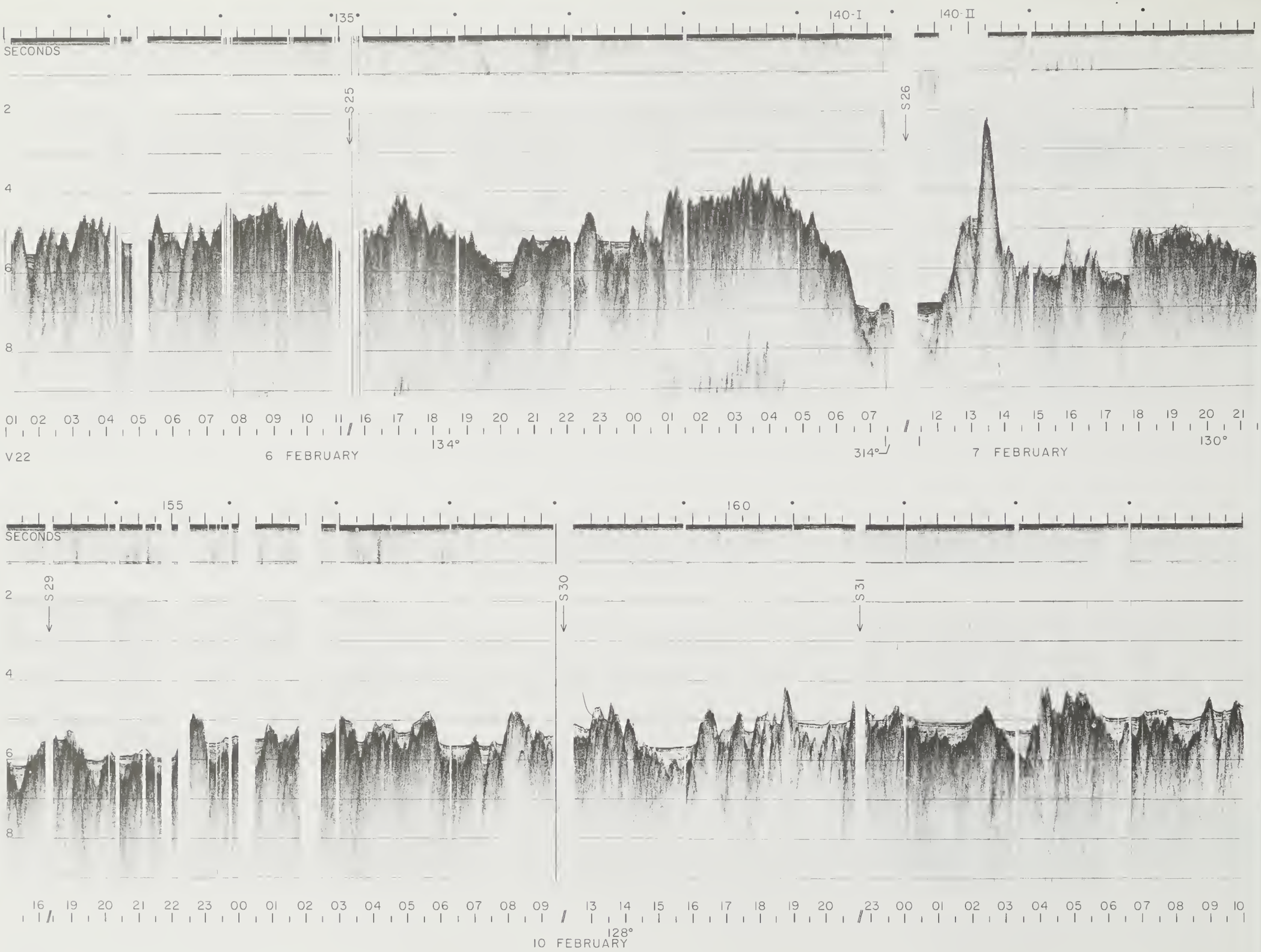

FATHOMS
800 4800
1600 5600
3200
08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 17 18 19 20
121° 117° 216° 157° 090° 120°
25 JANUARY
26 JANUARY
1966

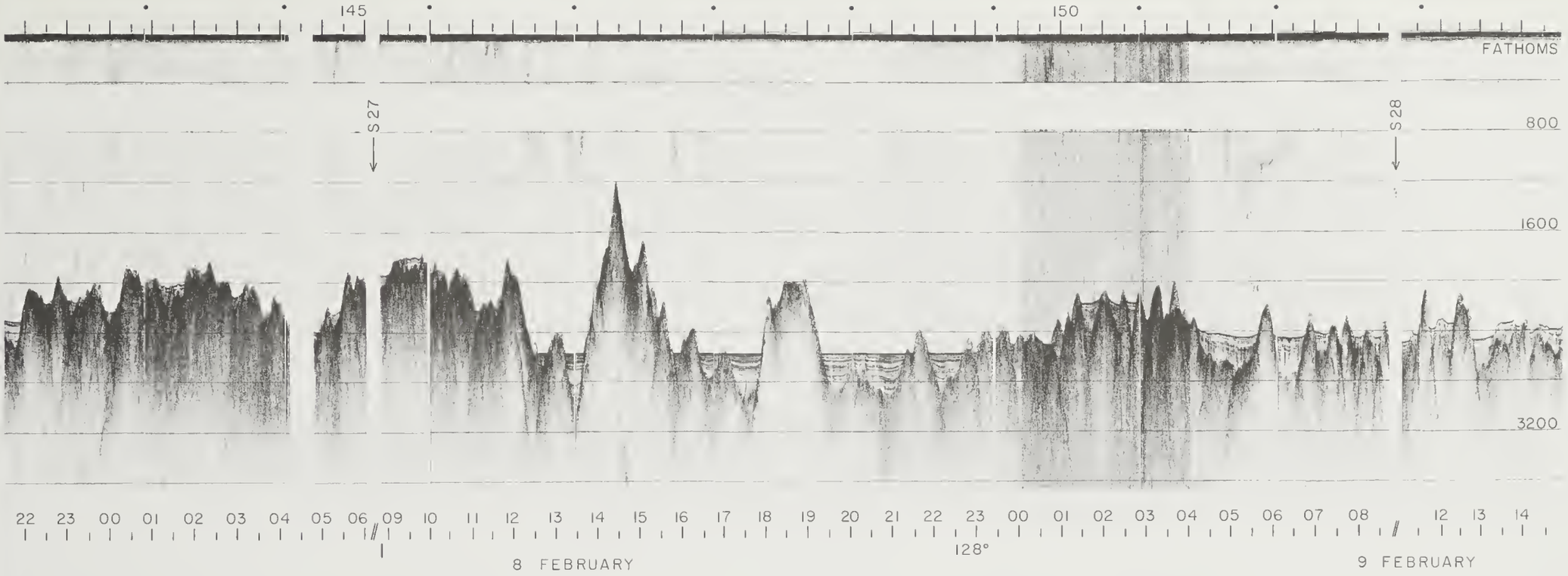

89
90-I
90-II
95
SECONDS
SAN JUAN, PUERTO RICO
S20
S21
S22
110
115
120
145°
160°
166°
211°
078°
093°
V22
27 JANUARY
30 JANUARY
31 JANUARY
2 FEBRUARY
3 FEBRUARY

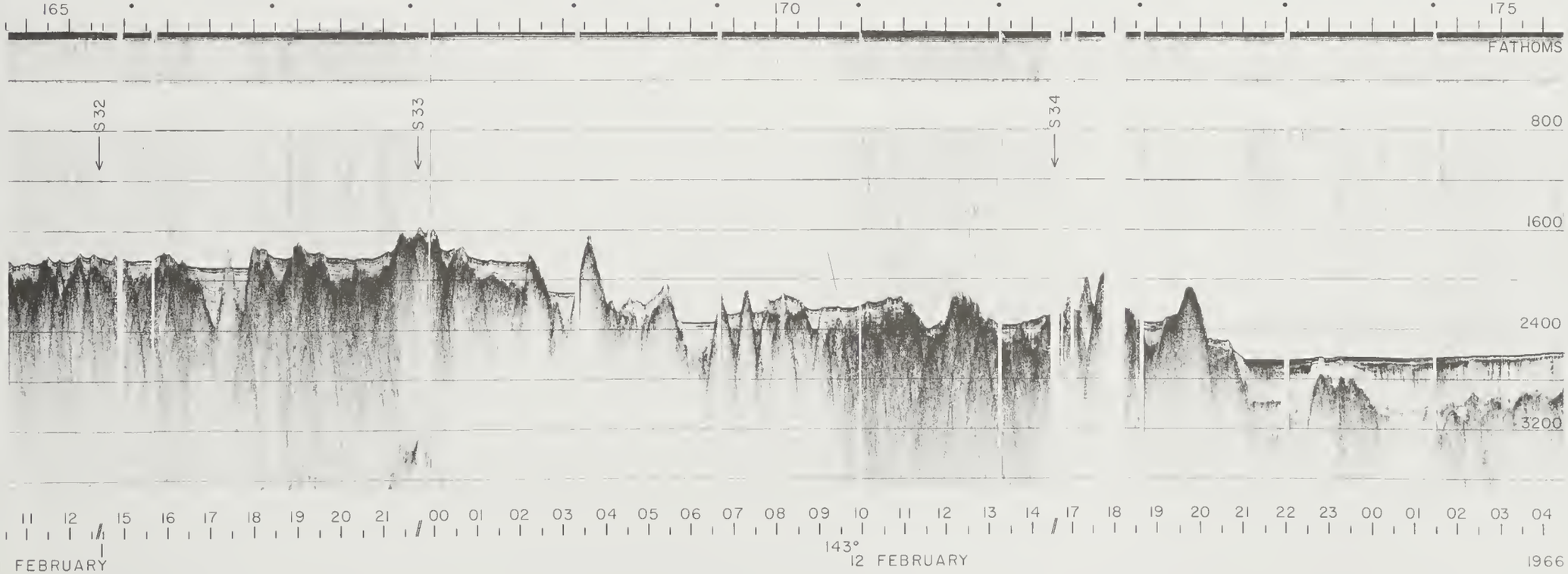

100
105
FATHOMS
800
1600
3200
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07
081°
1 FEBRUARY
090°

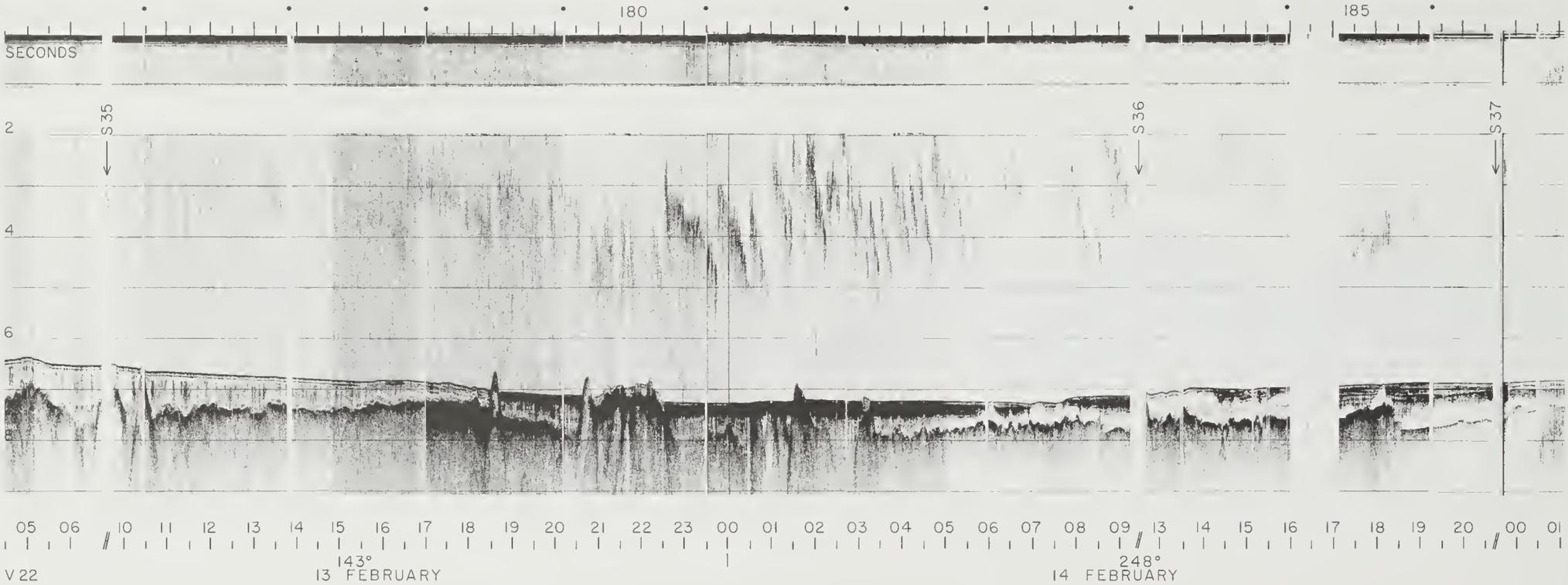

125
130
FATHOMS
S 23
S 24
800
1600
3200
06 07 08 09 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 17 18 19 20 21 22 23 00
4 FEBRUARY
118°
5 FEBRUARY
134°

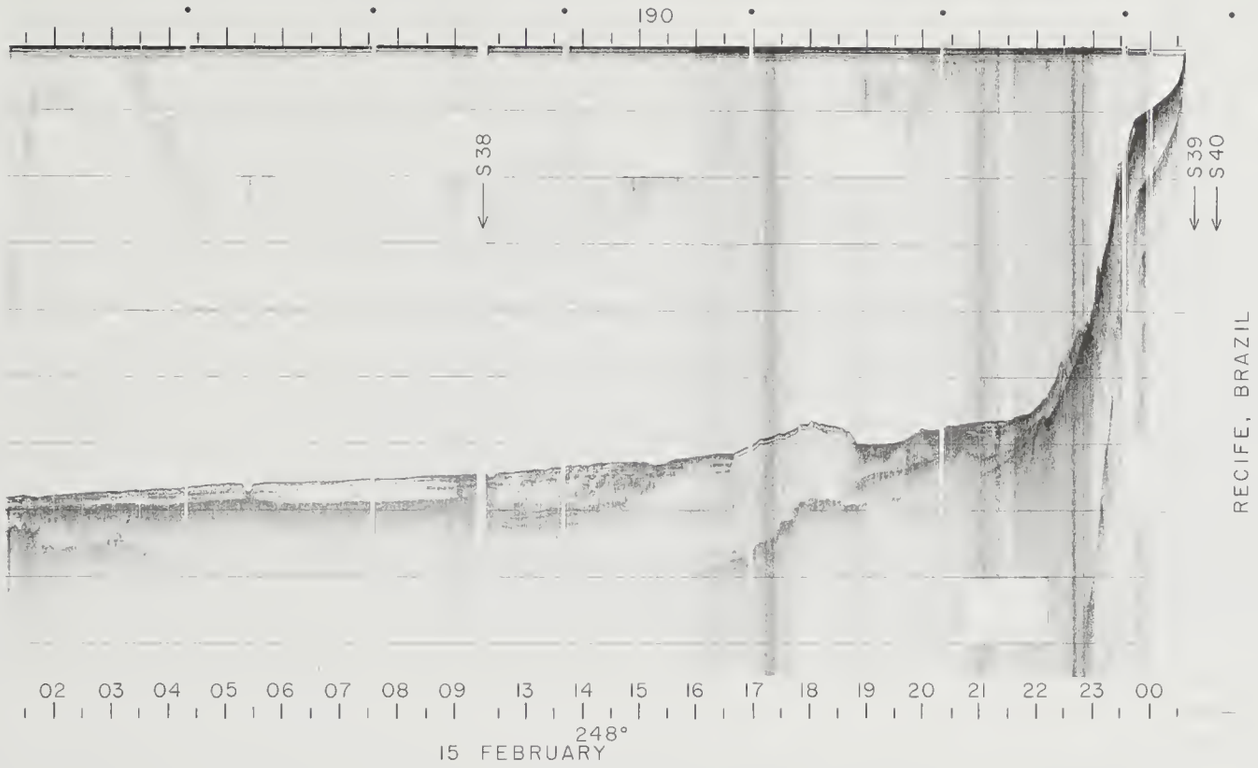
1966

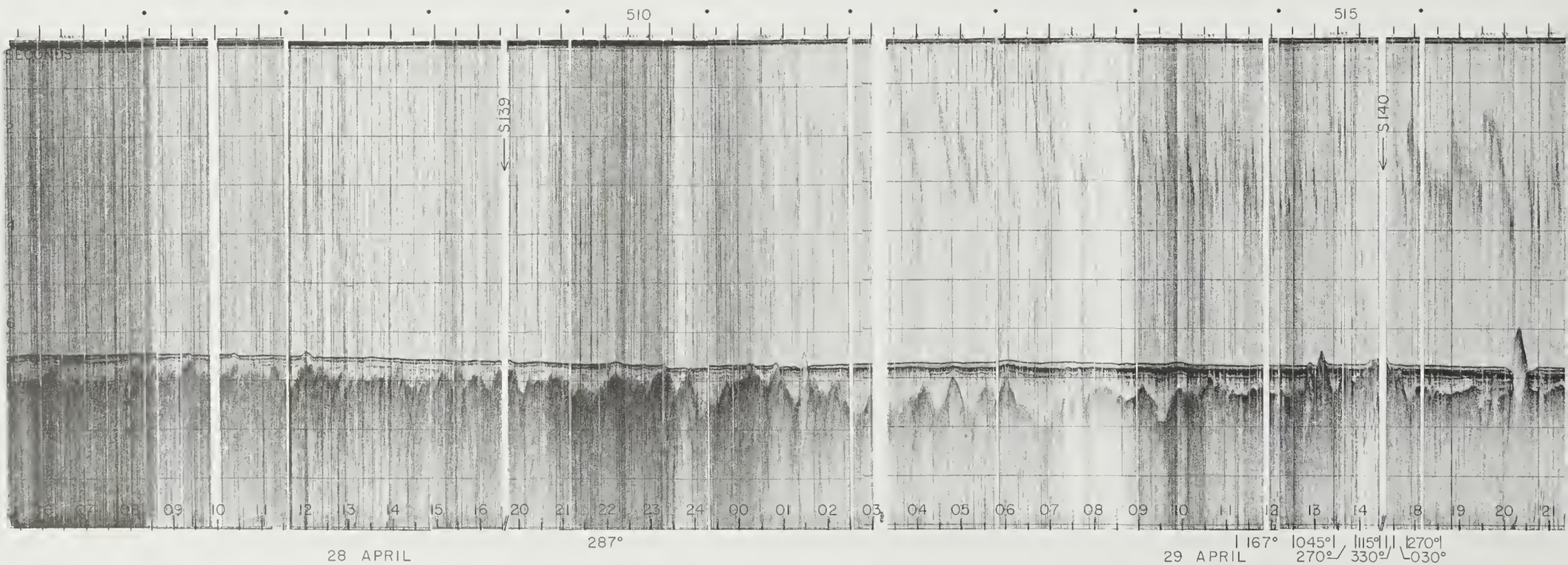

135°
140-I
140-II
SECONDS
2
4
6
8
S25
S26
01 02 03 04 05 06 07 08 09 10 11 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07
12 13 14 15 16 17 18 19 20 21
134°
314°
130°
V22
6 FEBRUARY
7 FEBRUARY
155
160
SECONDS
2
4
6
8
S29
S30
S31
16 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 13 14 15 16 17 18 19 20 23 00 01 02 03 04 05 06 07 08 09 10
128°
10 FEBRUARY

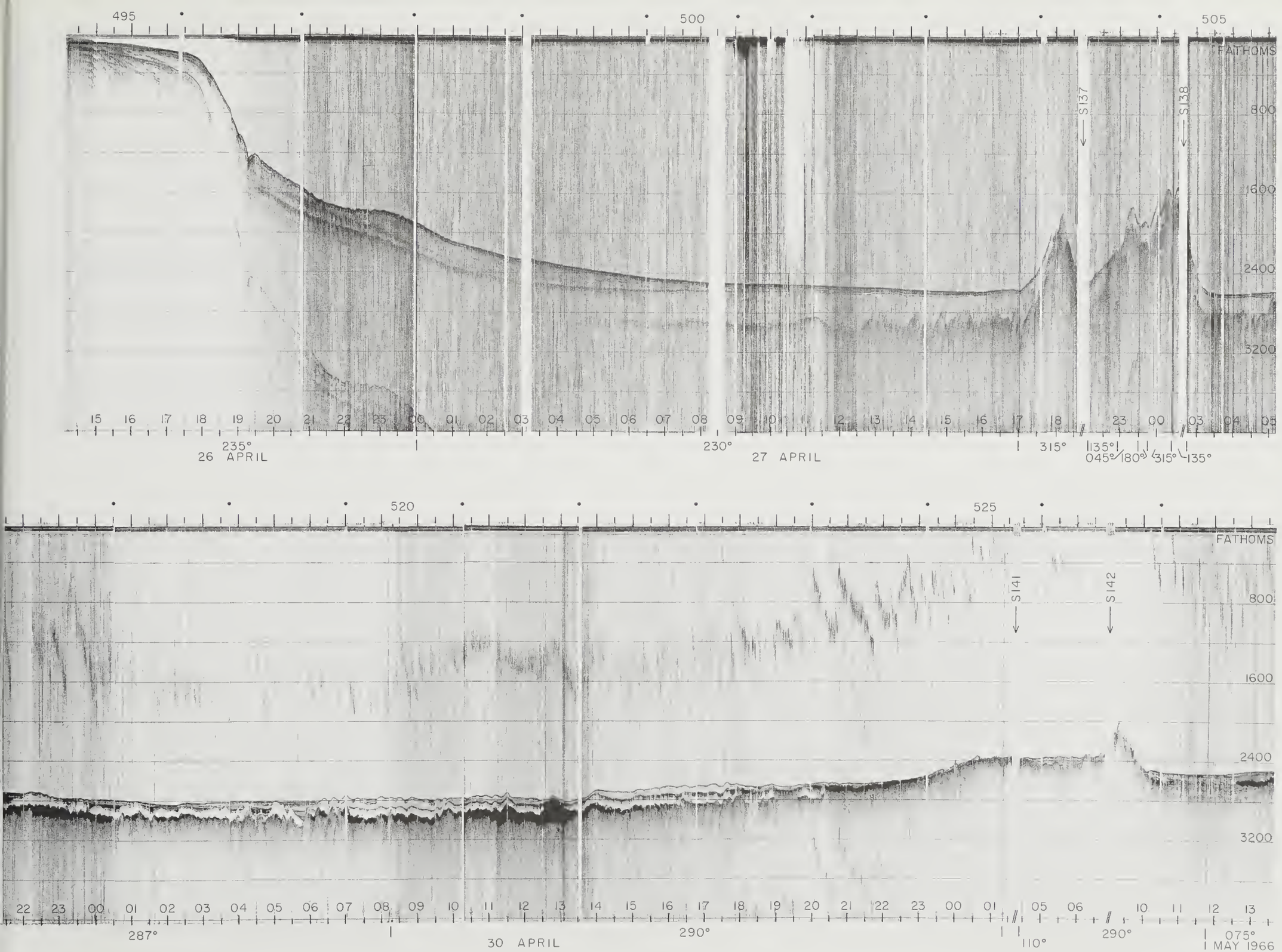

145
150
FATHOMS
S27
S28
800
1600
3200
22 23 00 01 02 03 04 05 06 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 12 13 14
128°
8 FEBRUARY
9 FEBRUARY

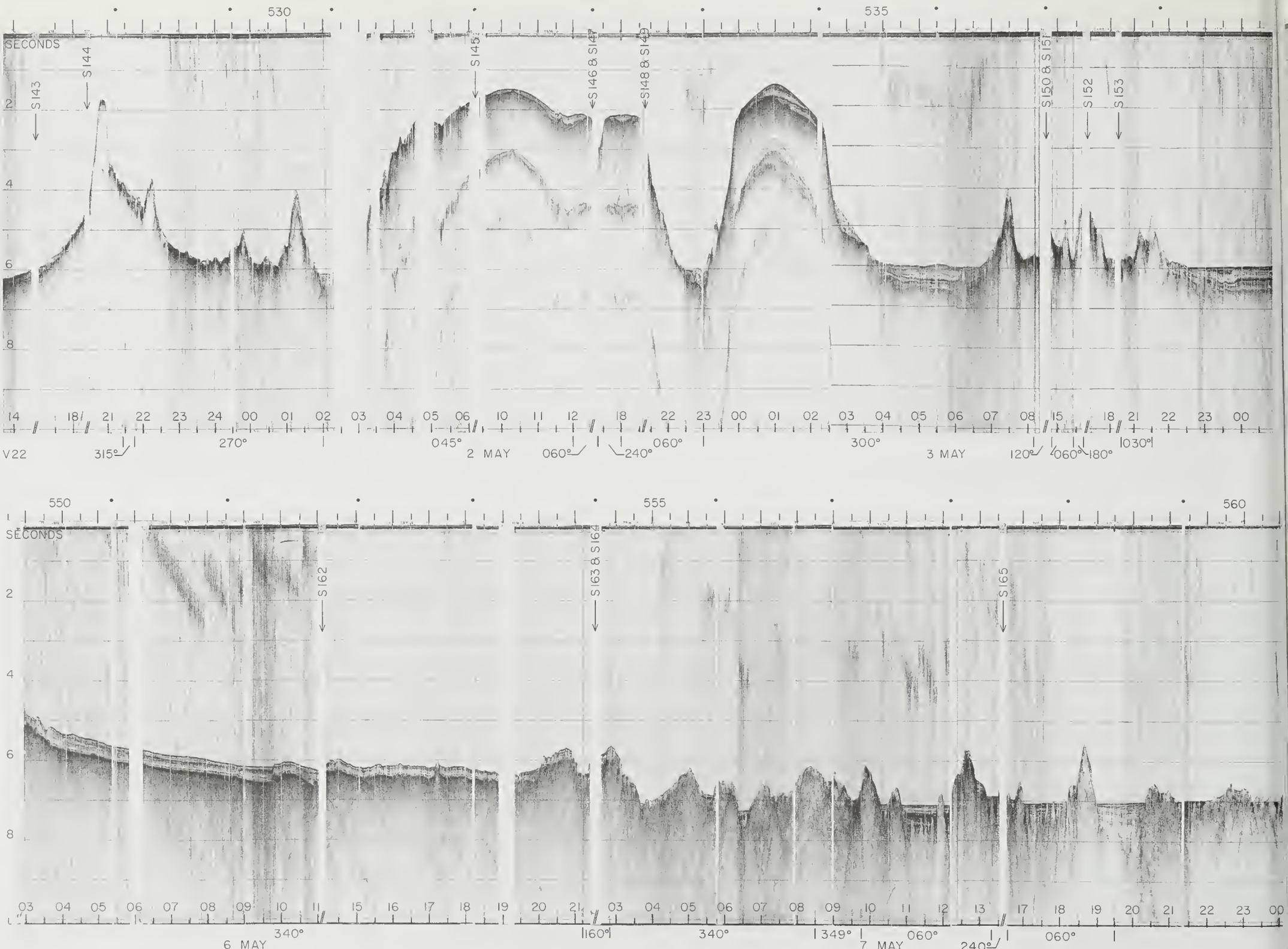

165
170
175
FATHOMS
S32
S33
S34
800
1600
2400
3200
11 12 15 16 17 18 19 20 21 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 17 18 19 20 21 22 23 00 01 02 03 04
143°
11 FEBRUARY
12 FEBRUARY
1966

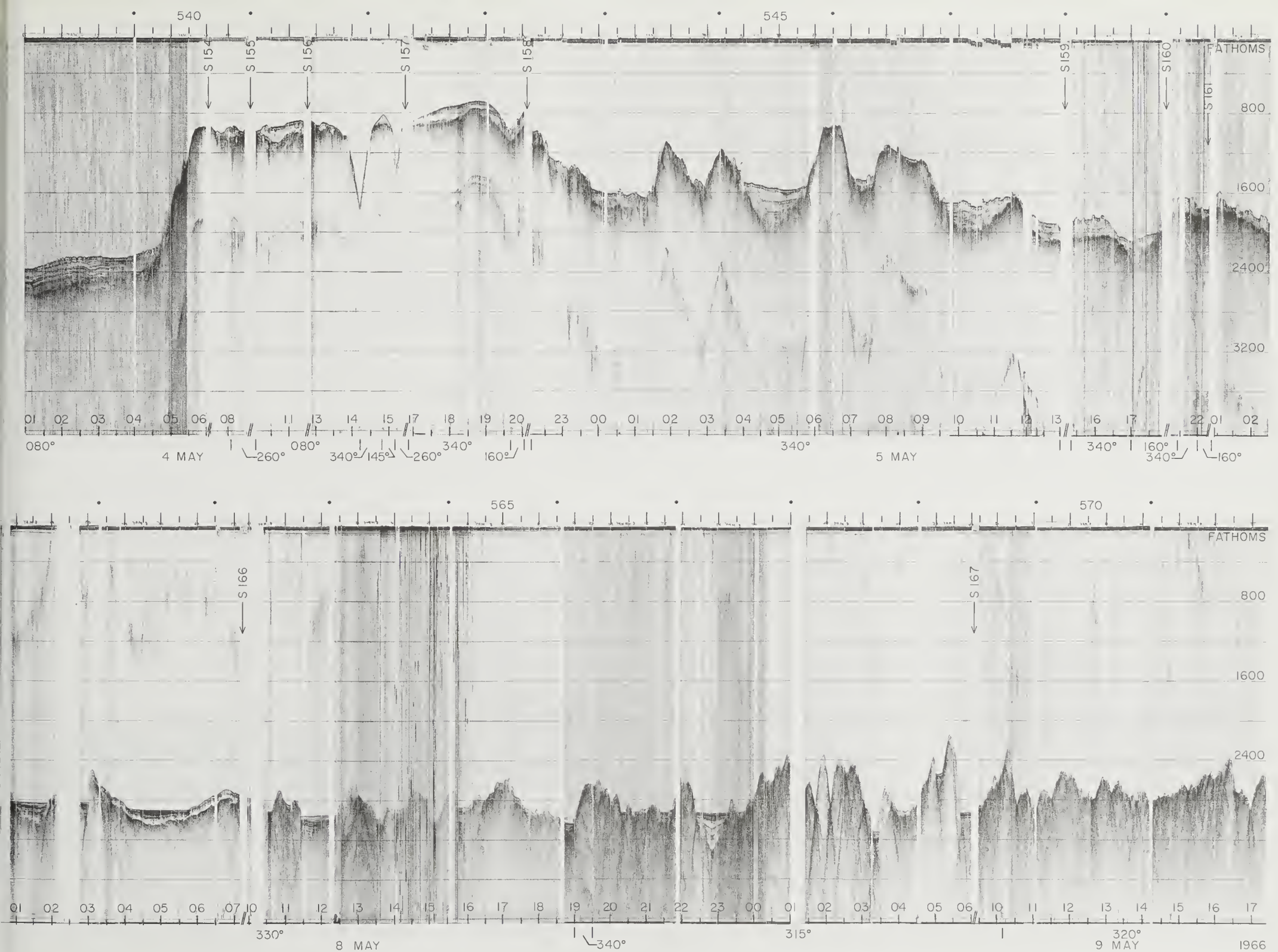

180
185
SECONDS
S35
S36
S37
2
4
6
05 06 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 13 14 15 16 17 18 19 20 00 01
V 22
143°
13 FEBRUARY
248°
14 FEBRUARY

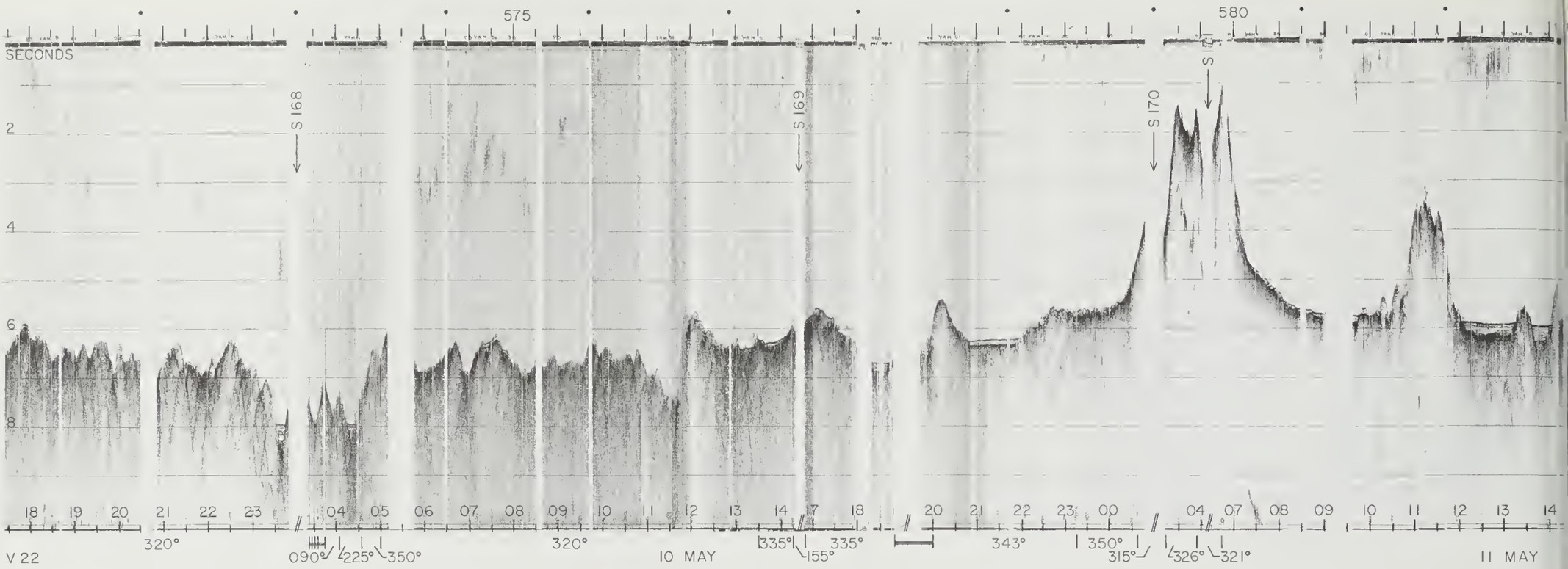

190
S38
S39
S40
RECIFE, BRAZIL
02 03 04 05 06 07 08 09 13 14 15 16 17 18 19 20 21 22 23 00
248°
15 FEBRUARY

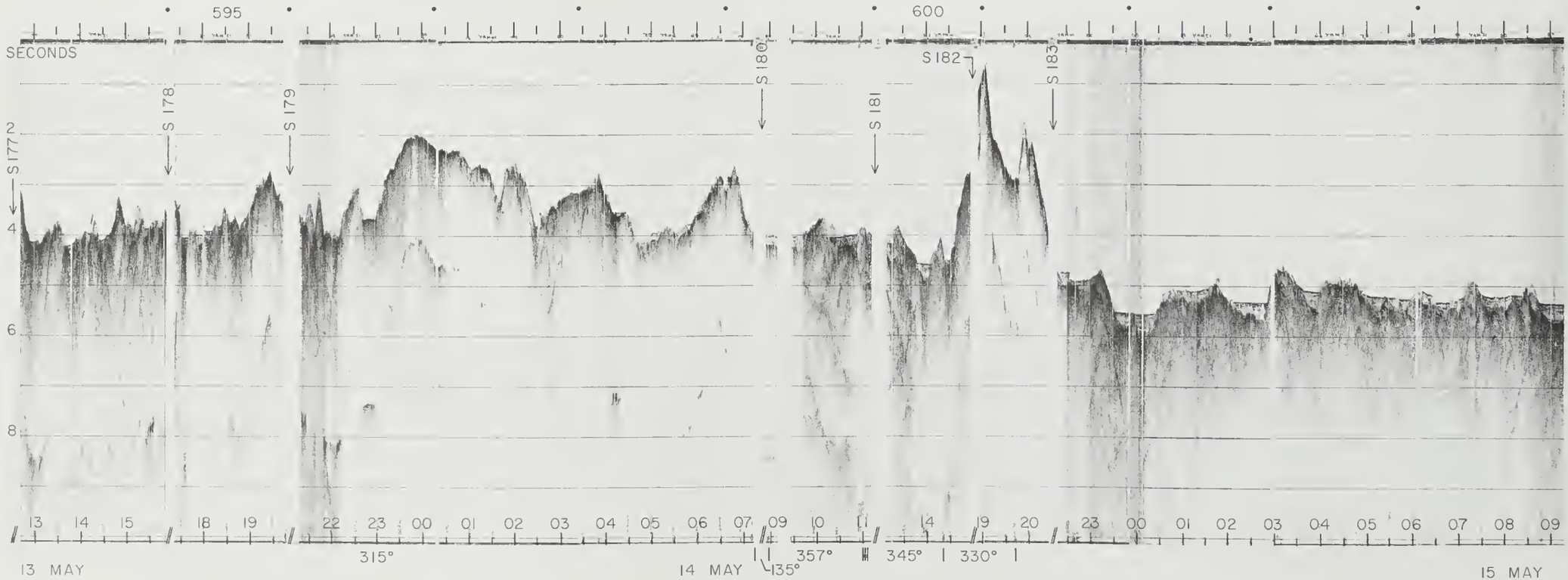

510
515
SECONDS
S139
S140
09 10 11 12 13 14 15 16 20 21 22 23 24 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 18 19 20 21
287°
167° 045° 115° 270°
270° 330° 030°
28 APRIL
29 APRIL

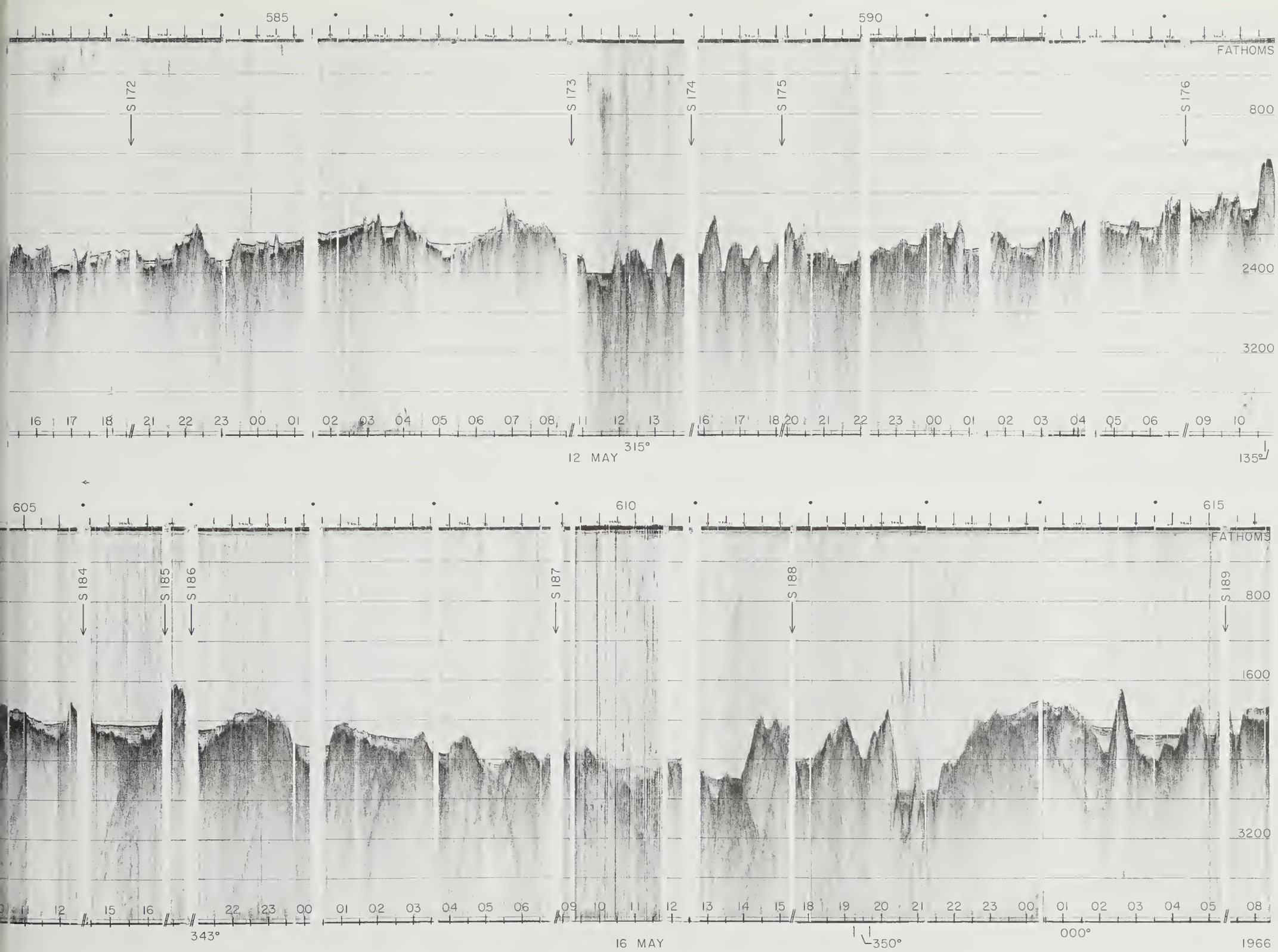

495
500
505
FATHOMS
800
1600
2400
3200
S137
S138
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 12 13 14 15 16 17 18 23 00 03 04 05
235°
26 APRIL
230°
27 APRIL
315°
135°
045°
180°
315°
135°
520
525
FATHOMS
800
1600
2400
3200
S141
S142
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 05 06 10 11 12 13
287°
30 APRIL
290°
110°
290°
075°
1 MAY 1966

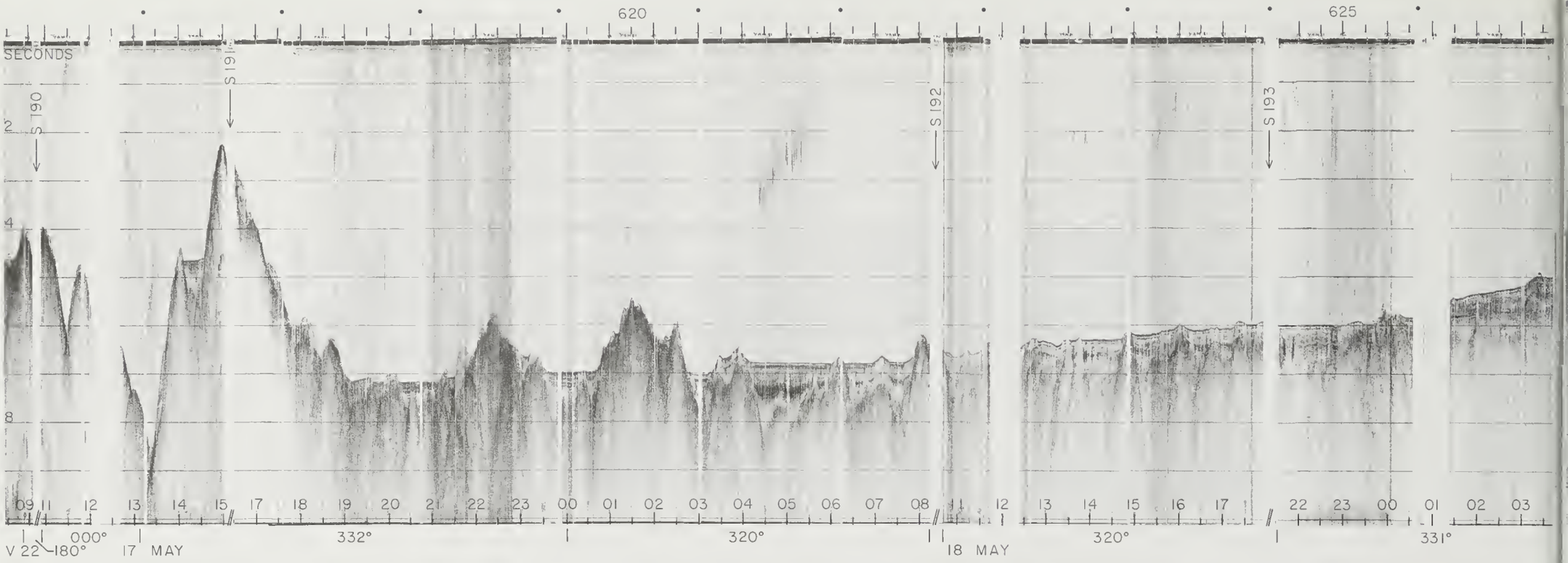

530
535
SECONDS
2
4
6
8
S143
S144
S145
S146 & S147
S148 & S149
S150 & S151
S152
S153
14 18 21 22 23 24 00 01 02 03 04 05 06 10 11 12 18 22 23 00 01 02 03 04 05 06 07 08 15 18 21 22 23 00
V22
315°
270°
045°
2 MAY
060°
240°
060°
300°
3 MAY
120°
060°
180°
030°
550
555
560
SECONDS
2
4
6
8
S162
S163 & S164
S165
03 04 05 06 07 08 09 10 11 15 16 17 18 19 20 21 03 04 05 06 07 08 09 10 11 12 13 17 18 19 20 21 22 23 00
340°
6 MAY
160°
340°
349°
060°
7 MAY
240°
060°

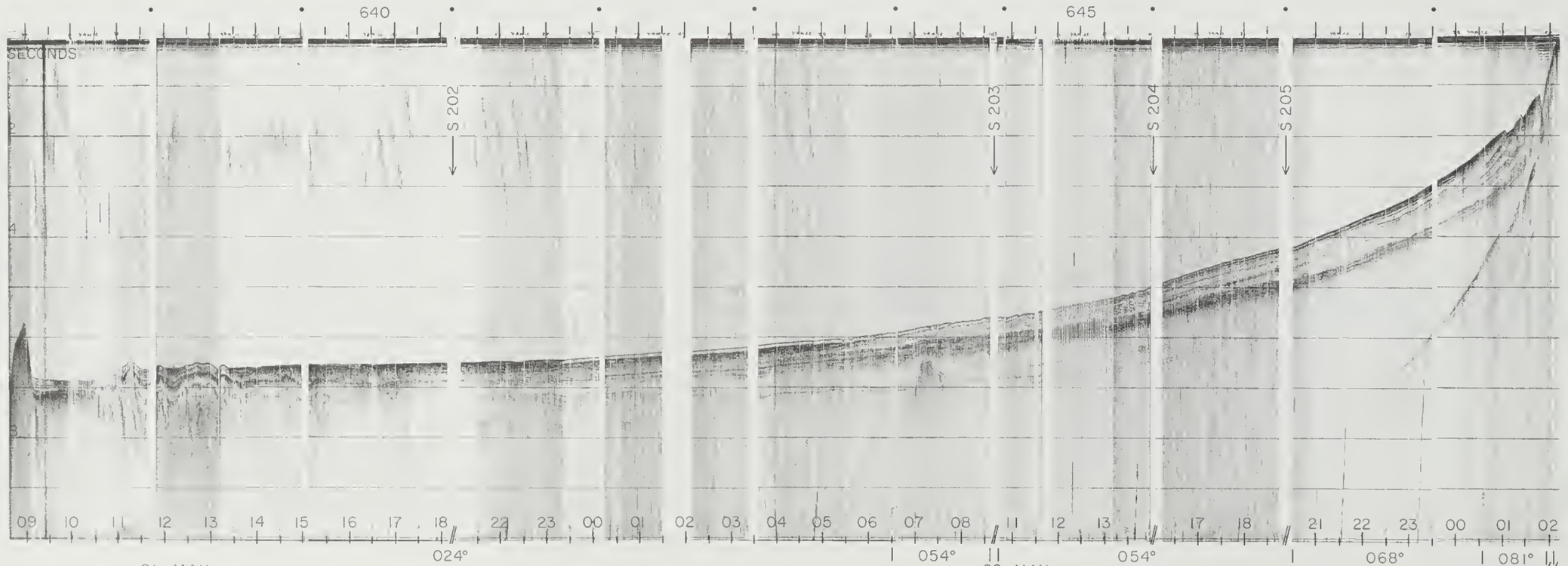

540
545
S 154
S 155
S 156
S 157
S 158
S 159
S 160
S 161
FATHOMS
800
1600
2400
3200
01 02 03 04 05 06 08 11 13 14 15 17 18 19 20 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 16 17 22 01 02
080° 080° 340° 340° 160° 340° 340° 160°
260° 340° 145° 260° 340° 160°
4 MAY
5 MAY
565
570
S 166
S 167
FATHOMS
800
1600
2400
01 02 03 04 05 06 07 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 10 11 12 13 14 15 16 17
330° 340° 315° 320°
8 MAY
9 MAY
1966

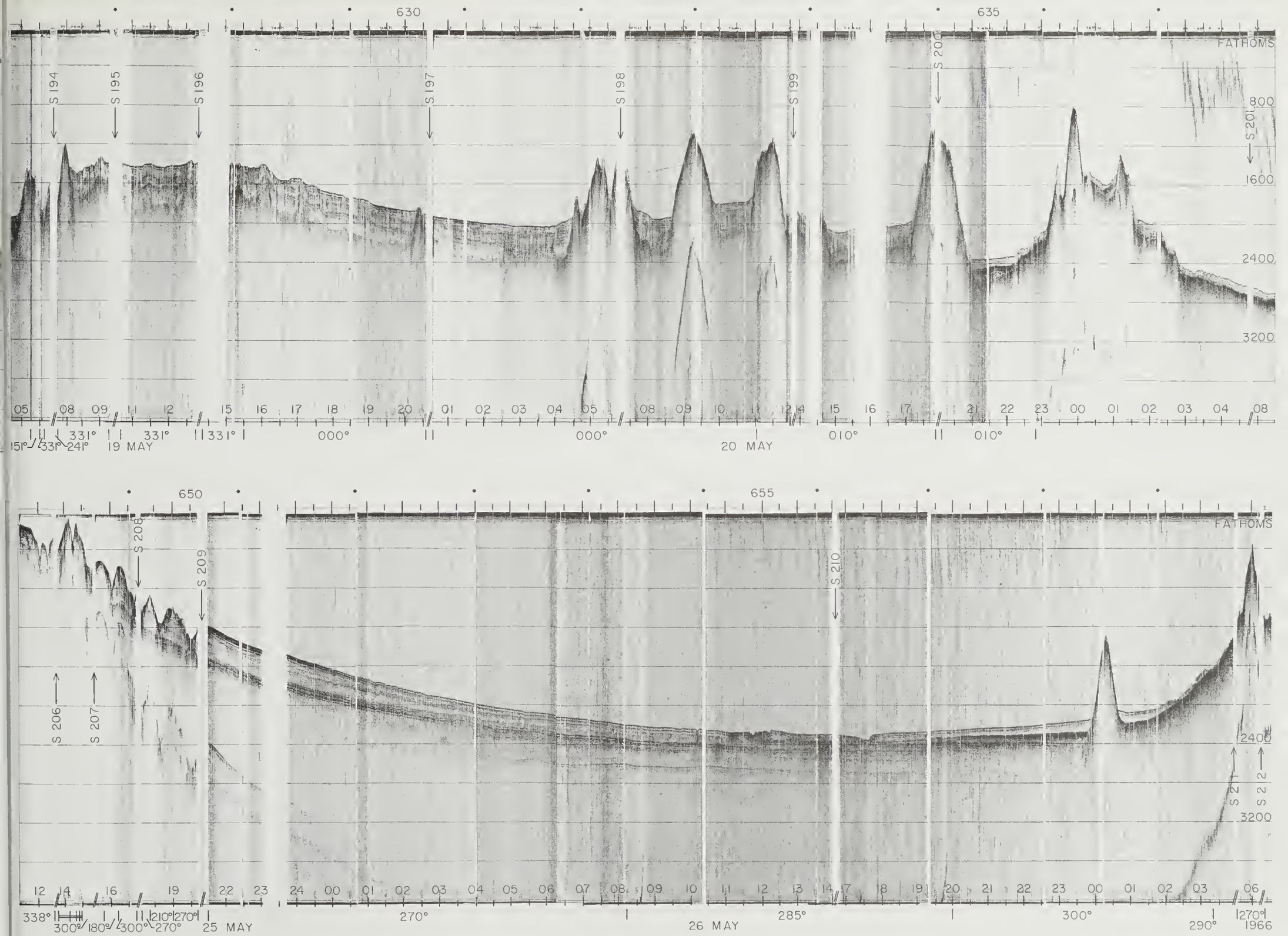

575
580
SECONDS
2
4
6
8
S 168
S 169
S 170
S 171
18 19 20 21 22 23 04 05 06 07 08 09 10 11 12 13 14 17 18 20 21 22 23 00 04 07 08 09 10 11 12 13 14
320° 090° 225° 350° 320° 335° 155° 335° 343° 350° 315° 326° 321°
V 22
10 MAY
11 MAY

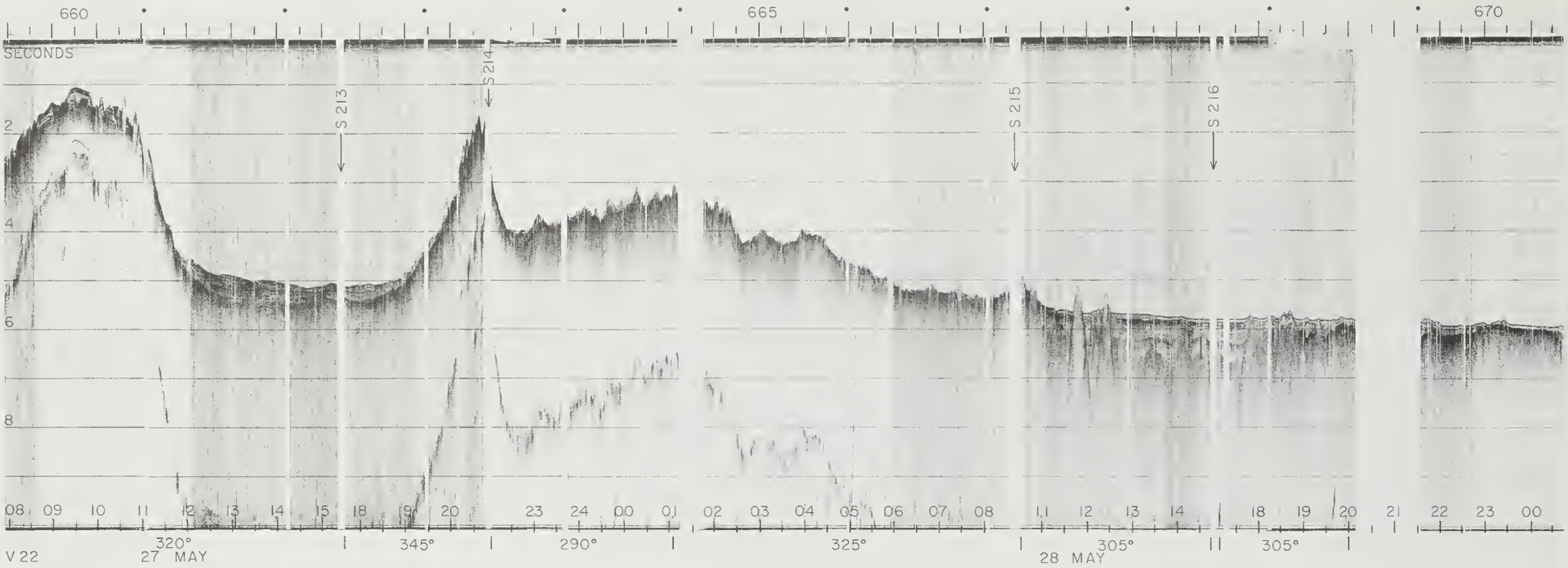

595
600
SECONDS
2
4
6
8
S 177
S 178
S 179
S 180
S 181
S 182
S 183
13 14 15 18 19 22 23 00 01 02 03 04 05 06 07 09 10 11 14 19 20 23 00 01 02 03 04 05 06 07 08 09
315° 135° 357° 345° 330°
13 MAY
14 MAY
15 MAY

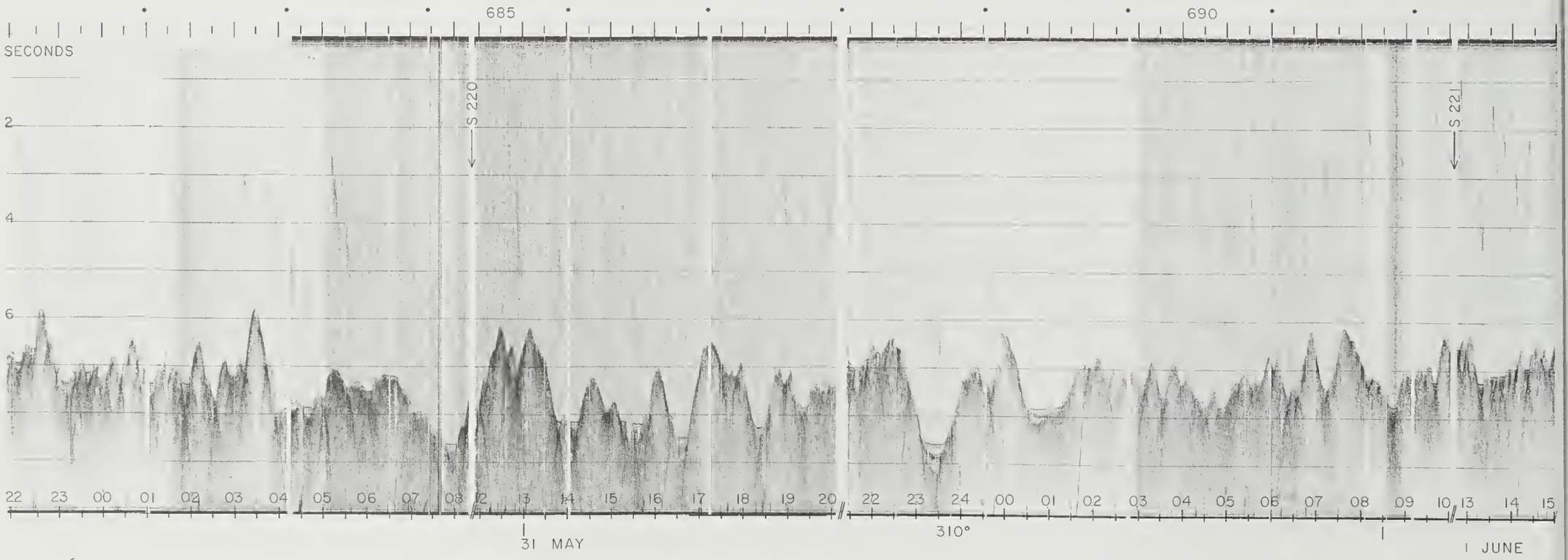

585
590
FATHOMS
S 172
S 173
S 174
S 175
S 176
800
2400
3200
16 17 18 21 22 23 00 01 02 03 04 05 06 07 08 11 12 13 16 17 18 20 21 22 23 00 01 02 03 04 05 06 09 10
315°
135°
12 MAY
605
610
615
FATHOMS
S 184
S 185
S 186
S 187
S 188
S 189
800
1600
3200
12 15 16 22 23 00 01 02 03 04 05 06 09 10 11 12 13 14 15 18 19 20 21 22 23 00 01 02 03 04 05 08
343°
350°
000°
16 MAY
1966

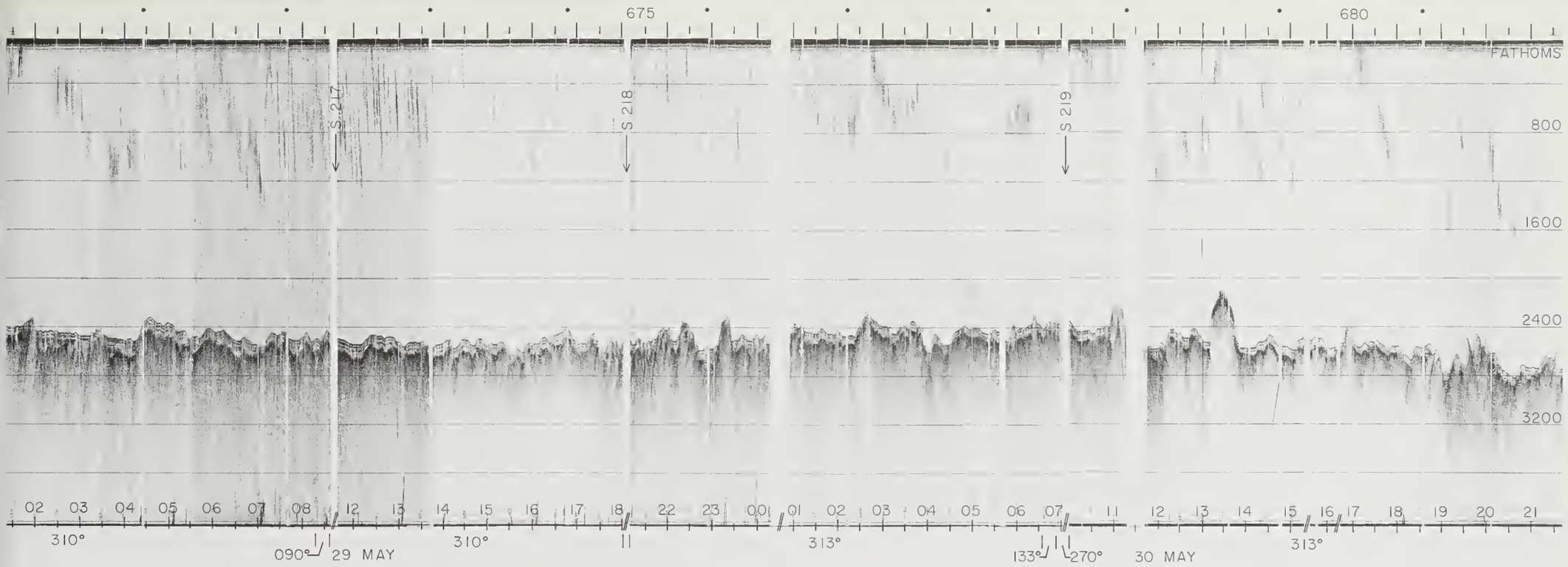

620
625
SECONDS
S 190
S 191
S 192
S 193
2
4
8
09 11 12 13 14 15 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 11 12 13 14 15 16 17 22 23 00 01 02 03
000°
180°
V 22
17 MAY
332°
320°
18 MAY
320°
331°

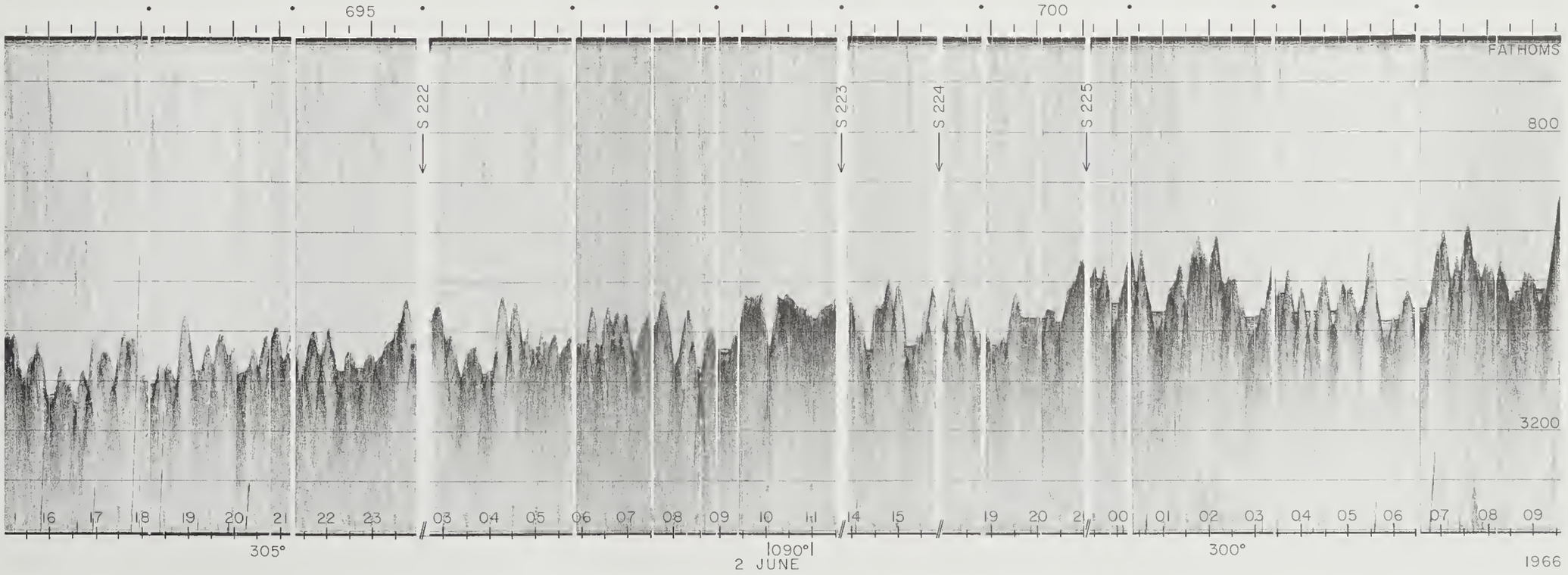

640
645
SECONDS
S 202
S 203
S 204
S 205
2
4
8
09 10 11 12 13 14 15 16 17 18 22 23 00 01 02 03 04 05 06 07 08 11 12 13 17 18 21 22 23 00 01 02
024°
21 MAY
054°
22 MAY
054°
068°
081°
23 MAY 110°
081°
DAKAR, SENEGAL

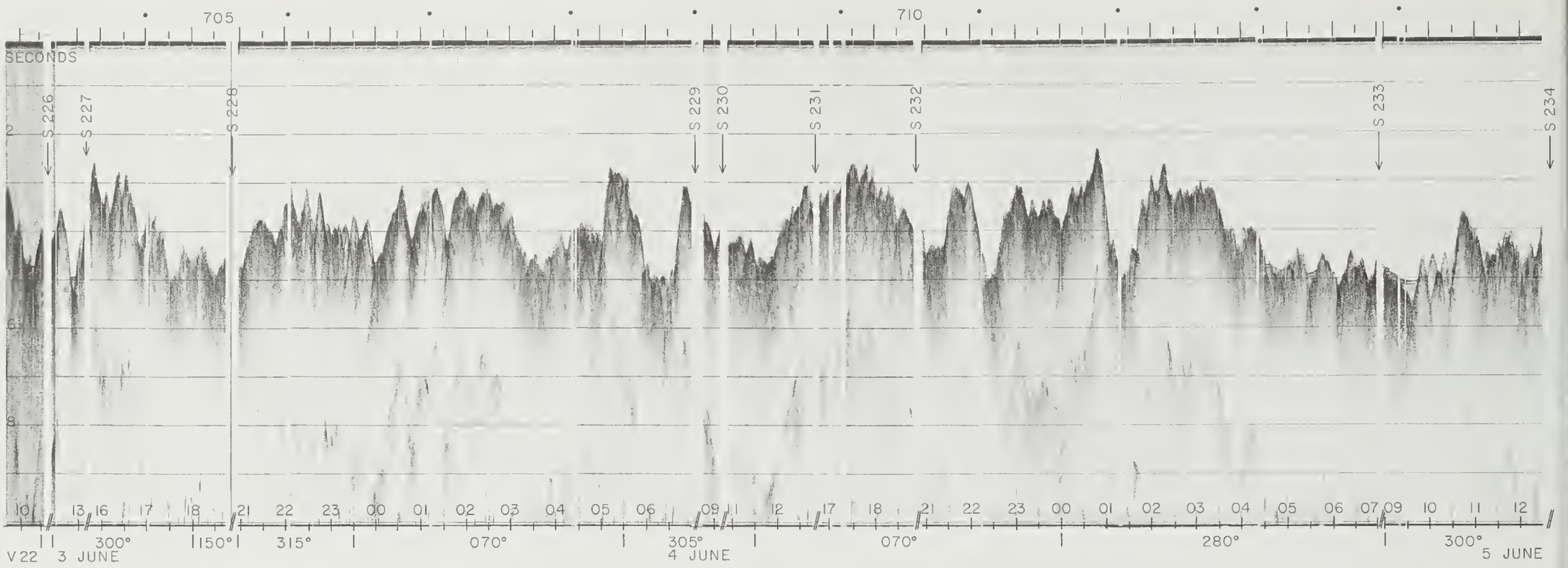

630
635
650
655
FATHOMS
S 194
S 195
S 196
S 197
S 198
S 199
S 200
S 201
S 206
S 207
S 208
S 209
S 210
S 211
S 212
800
1600
2400
3200
05 08 09 11 12 15 16 17 18 19 20 01 02 03 04 05 08 09 10 11 12 14 15 16 17 21 22 23 00 01 02 03 04 08
151° 331° 241° 19 MAY
331° 331° 331° 000° 000° 20 MAY
010° 010°
12 14 16 19 22 23
338° 300° 180° 300° 210° 270° 25 MAY
24 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 17 18 19 20 21 22 23 00 01 02 03 06
270° 285° 300° 290° 270°
26 MAY
1966

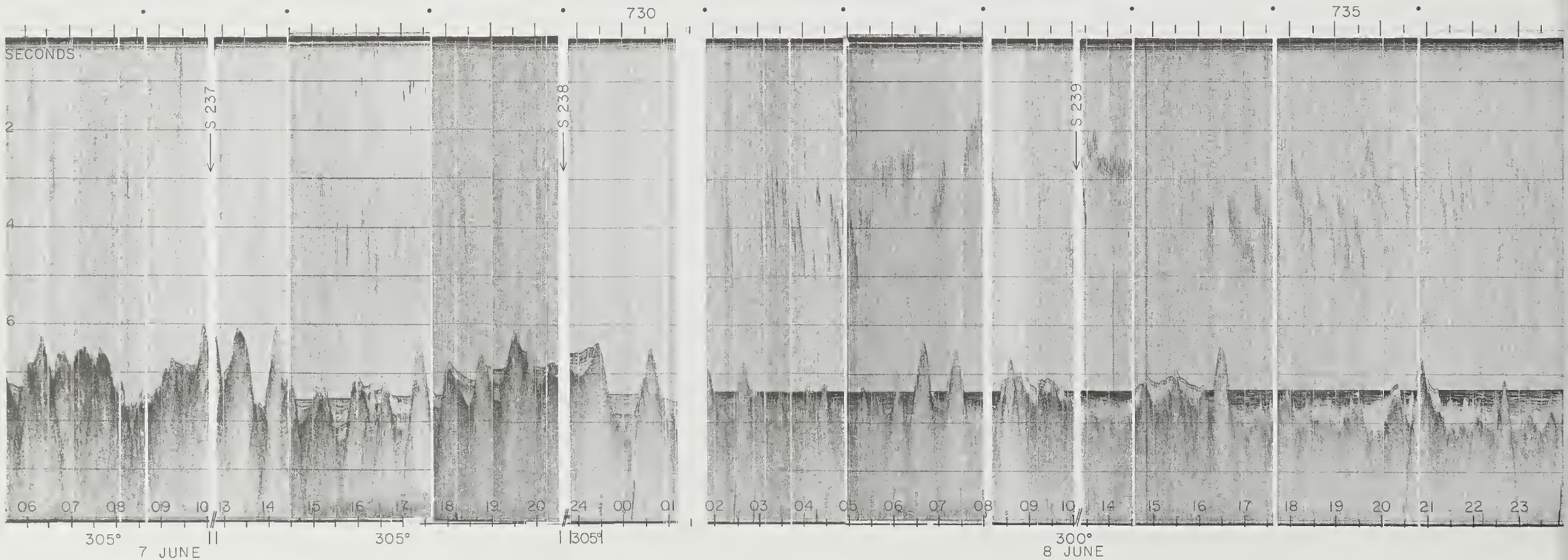

660
665
670
SECONDS
2
4
6
8
S 213
S 214
S 215
S 216
08 09 10 11 12 13 14 15 18 19 20 23 24 00 01
02 03 04 05 06 07 08 11 12 13 14 18 19 20 21 22 23 00
320°
345°
290°
325°
305°
305°
V 22
27 MAY
28 MAY

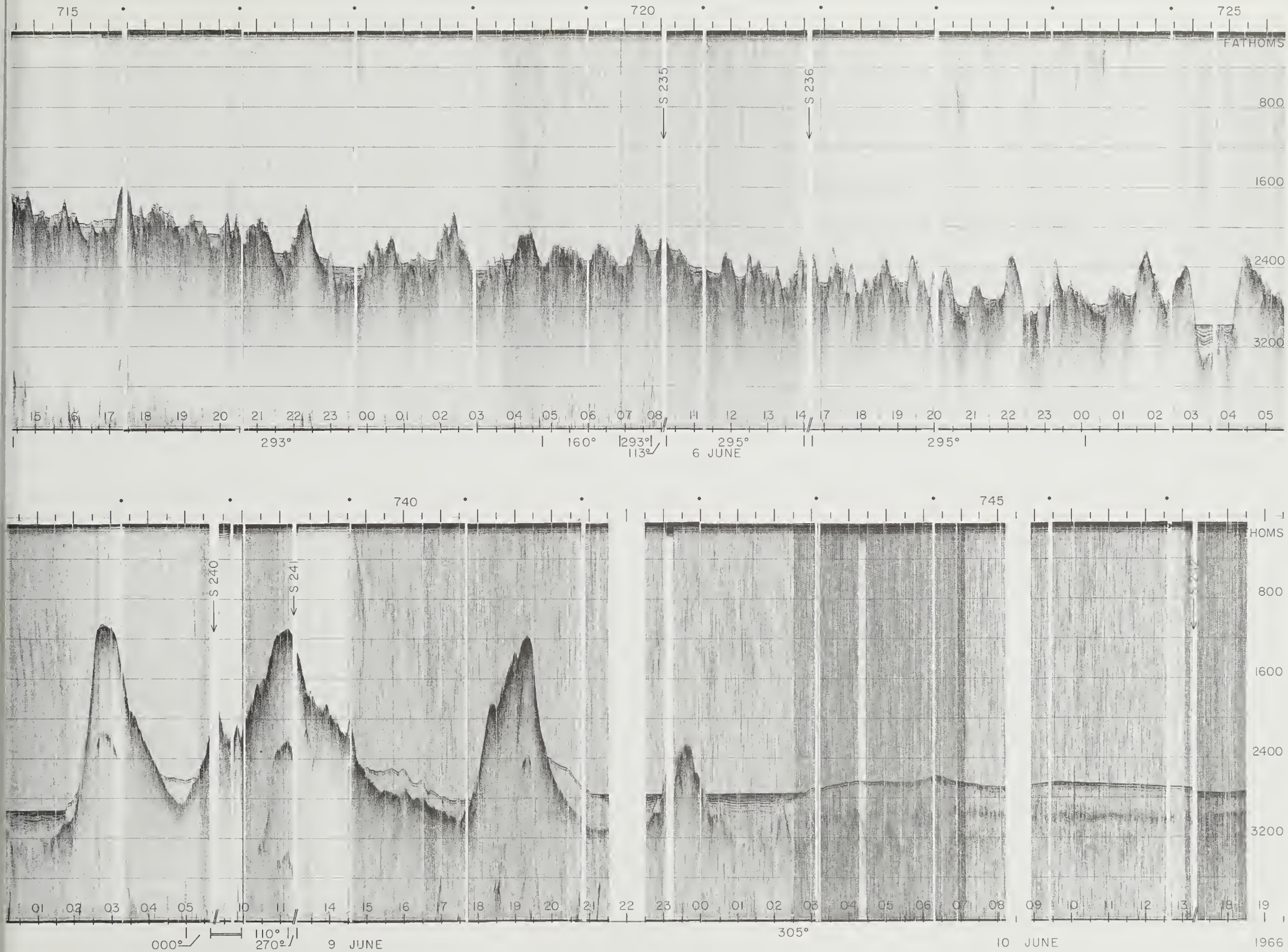

685
690
SECONDS
2
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6
S 220
S 221
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310°
31 MAY
1 JUNE

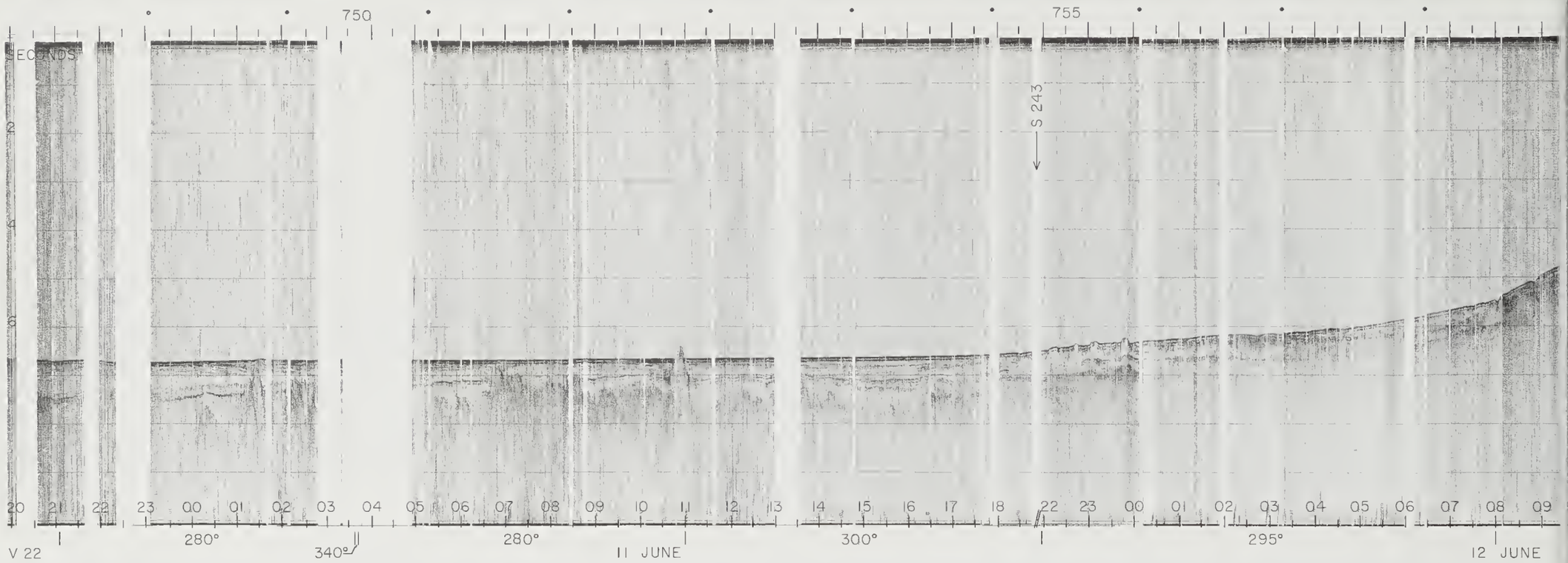

675
680
FATHOMS
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1600
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3200
S 217
S 218
S 219
02 03 04 05 06 07 08 12 13 14 15 16 17 18 22 23 00 01 02 03 04 05 06 07 11 12 13 14 15 16 17 18 19 20 21
310°
090°
29 MAY
310°
313°
133°
270°
30 MAY
313°

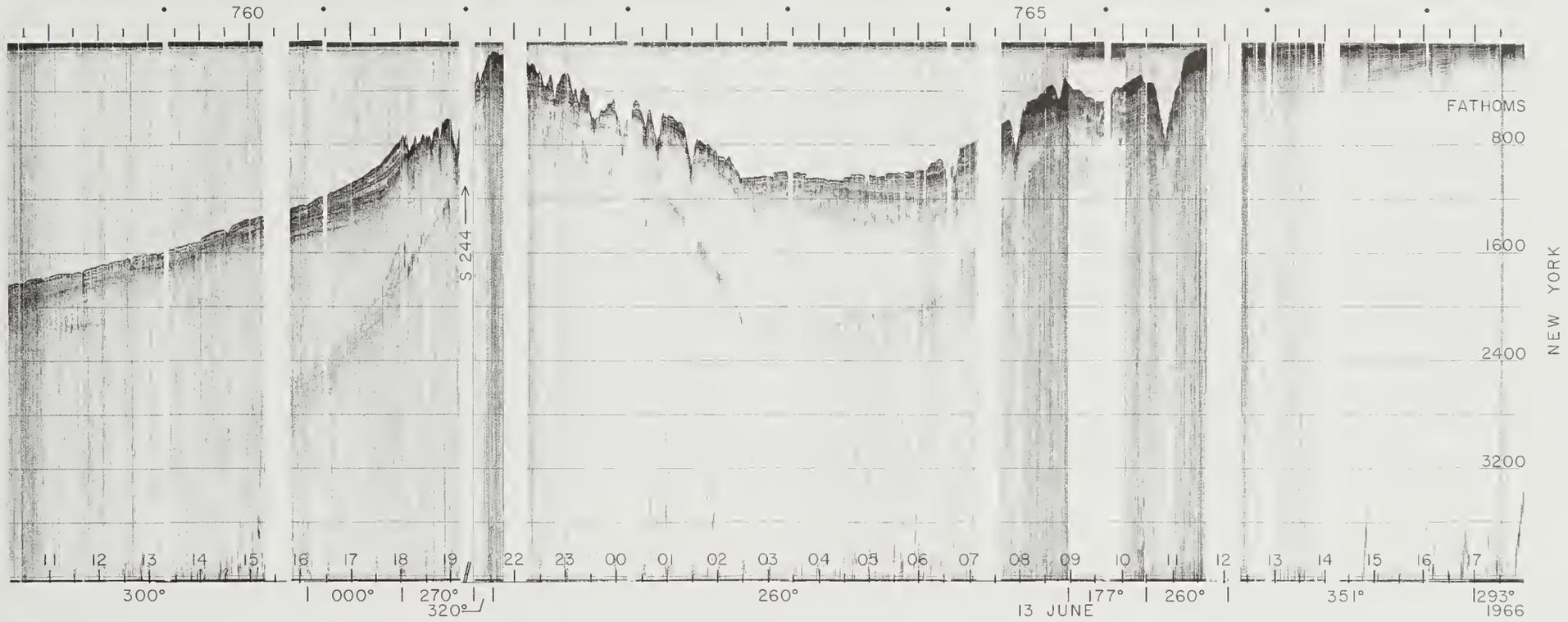

695
700
FATHOMS
800
3200
S 222
S 223
S 224
S 225
16 17 18 19 20 21 22 23 03 04 05 06 07 08 09 10 11 14 15 19 20 21 00 01 02 03 04 05 06 07 08 09
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090°
2 JUNE
300°
1966

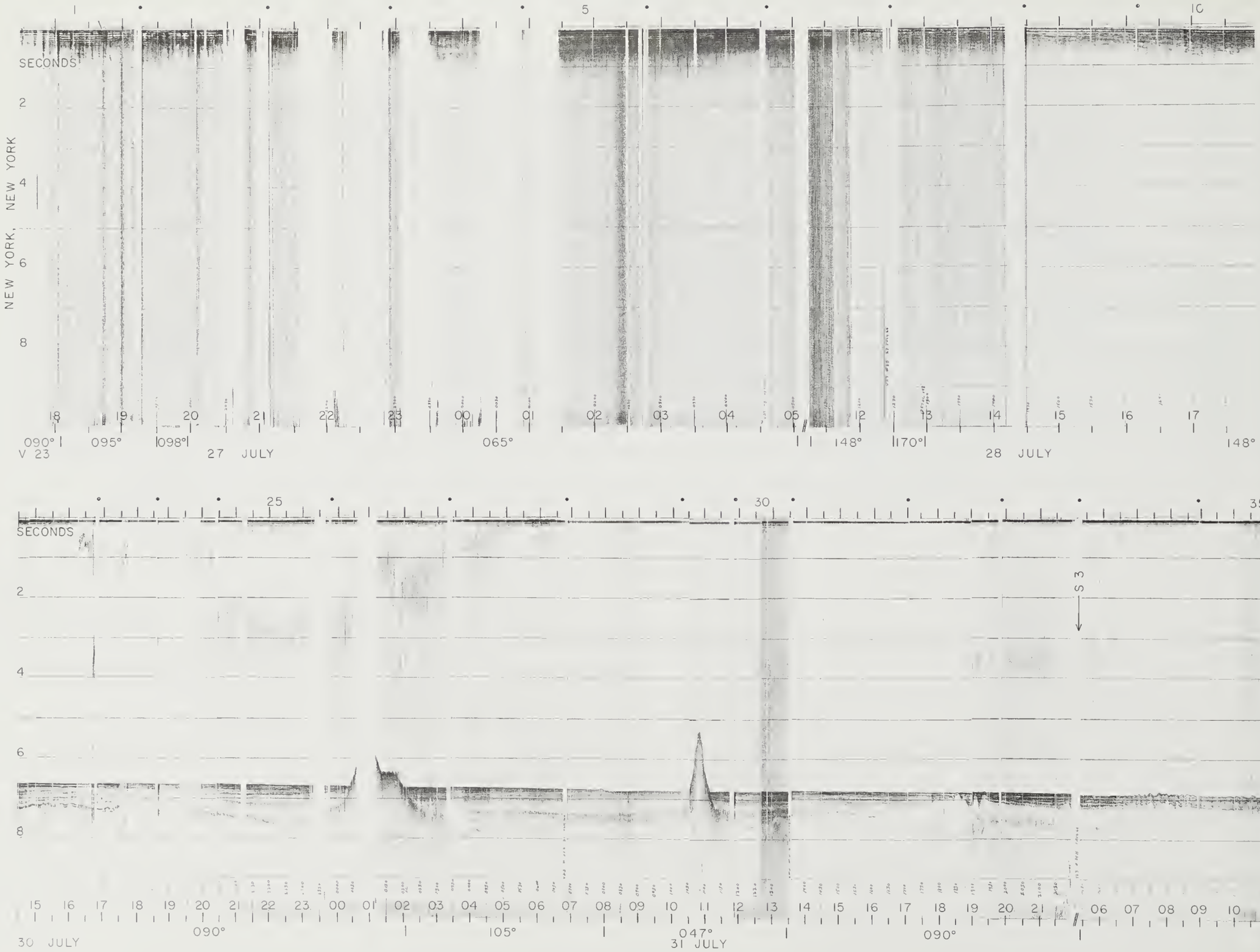

705
710
SECONDS
S 226
S 227
S 228
S 229
S 230
S 231
S 232
S 233
S 234
2
6
8
10 13 16 17 18 21 22 23 00 01 02 03 04 05 06 09 11 12 17 18 21 22 23 00 01 02 03 04 05 06 07 09 10 11 12
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V22 3 JUNE
4 JUNE
5 JUNE

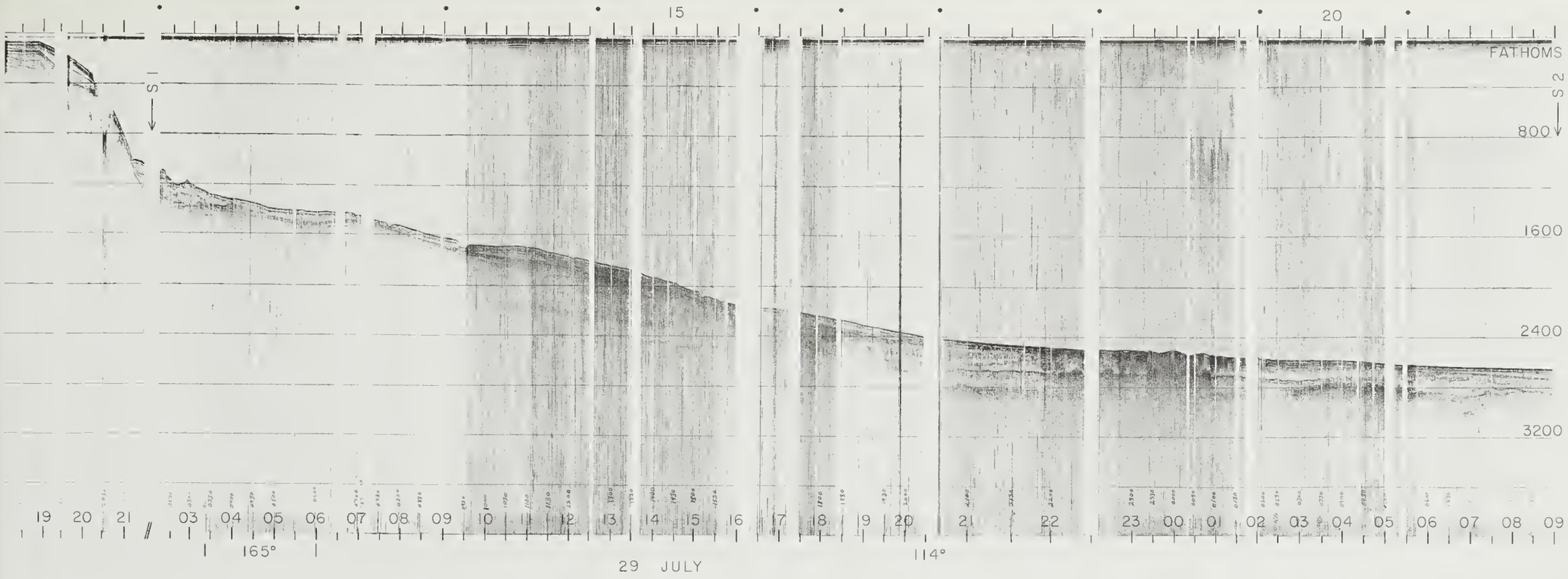

730
735
SECONDS
S 237
S 238
S 239
2
4
6
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305° 305° 305°
300°
7 JUNE
8 JUNE

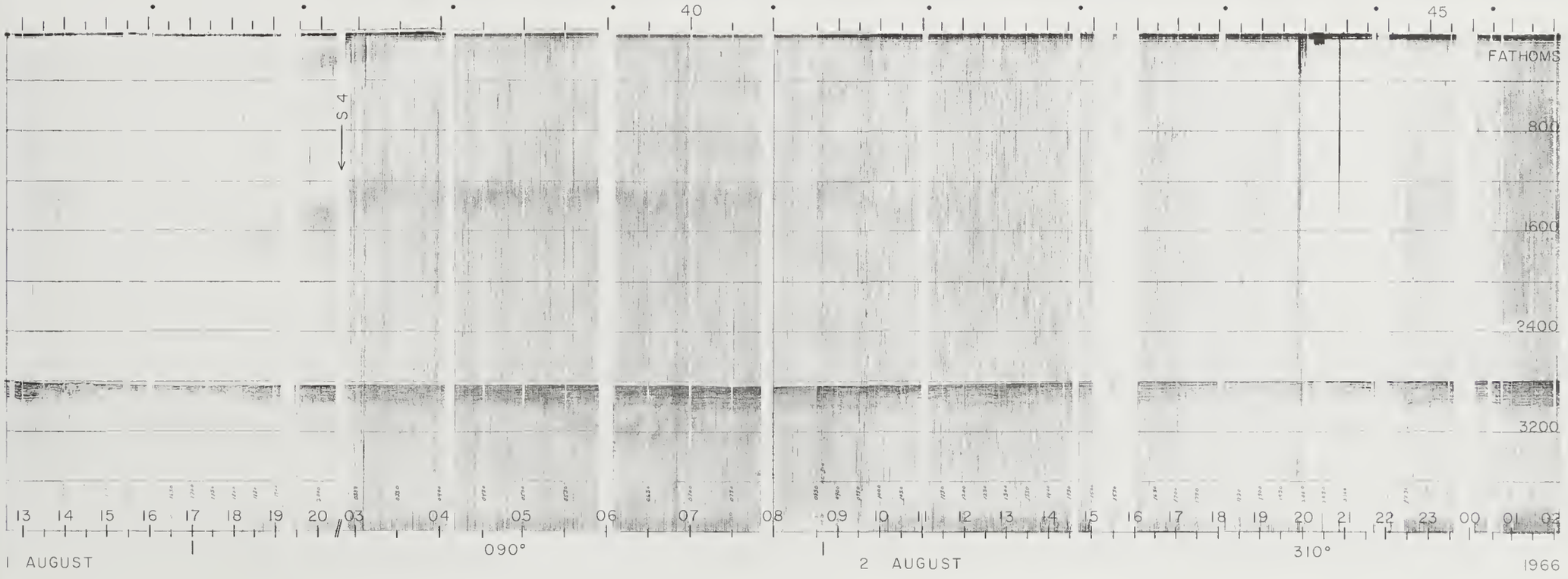

715
720
725
FATHOMS
S 235
S 236
800
1600
2400
3200
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 11 12 13 14 17 18 19 20 21 22 23 00 01 02 03 04 05
293°
160°
293°
113°
295°
6 JUNE
295°
740
745
HOMS
S 240
S 241
800
1600
2400
3200
01 02 03 04 05 10 11 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 18 19
000°
110°
270°
9 JUNE
305°
10 JUNE
1966

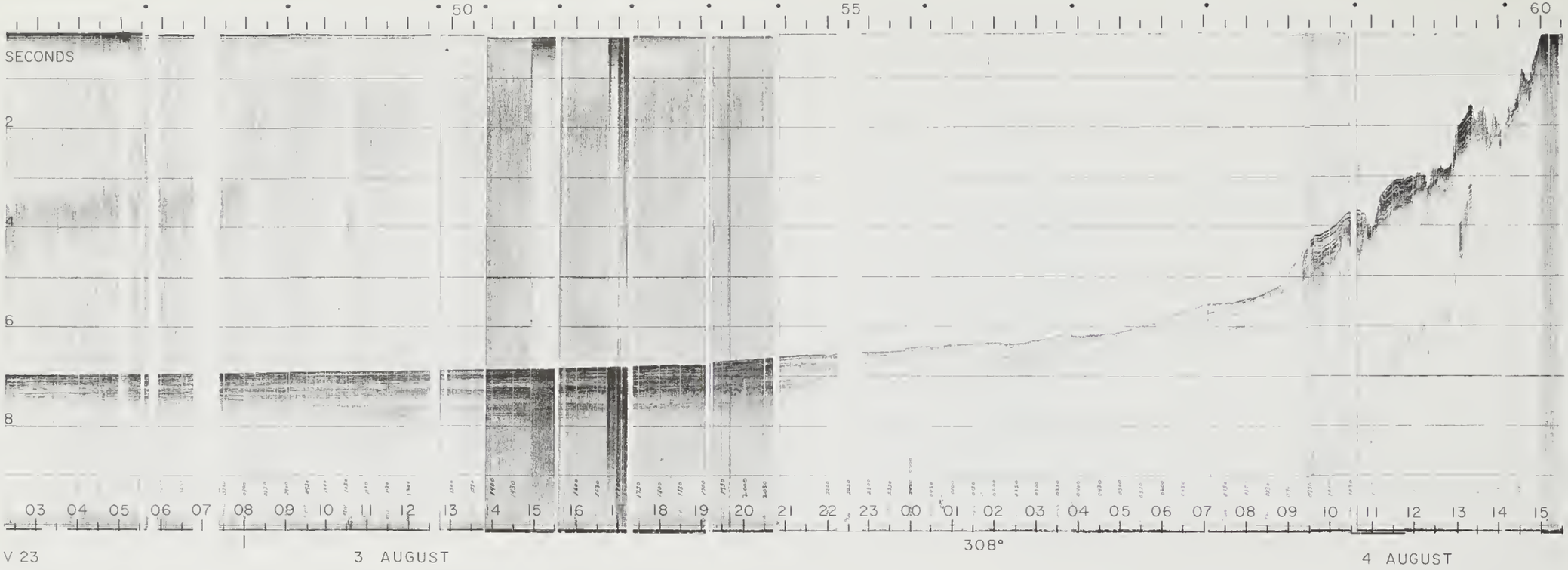

750
755
SECONDS
2
4
6
S 243
20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 22 23 00 01 02 03 04 05 06 07 08 09
V 22
280°
340°
280°
11 JUNE
300°
295°
12 JUNE

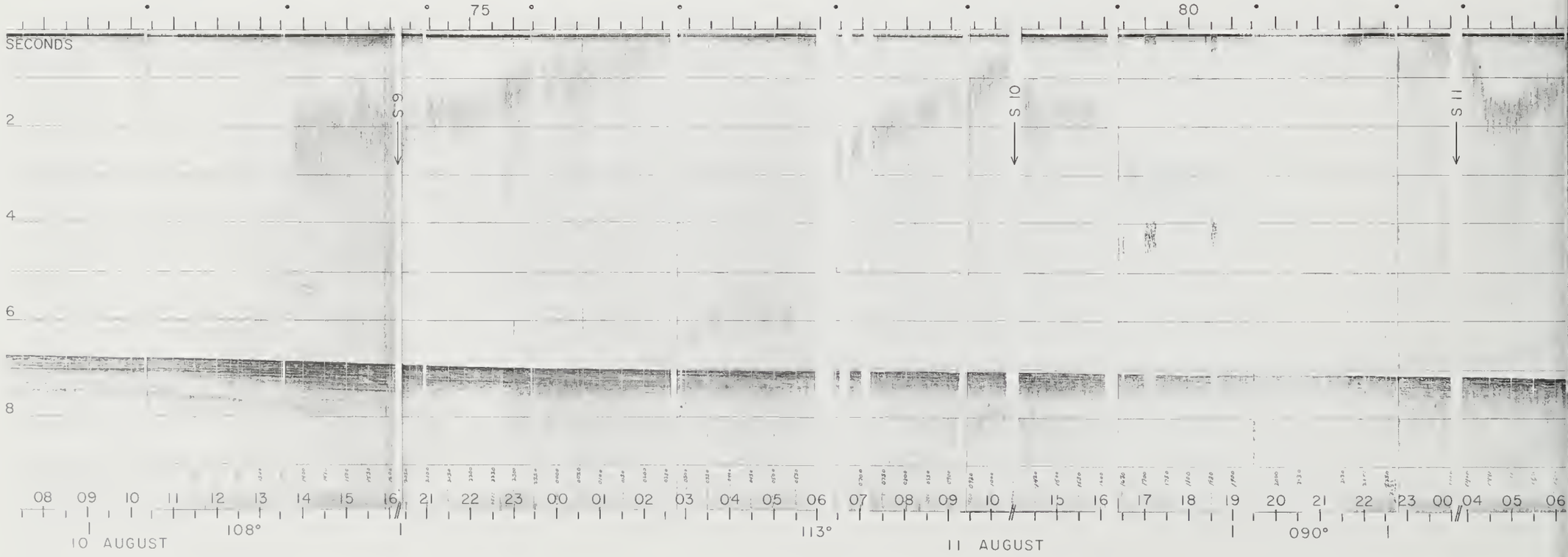

760
765
FATHOMS
800
1600
2400
3200
S 244
NEW YORK
11 12 13 14 15 16 17 18 19 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17
300° 000° 270° 320° 260° 177° 260° 351° 293°
13 JUNE 1966

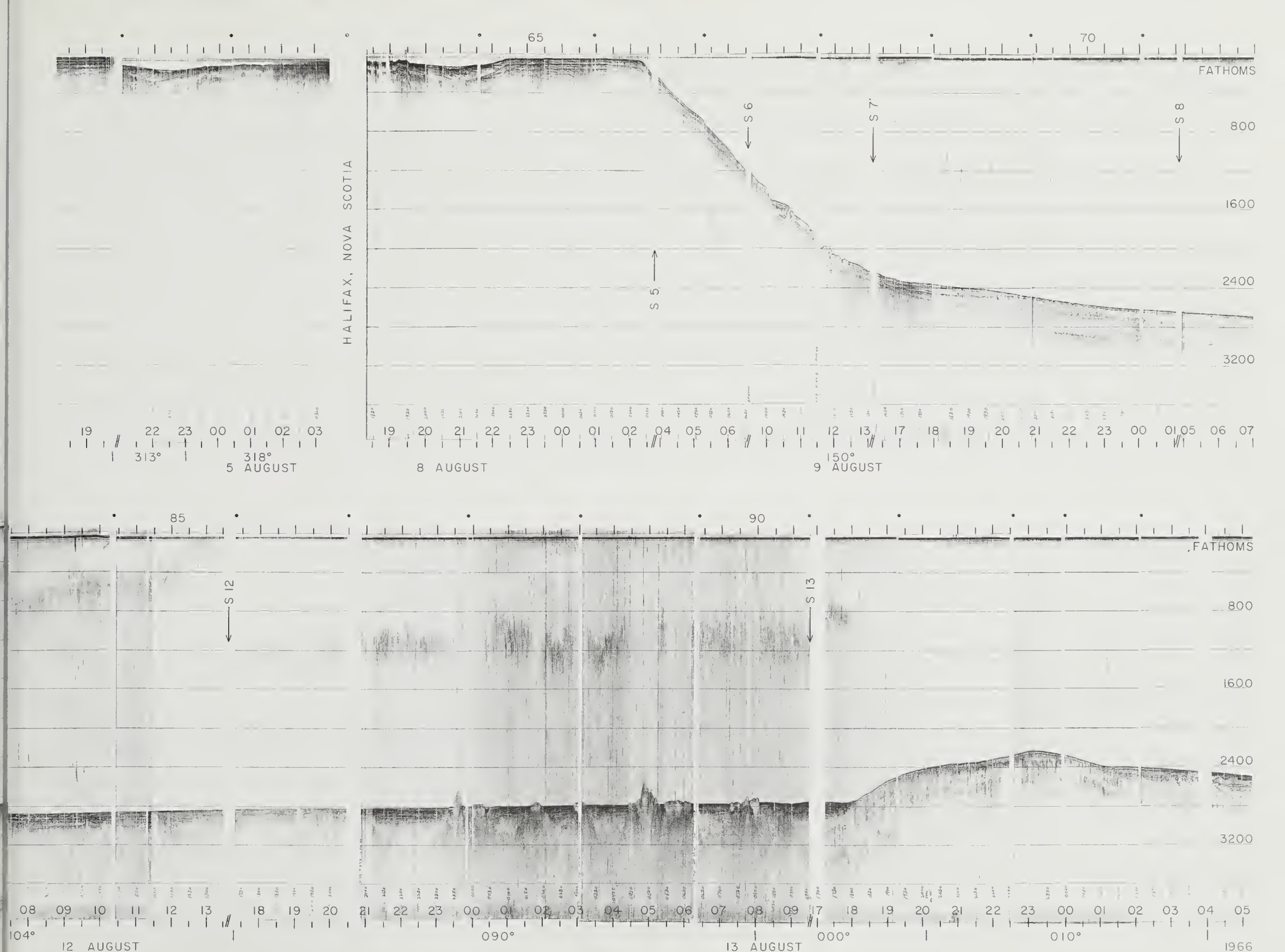

SECONDS
NEW YORK, NEW YORK
2
4
6
8
18 19 20 21 22 23 00 01 02 03 04 05 12 13 14 15 16 17
090° 095° 098° 065° 148° 170° 148°
V 23
27 JULY
28 JULY
SECONDS
S
2
4
6
8
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 06 07 08 09 10 11 12
090° 105° 047° 090° 105°
30 JULY
31 JULY

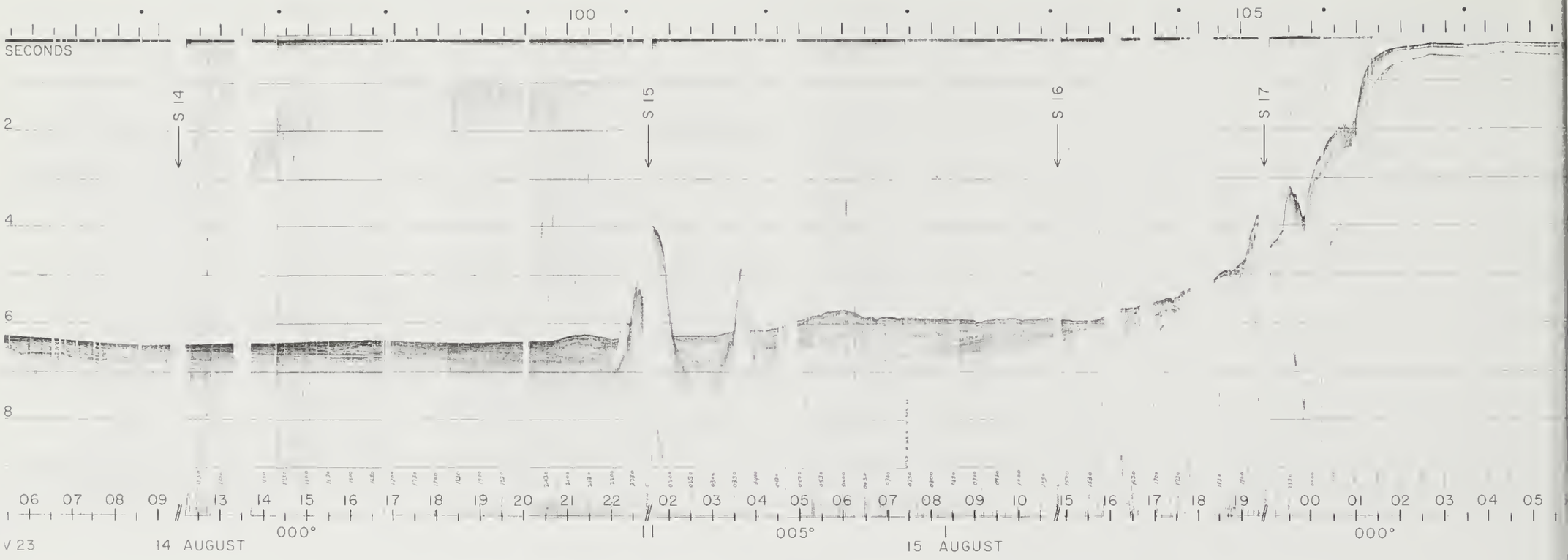

15
20
FATHOMS
S 2
800
1600
2400
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19 20 21 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
165°
29 JULY
114°

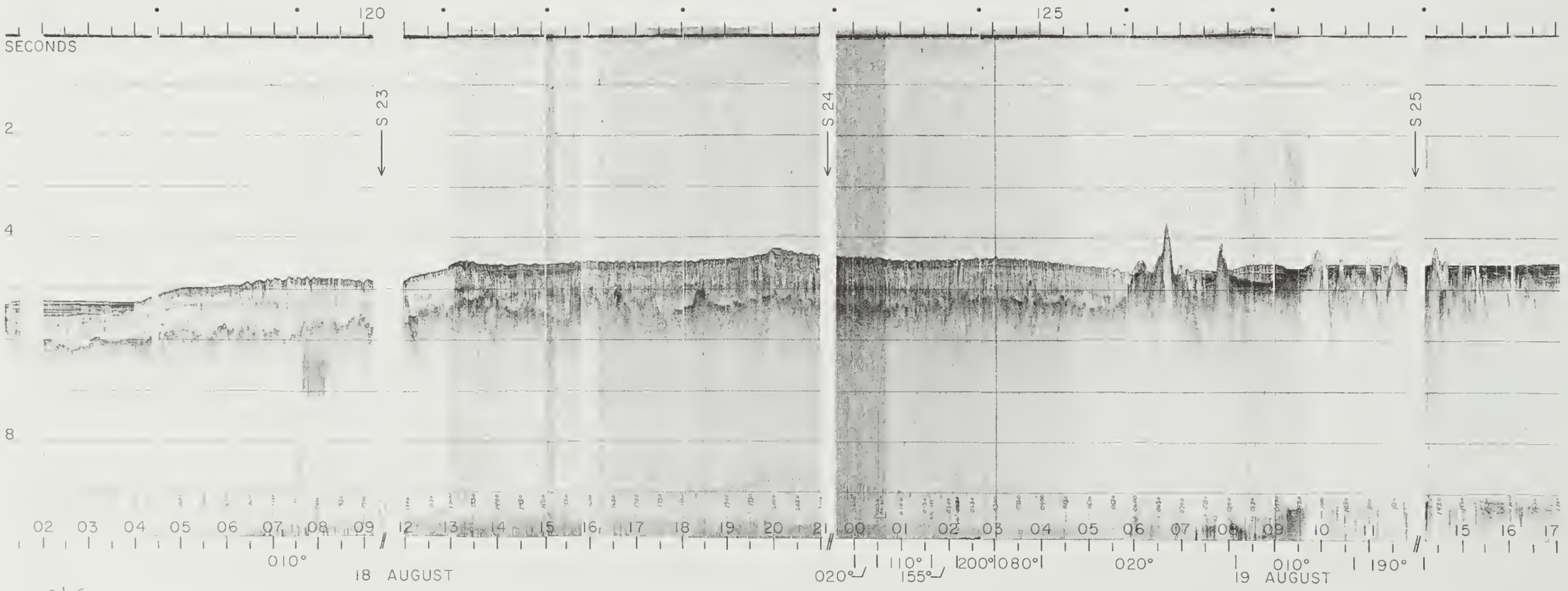

40
45
FATHOMS
S 4
800
1600
2400
3200
13 14 15 16 17 18 19 20 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02
090°
310°
1 AUGUST
2 AUGUST
1966

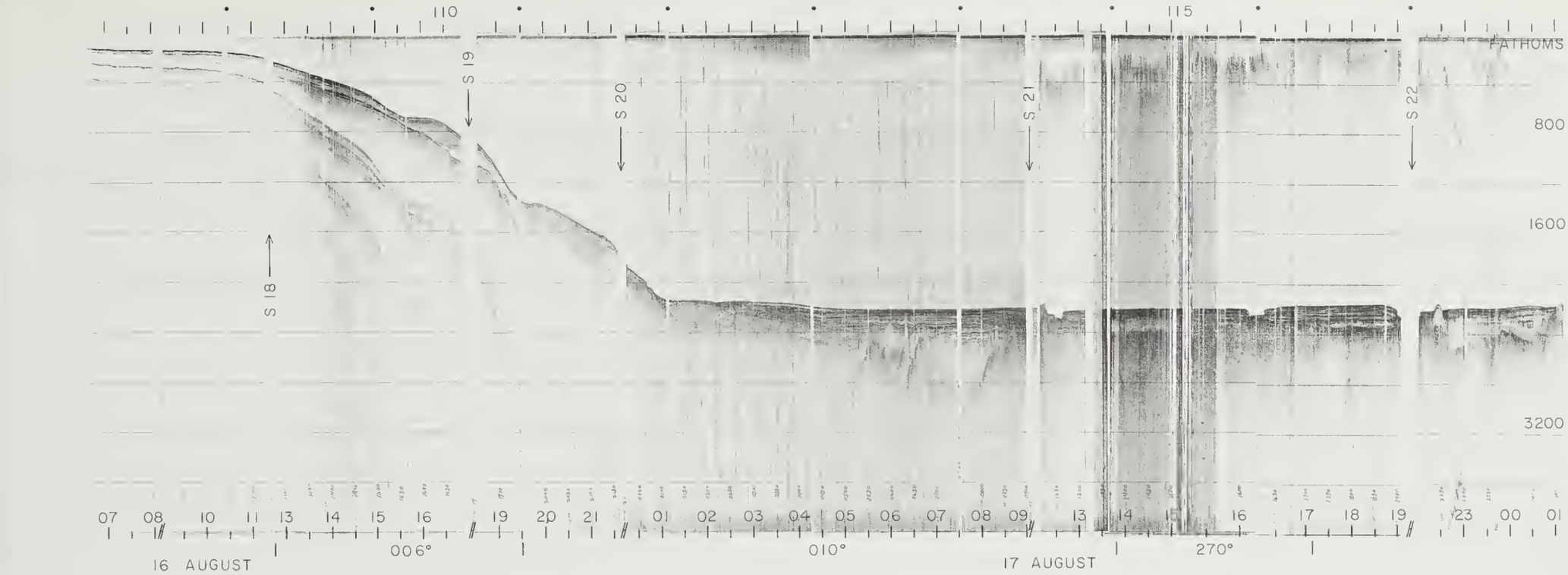

50
55
60
SECONDS
2
4
6
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3 AUGUST
308°
4 AUGUST

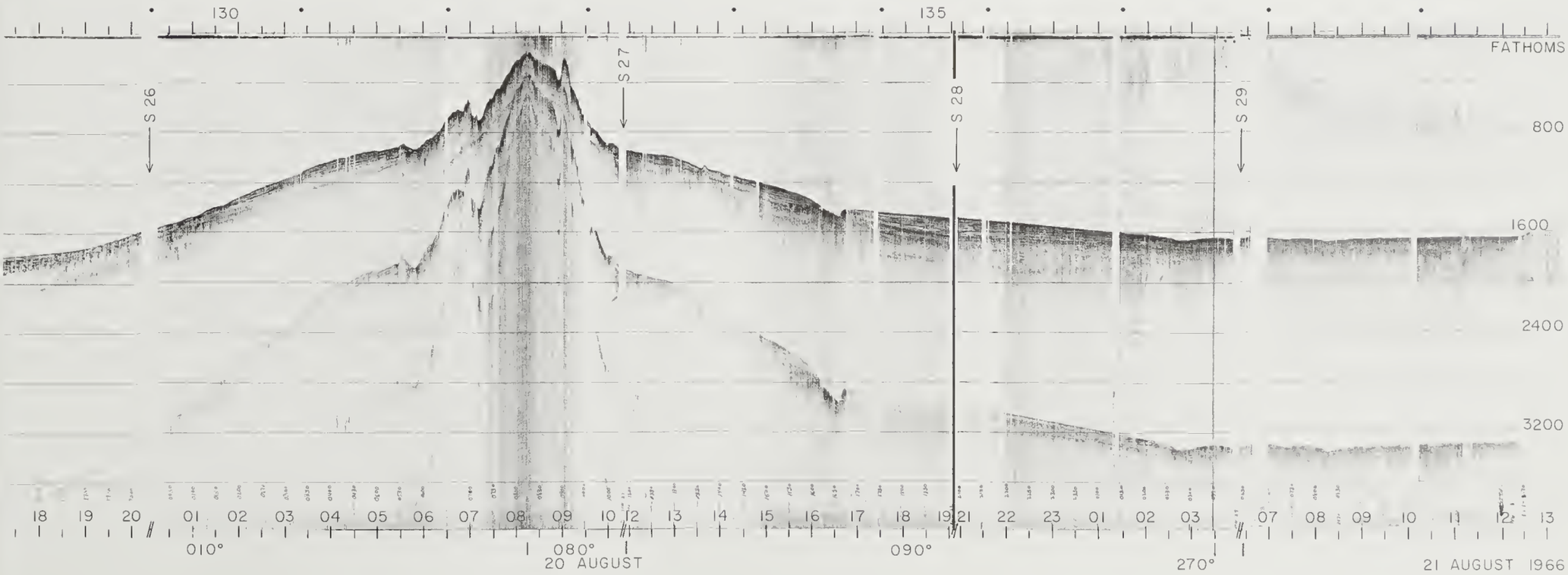

75
80
SECONDS
2
4
6
8
S 9
S 10
S 11
08 09 10 11 12 13 14 15 16 21 22 23 00 01 02 03 04 05 06 07 08 09 10 15 16 17 18 19 20 21 22 23 00 04 05 06
10 AUGUST
108°
113°
11 AUGUST
090°

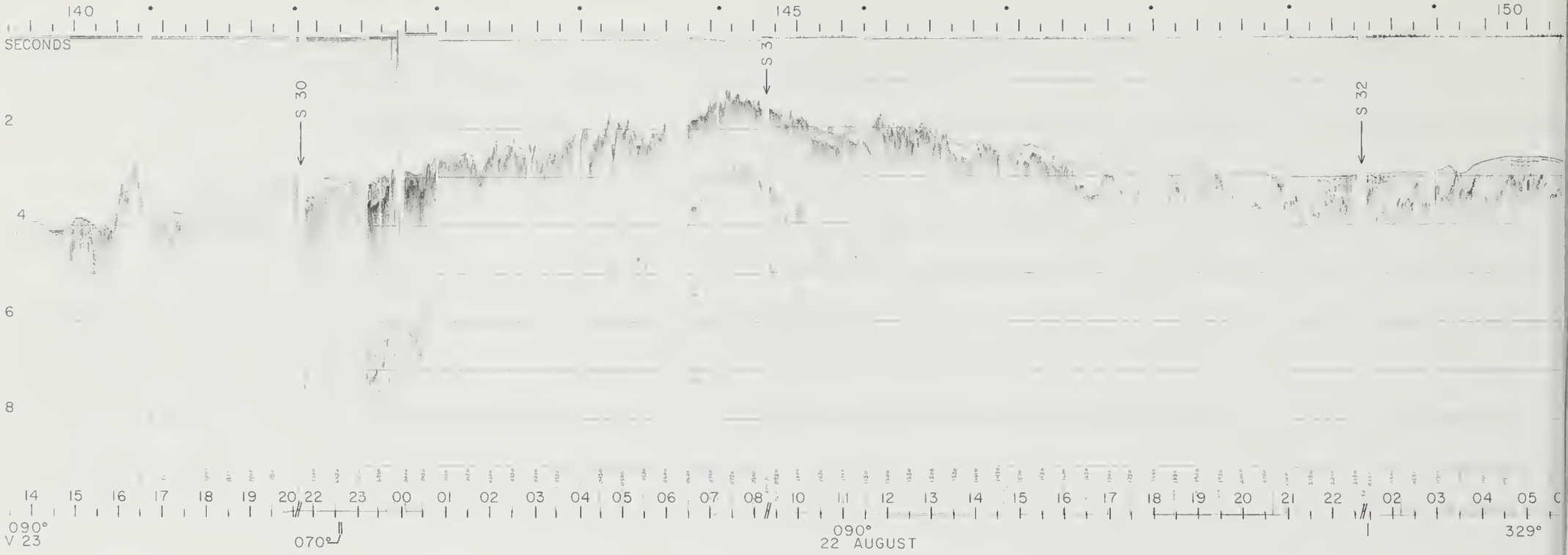

65
70
FATHOMS
800
1600
2400
3200
S 5
S 6
S 7
S 8
HALIFAX, NOVA SCOTIA
19 22 23 00 01 02 03
313°
318°
5 AUGUST
19 20 21 22 23 00 01 02 04 05 06 10 11 12 13 17 18 19 20 21 22 23 00 01 05 06 07
8 AUGUST
150°
9 AUGUST
85
90
FATHOMS
800
1600
2400
3200
S 12
S 13
08 09 10 11 12 13 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 17 18 19 20 21 22 23 00 01 02 03 04 05
104°
12 AUGUST
090°
13 AUGUST
000°
010°
1966

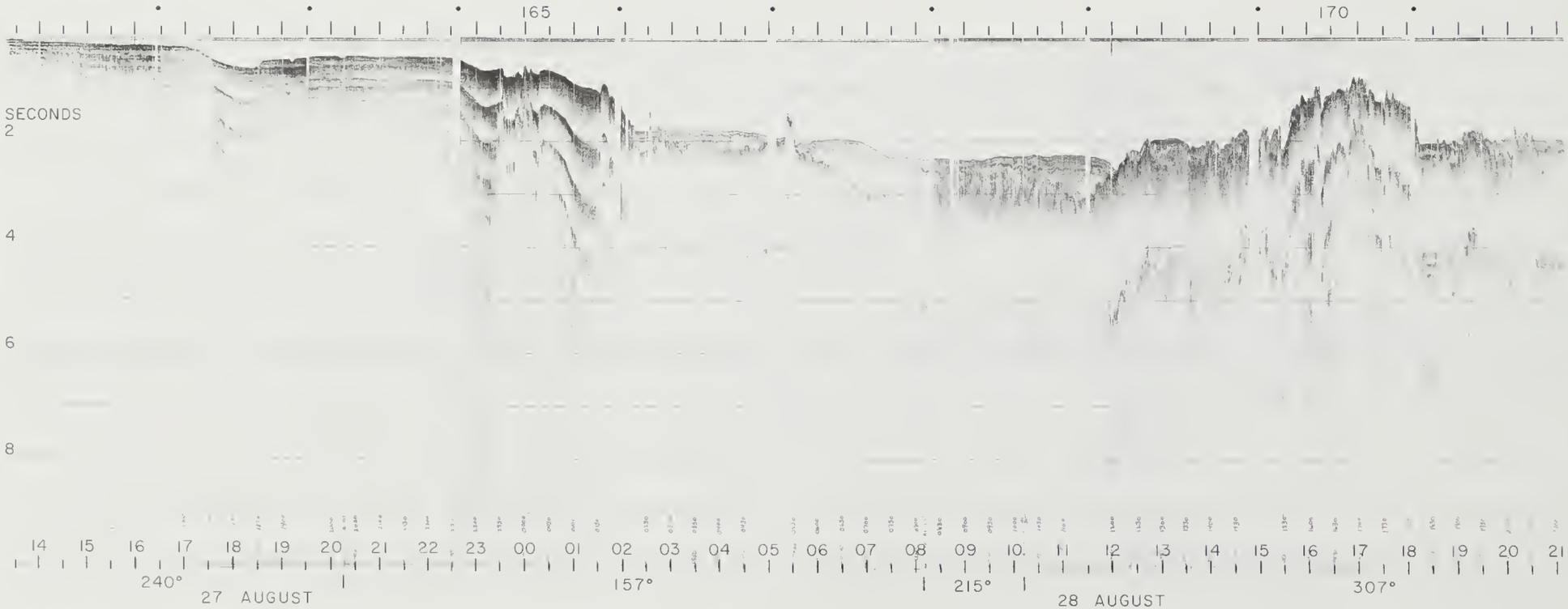

100
105
SECONDS
2
4
6
8
S 14
S 15
S 16
S 17
06 07 08 09 13 14 15 16 17 18 19 20 21 22 02 03 04 05 06 07 08 09 10 15 16 17 18 19 00 01 02 03 04 05
000°
005°
000°
V 23
14 AUGUST
15 AUGUST

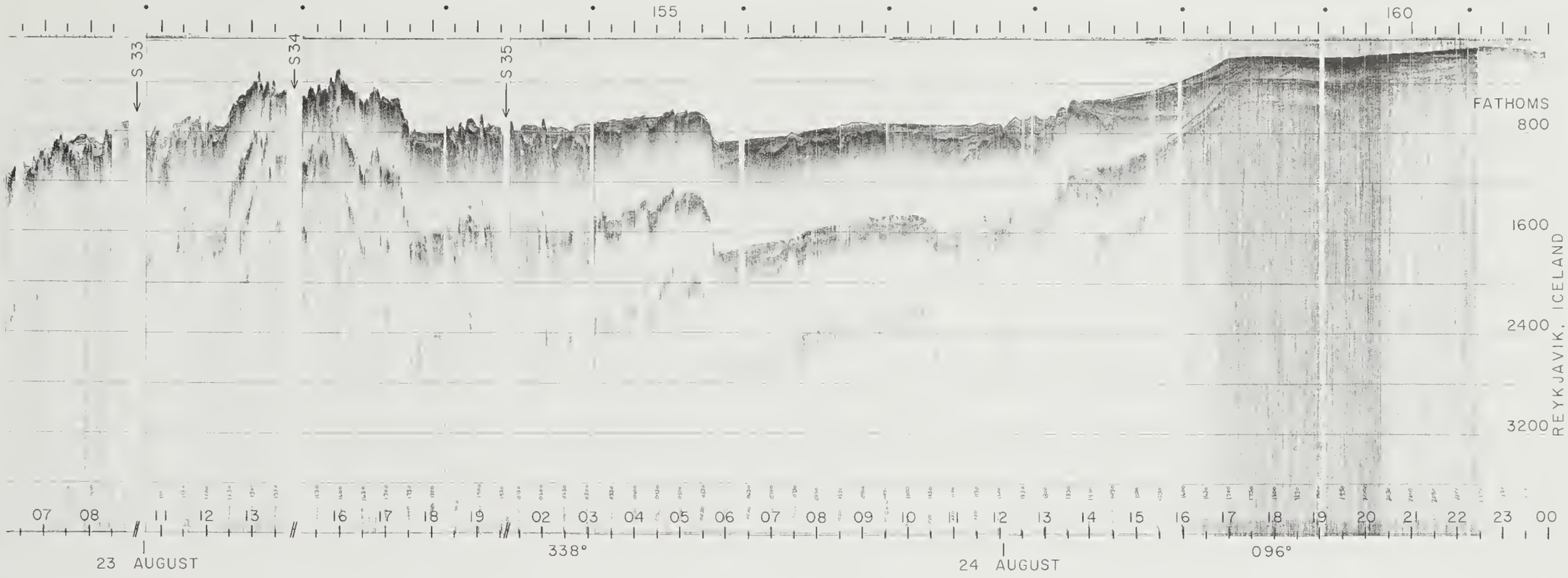

120
125
SECONDS
2
4
8
S 23
S 24
S 25
02 03 04 05 06 07 08 09 12 13 14 15 16 17 18 19 20 21 00 01 02 03 04 05 06 07 08 09 10 11 15 16 17
010°
020°
110°
155°
200°
080°
020°
010°
190°
18 AUGUST
19 AUGUST

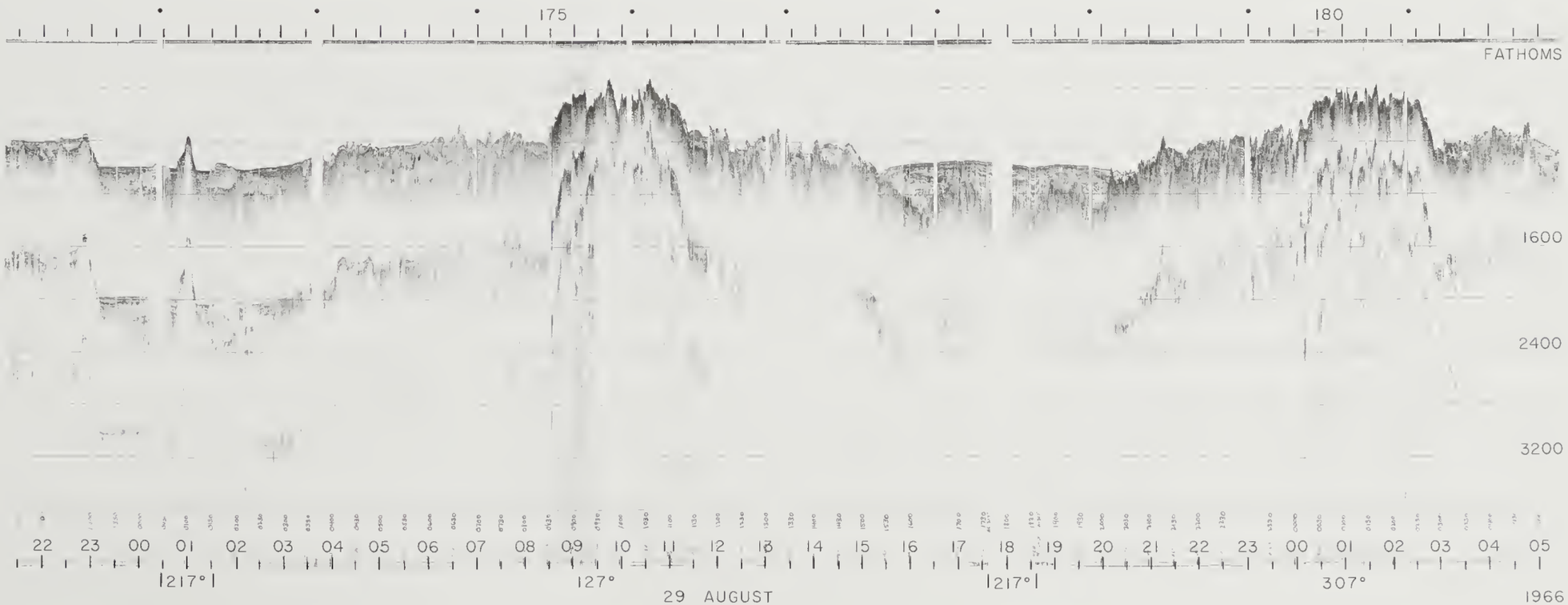

110
115
FATHOMS
800
1600
3200
S 18
S 19
S 20
S 21
S 22
07 08 10 11 13 14 15 16 19 20 21 01 02 03 04 05 06 07 08 09 13 14 15 16 17 18 19 23 00 01
006°
010°
270°
16 AUGUST
17 AUGUST

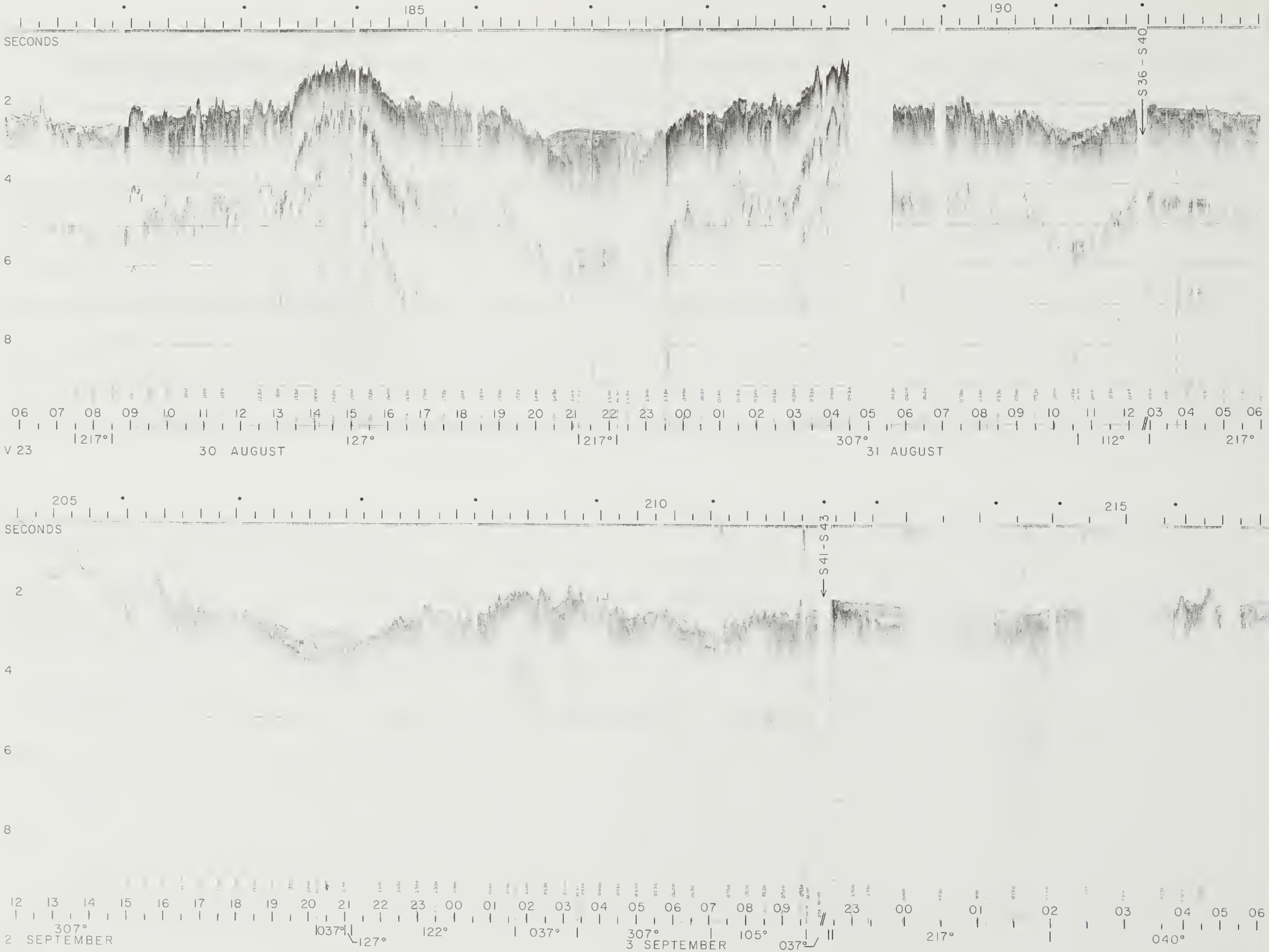

130
135
FATHOMS
800
1600
2400
3200
S 26
S 27
S 28
S 29
18 19 20 01 02 03 04 05 06 07 08 09 10 12 13 14 15 16 17 18 19 21 22 23 01 02 03 07 08 09 10 11 12 13
010°
080°
090°
270°
20 AUGUST
21 AUGUST 1966

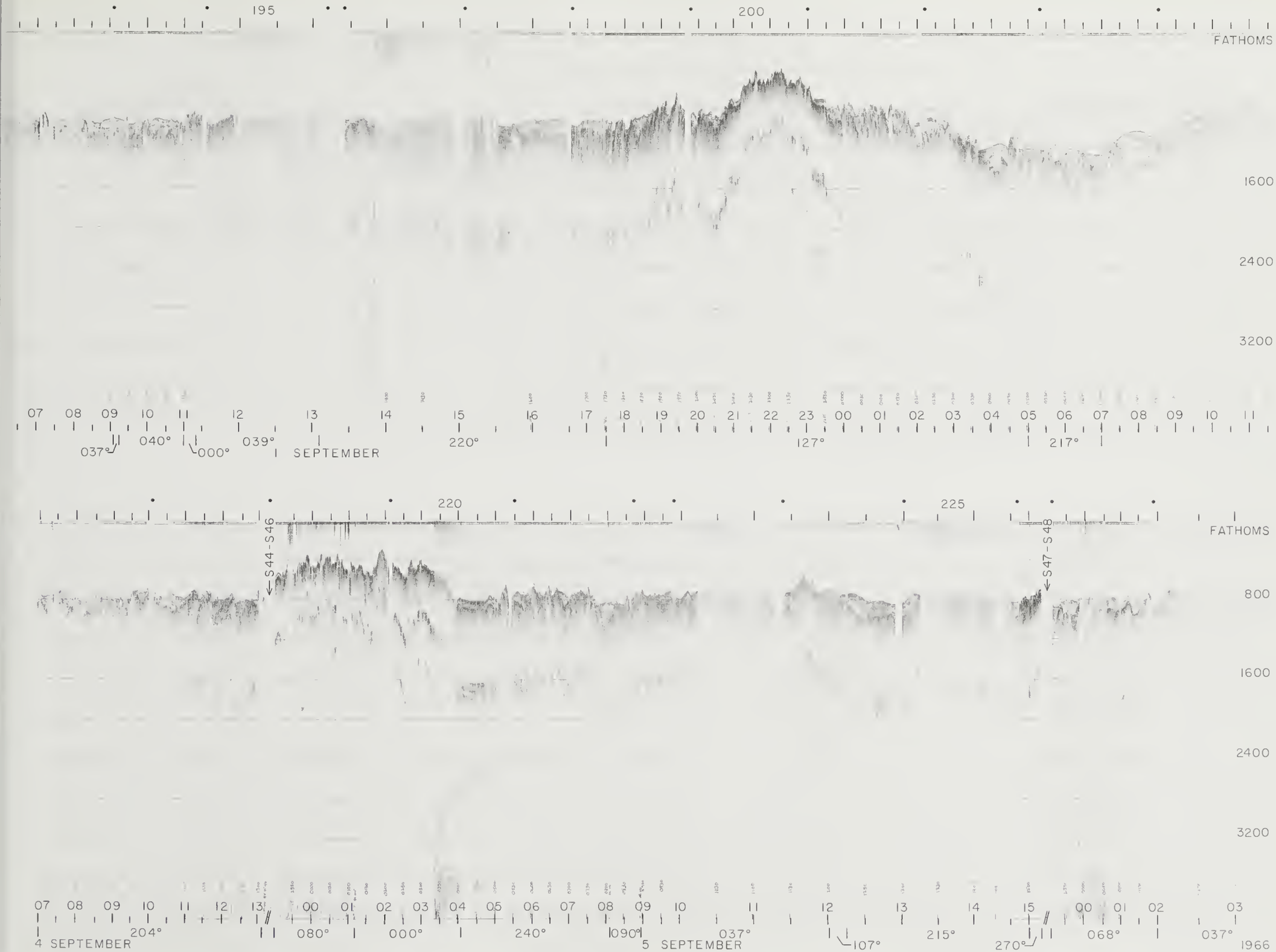

140
145
150
SECONDS
2
4
6
8
S 30
S 31
S 32
14 15 16 17 18 19 20 22 23 00 01 02 03 04 05 06 07 08 10 11 12 13 14 15 16 17 18 19 20 21 22 02 03 04 05
090°
V 23
070°
090°
22 AUGUST
329°

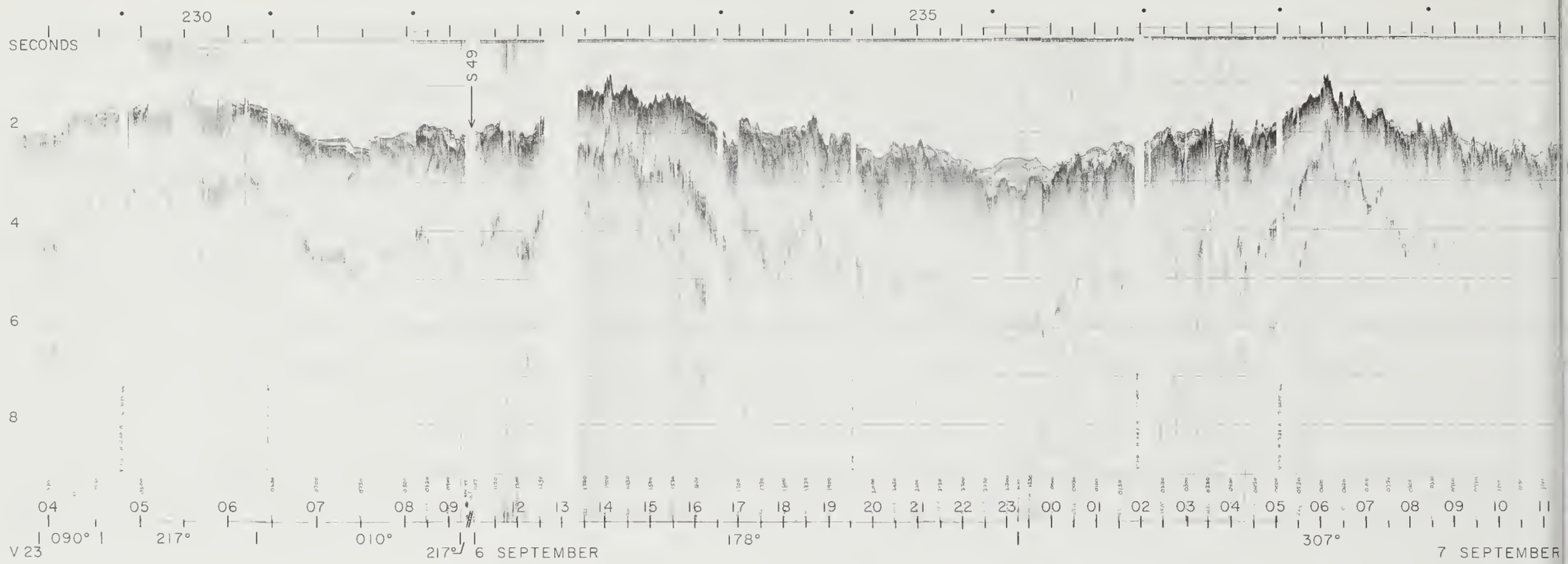

165
170
SECONDS
2
4
6
8
14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21
240°
27 AUGUST
157°
215°
28 AUGUST
307°

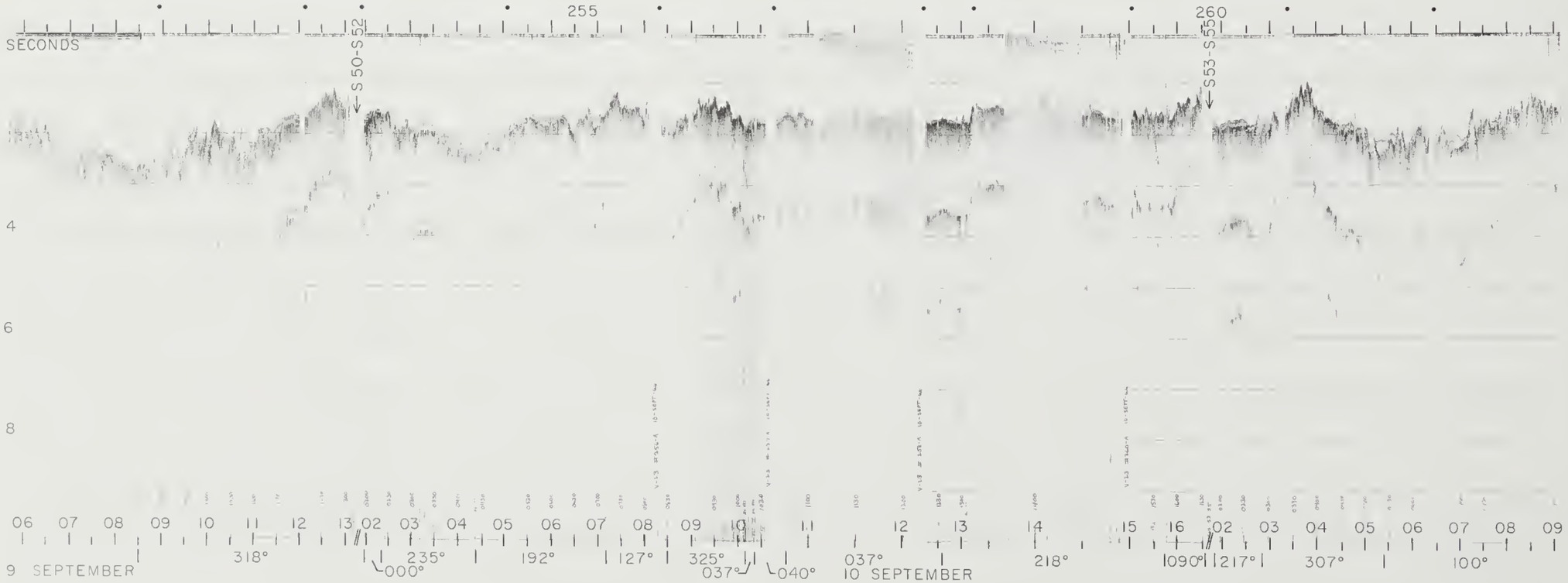

155
160
S 33
S 34
S 35
FATHOMS
800
1600
2400
3200
REYKJAVIK, ICELAND
07 08 11 12 13 16 17 18 19 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00
23 AUGUST
338°
24 AUGUST
096°

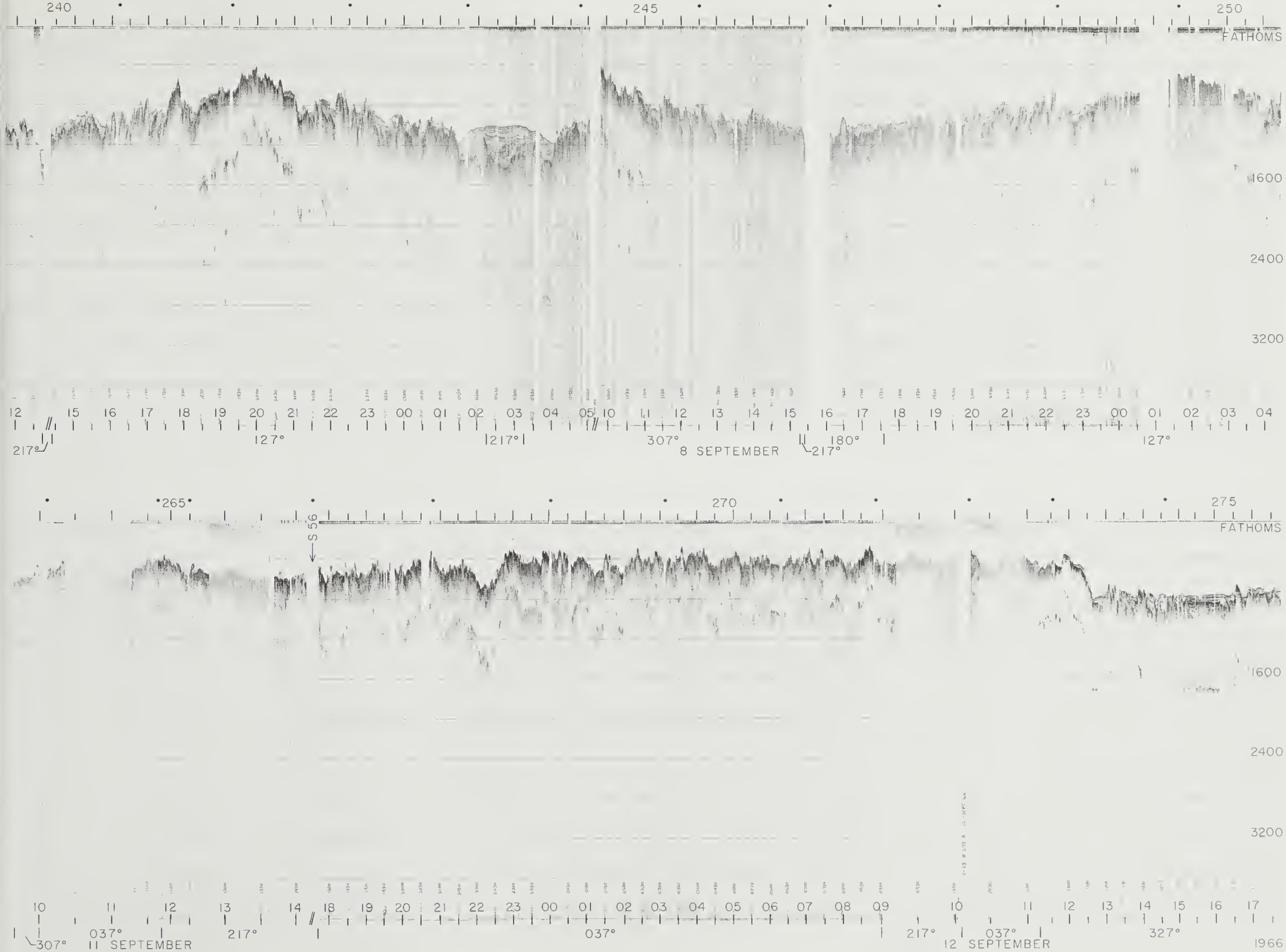

175
180
FATHOMS
1600
2400
3200
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05
217°
127°
29 AUGUST
217°
307°
1966

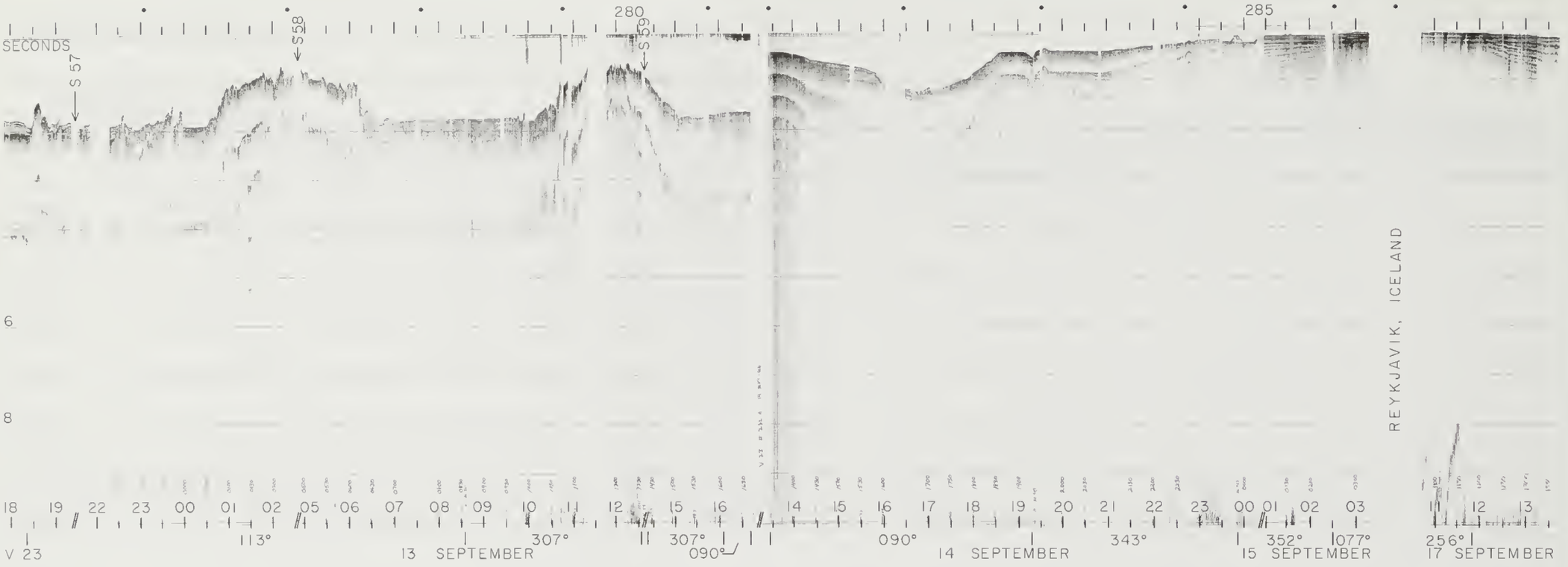

185
190
SECONDS
2
4
6
8
S 36 - S 40
06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 03 04 05 06
217°
127°
217°
307°
112°
217°
V 23
30 AUGUST
31 AUGUST
205
210
215
SECONDS
2
4
6
8
S 41 - S 43
12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 23 00 01 02 03 04 05 06
307°
103°
127°
122°
037°
307°
105°
037°
217°
040°
2 SEPTEMBER
3 SEPTEMBER

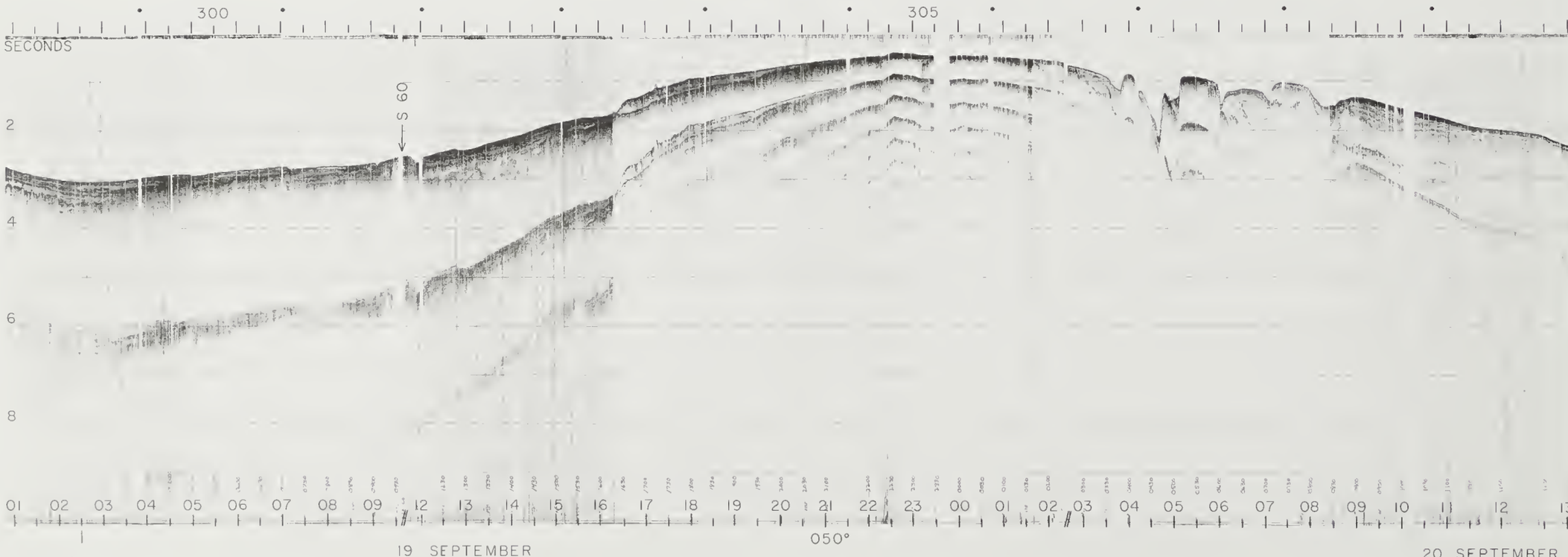

195
200
FATHOMS
1600
2400
3200
07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11
037°
040°
000°
039°
1 SEPTEMBER
220°
127°
217°
220
225
FATHOMS
S44-S46
S47-S48
800
1600
2400
3200
07 08 09 10 11 12 13 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 00 01 02 03
204°
4 SEPTEMBER
080°
000°
240°
090°
037°
5 SEPTEMBER
107°
215°
270°
068°
037°
1966

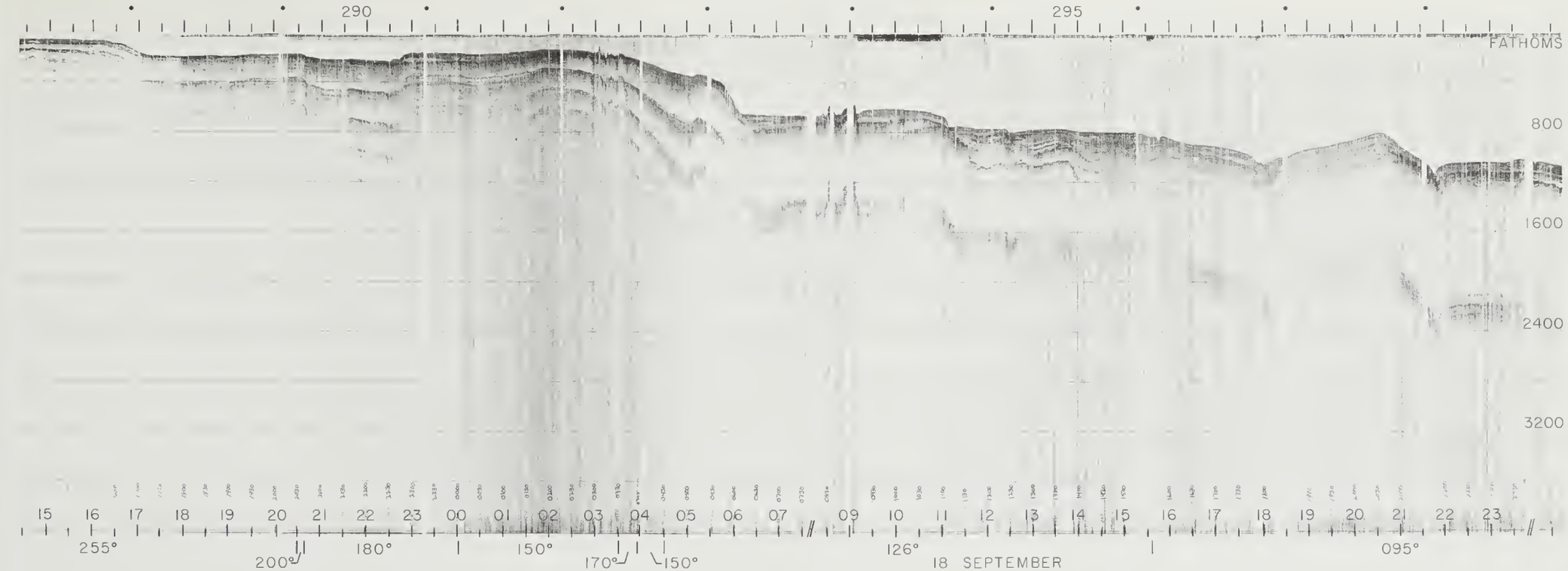

230
235
SECONDS
S 49
2
4
6
8
04 05 06 07 08 09 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11
090° 217° 010° 217° 178° 307°
V 23
6 SEPTEMBER
7 SEPTEMBER

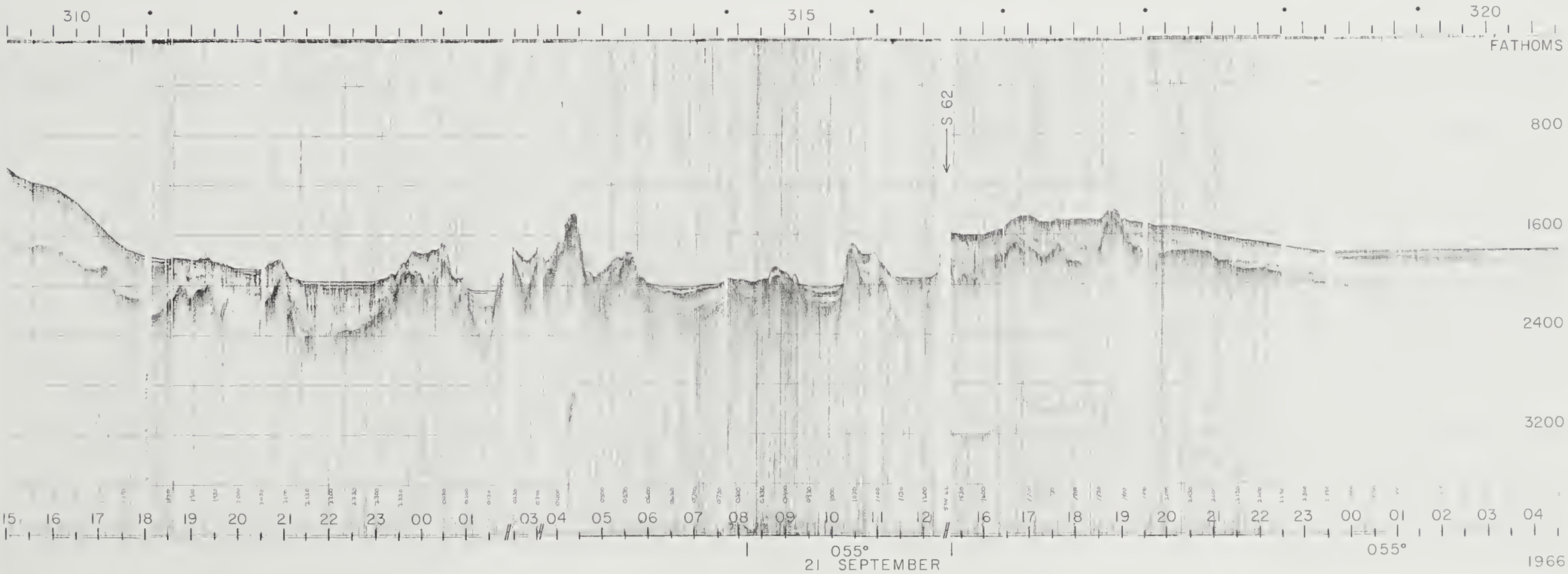

255
260
SECONDS
S 50-S 52
S 53-S 55
4
6
8
06 07 08 09 10 11 12 13 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 02 03 04 05 06 07 08 09
318° 235° 192° 127° 325° 037° 218° 090° 217° 307° 100°
000° 040°
9 SEPTEMBER
10 SEPTEMBER

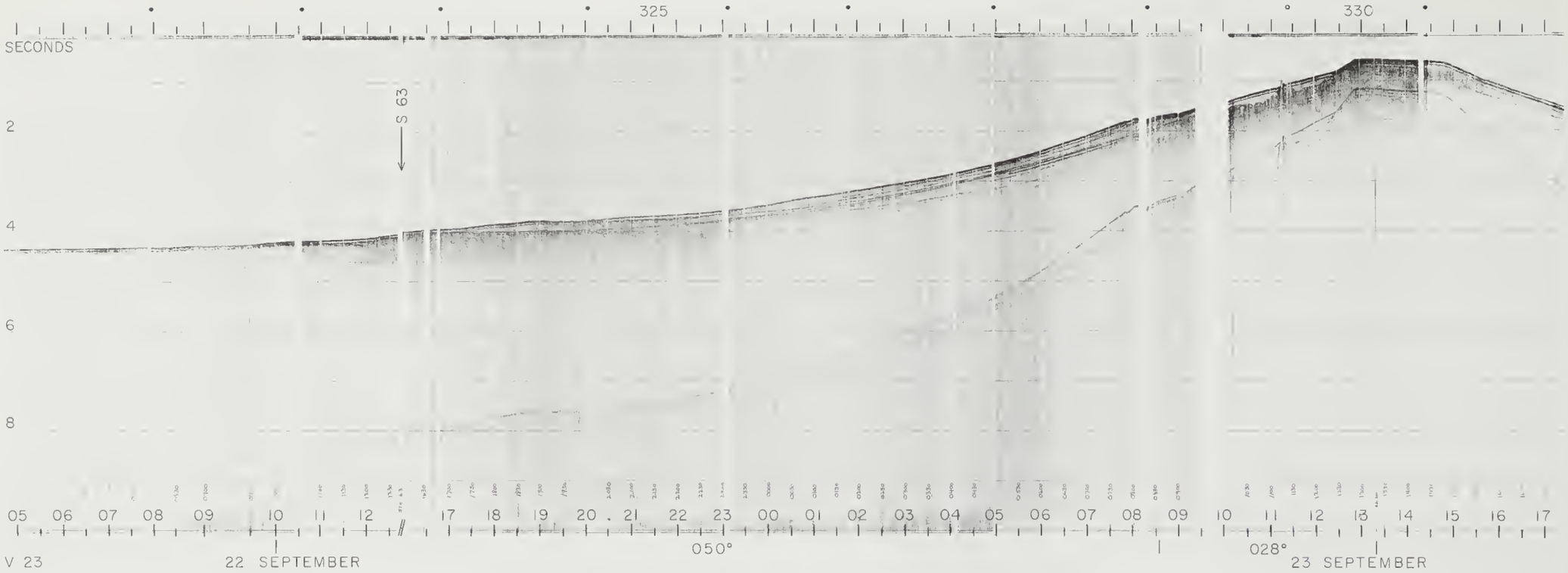

240
245
250
FATHOMS
1600
2400
3200
12 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
217°
127°
217°
307°
8 SEPTEMBER
180°
217°
127°
265
270
275
FATHOMS
S 56
1600
2400
3200
10 11 12 13 14 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17
307°
037°
11 SEPTEMBER
217°
037°
217°
037°
12 SEPTEMBER
327°
1966

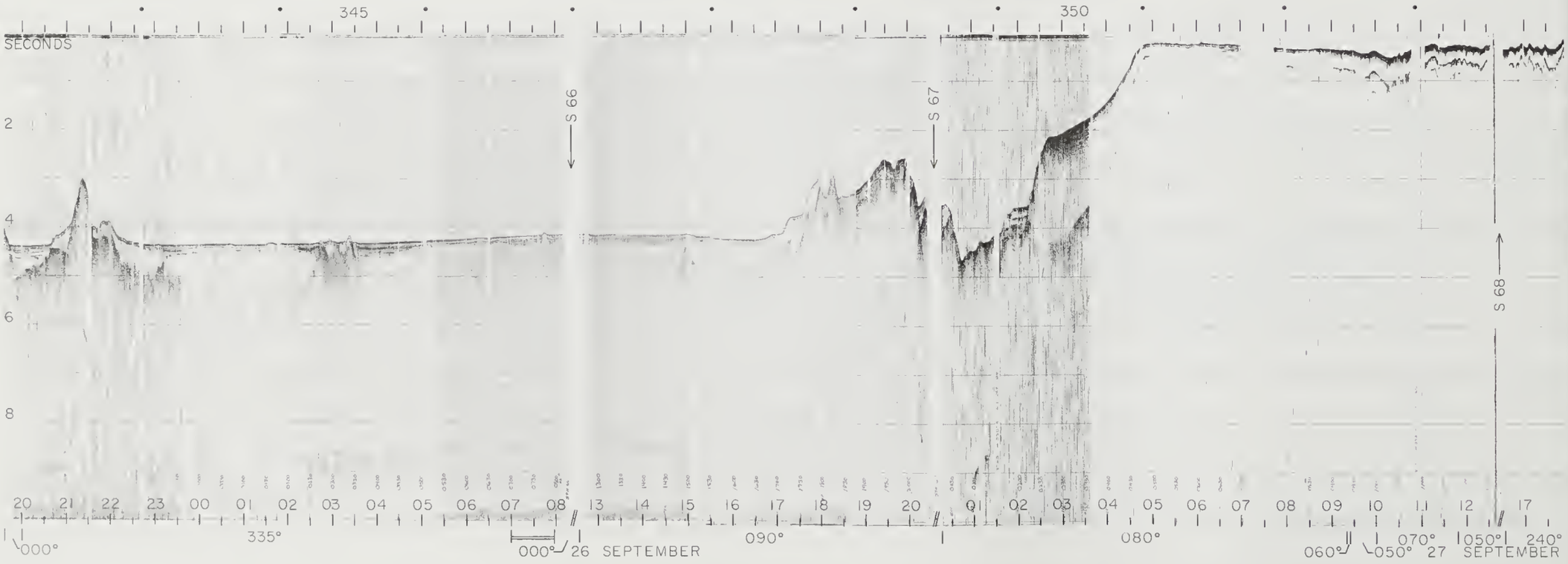

280
285
SECONDS
S 57
S 58
S 59
6
8
REYKJAVIK, ICELAND
18 19 22 23 00 01 02 05 06 07 08 09 10 11 12 15 16 14 15 16 17 18 19 20 21 22 23 00 01 02 03 11 12 13
113°
307°
307°
090°
090°
343°
352°
077°
256°
V 23
13 SEPTEMBER
14 SEPTEMBER
15 SEPTEMBER
17 SEPTEMBER

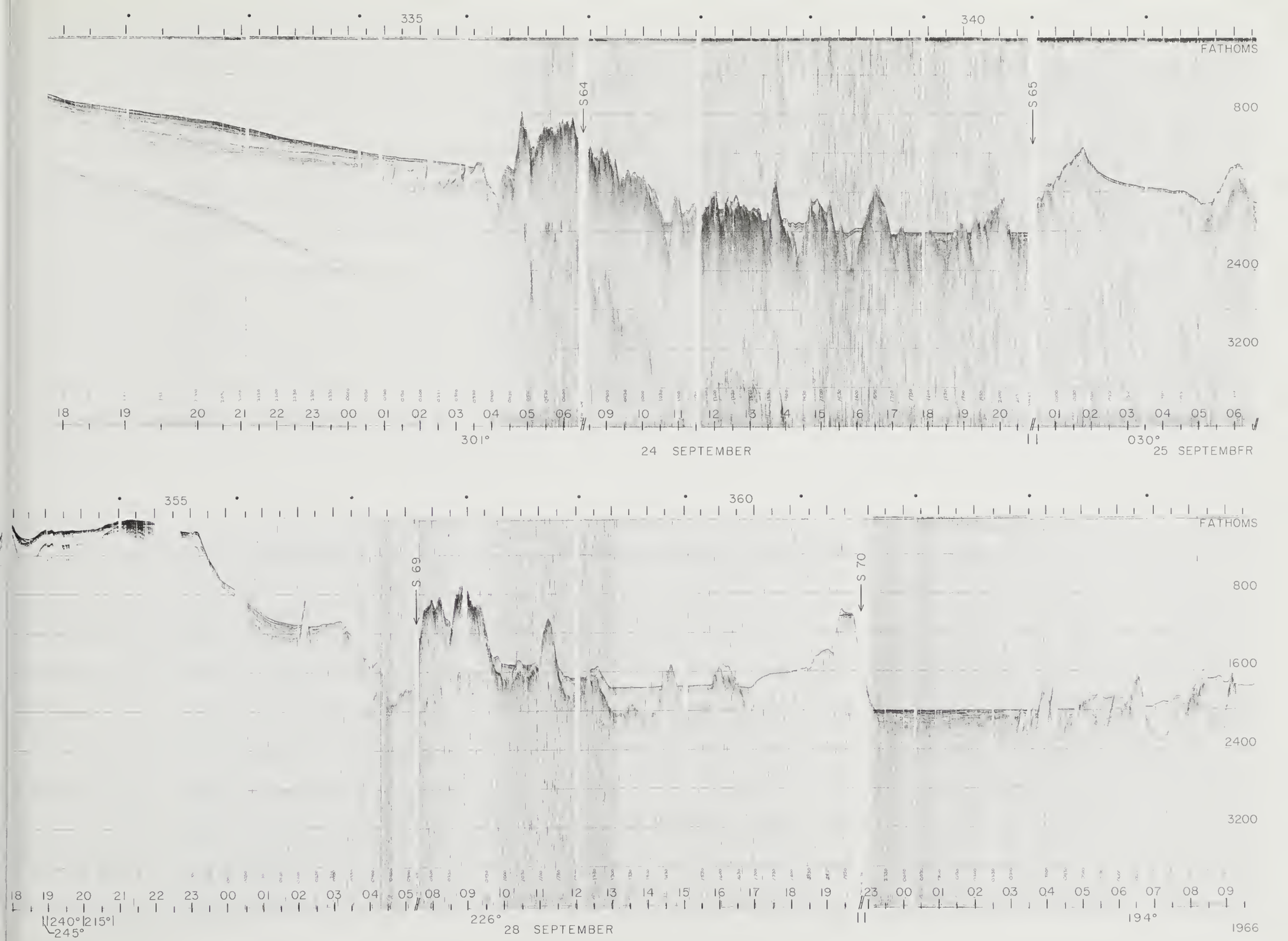

300
305
SECONDS
S 60
S 61
2
4
6
8
01 02 03 04 05 06 07 08 09 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13
050°
19 SEPTEMBER
20 SEPTEMBER

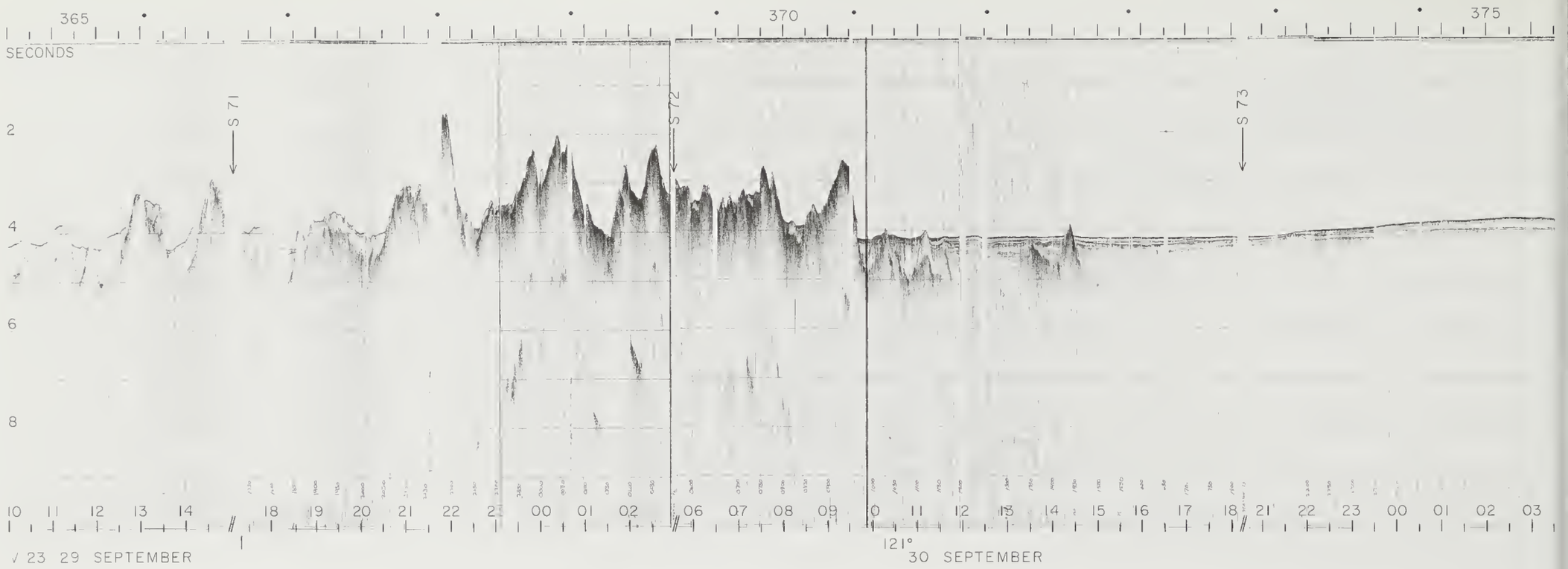

290
295
FATHOMS
800
1600
2400
3200
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
255°
200°
180°
150°
170°
150°
126°
095°
18 SEPTEMBER

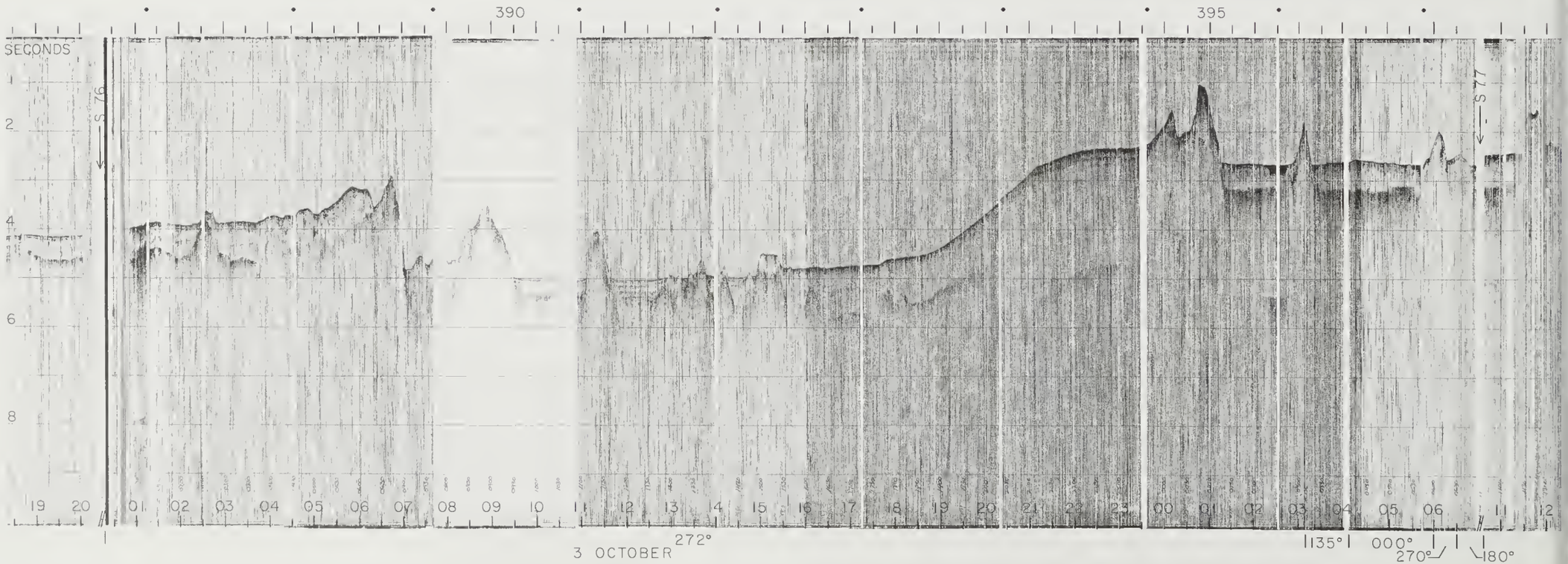

310
315
320
FATHOMS
S 62
800
1600
2400
3200
15 16 17 18 19 20 21 22 23 00 01 03 04 05 06 07 08 09 10 11 12 16 17 18 19 20 21 22 23 00 01 02 03 04
055°
055°
21 SEPTEMBER
1966

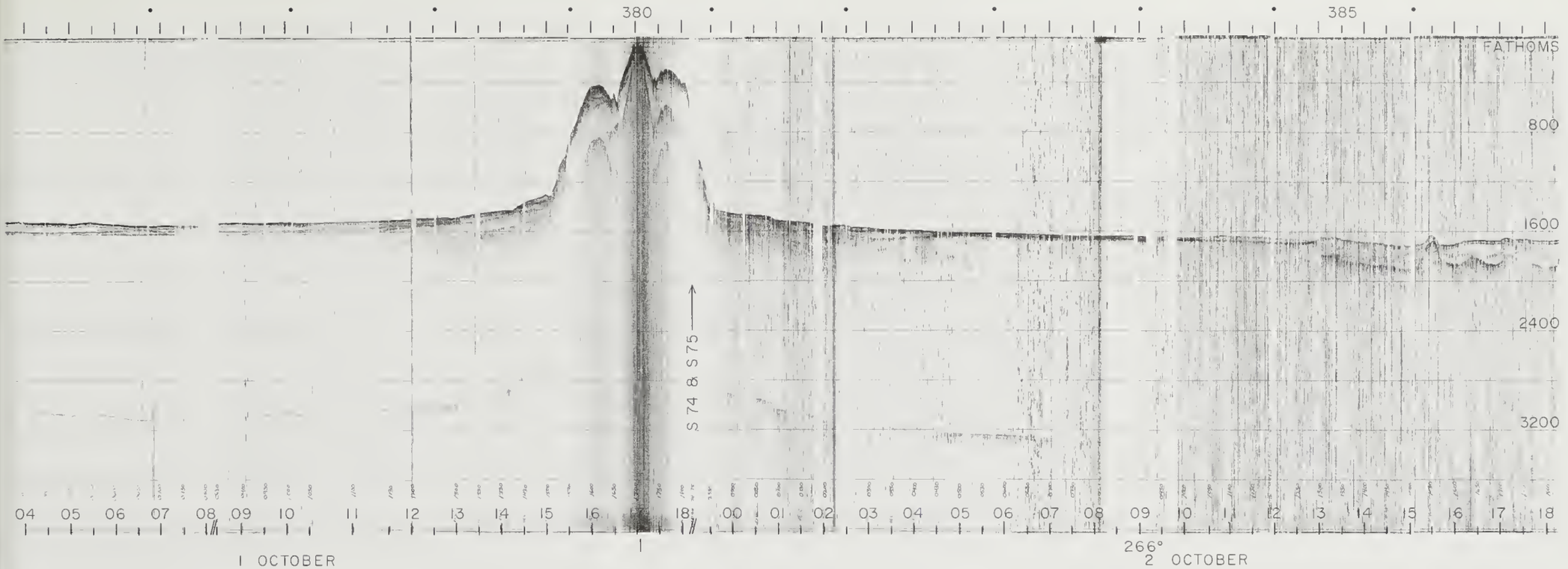

325
330
SECONDS
2
4
6
8
S 63
05 06 07 08 09 10 11 12 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17
V 23
22 SEPTEMBER
050°
028°
23 SEPTEMBER

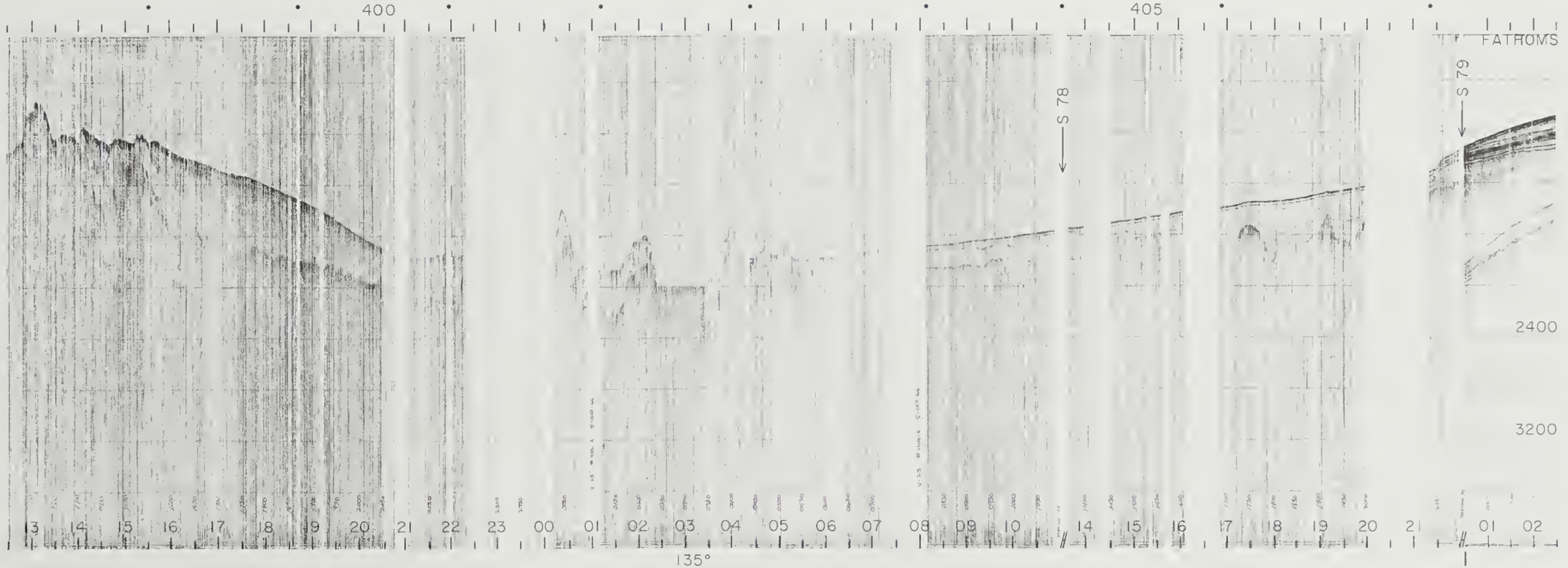

345
350
SECONDS
2
4
6
8
S 66
S 67
S 68
20 21 22 23 00 01 02 03 04 05 06 07 08 13 14 15 16 17 18 19 20 01 02 03 04 05 06 07 08 09 10 11 12 17
000°
335°
000°
26 SEPTEMBER
090°
080°
060°
070°
050°
050°
27 SEPTEMBER
240°

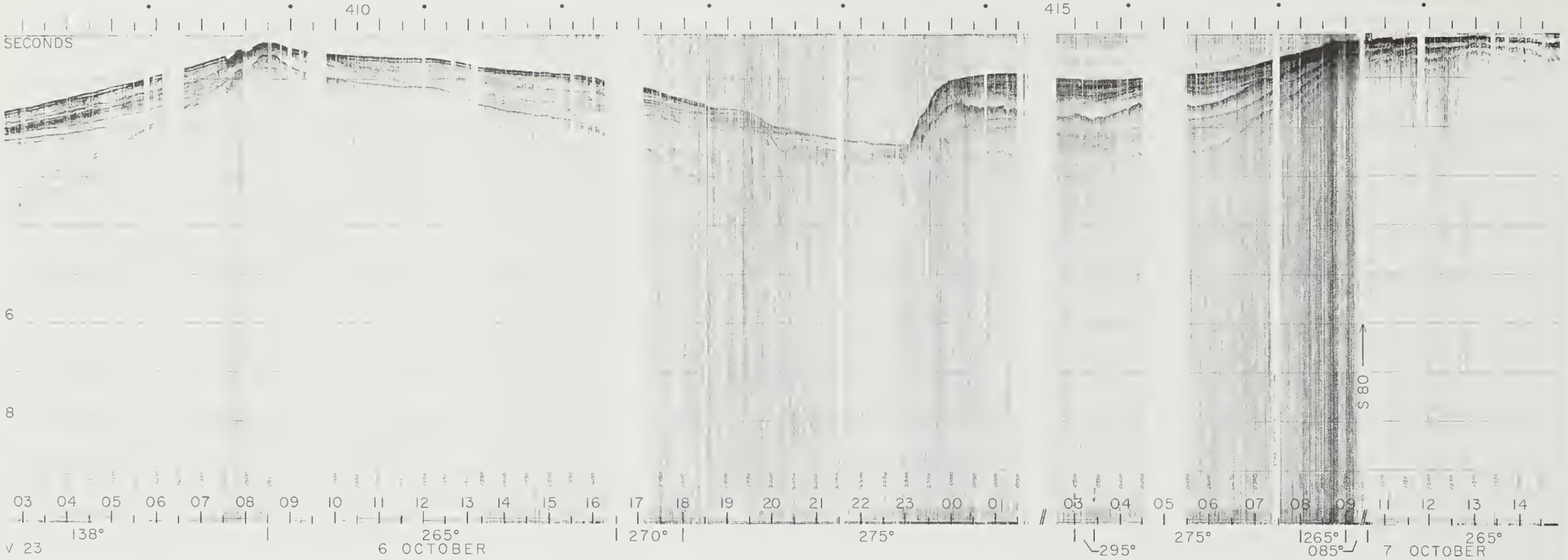

335
340
FATHOMS
S64
S65
800
2400
3200
18 19 20 21 22 23 00 01 02 03 04 05 06 09 10 11 12 3 4 15 16 17 18 19 20 01 02 03 04 05 06
301°
24 SEPTEMBER
030°
25 SEPTEMBER
355
360
FATHOMS
S69
S70
800
1600
2400
3200
18 19 20 21 22 23 00 01 02 03 04 05 08 09 10 11 12 13 14 15 16 17 18 19 23 00 01 02 03 04 05 06 07 08 09
240° 215°
245°
226°
28 SEPTEMBER
194°
1966

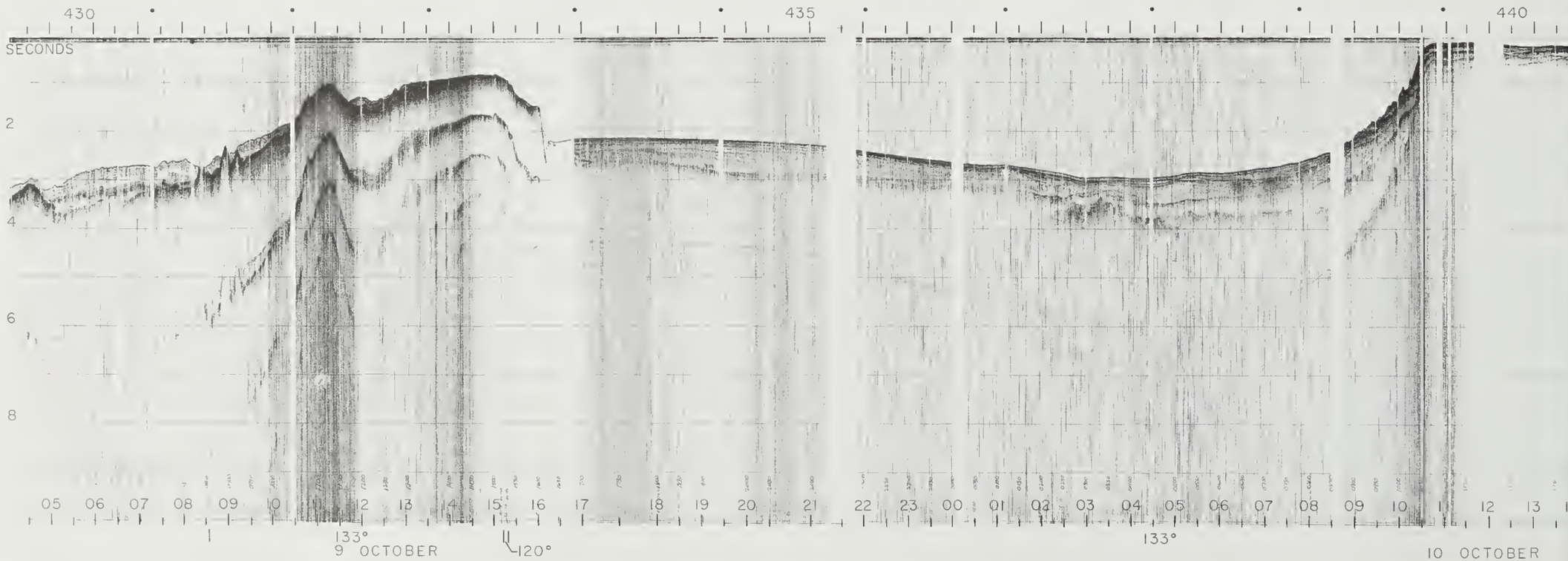

365
370
375
SECONDS
2
4
6
8
S 71
S 72
S 73
10 11 12 13 14 18 19 20 21 22 23 00 01 02 06 07 08 09 0 11 12 13 14 15 16 17 18 21 22 23 00 01 02 03
23 29 SEPTEMBER
121°
30 SEPTEMBER

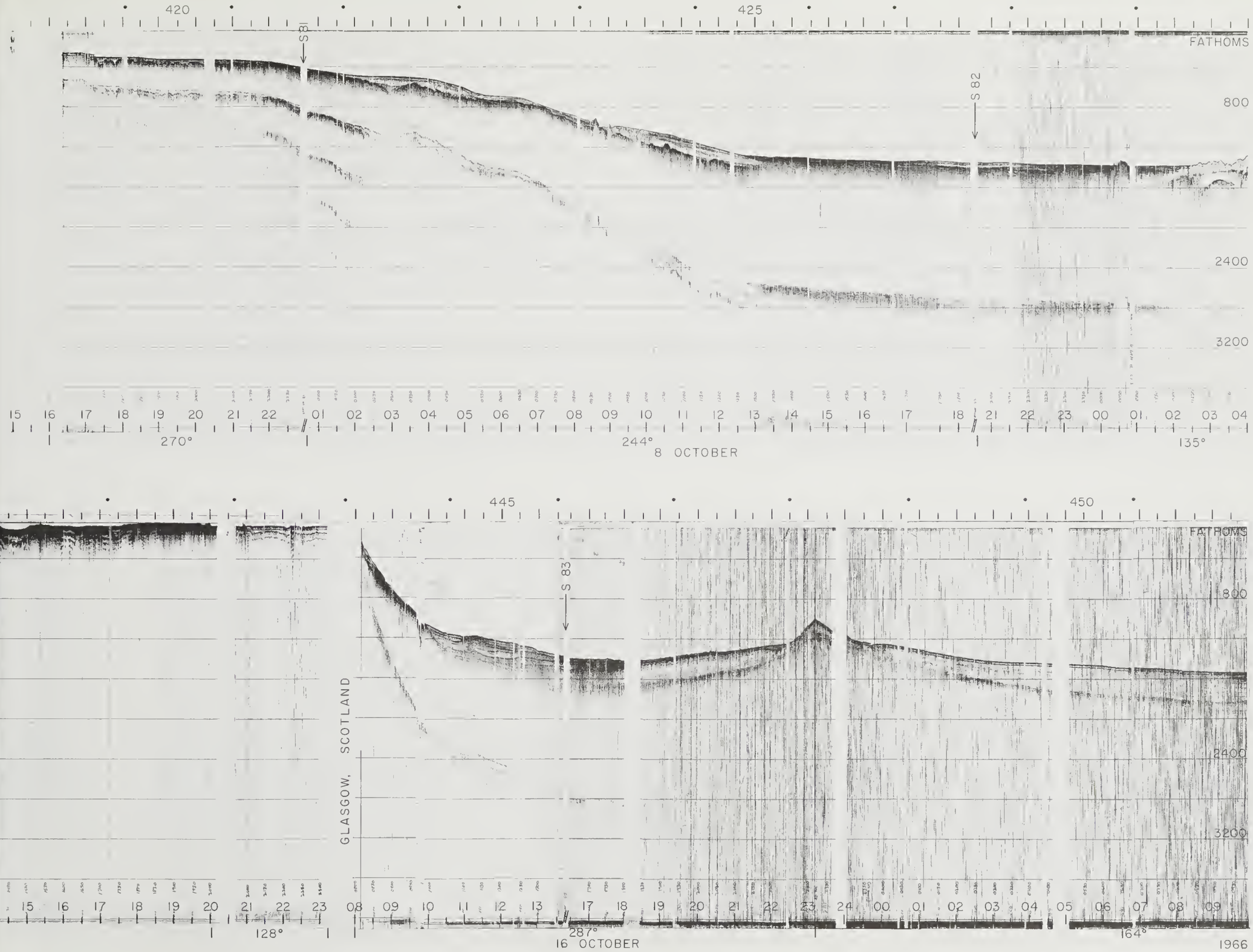

390
395
SECONDS
1
2
4
6
8
S 76
S 77
19 20 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 11 12
272°
3 OCTOBER
135°
000°
270°
180°

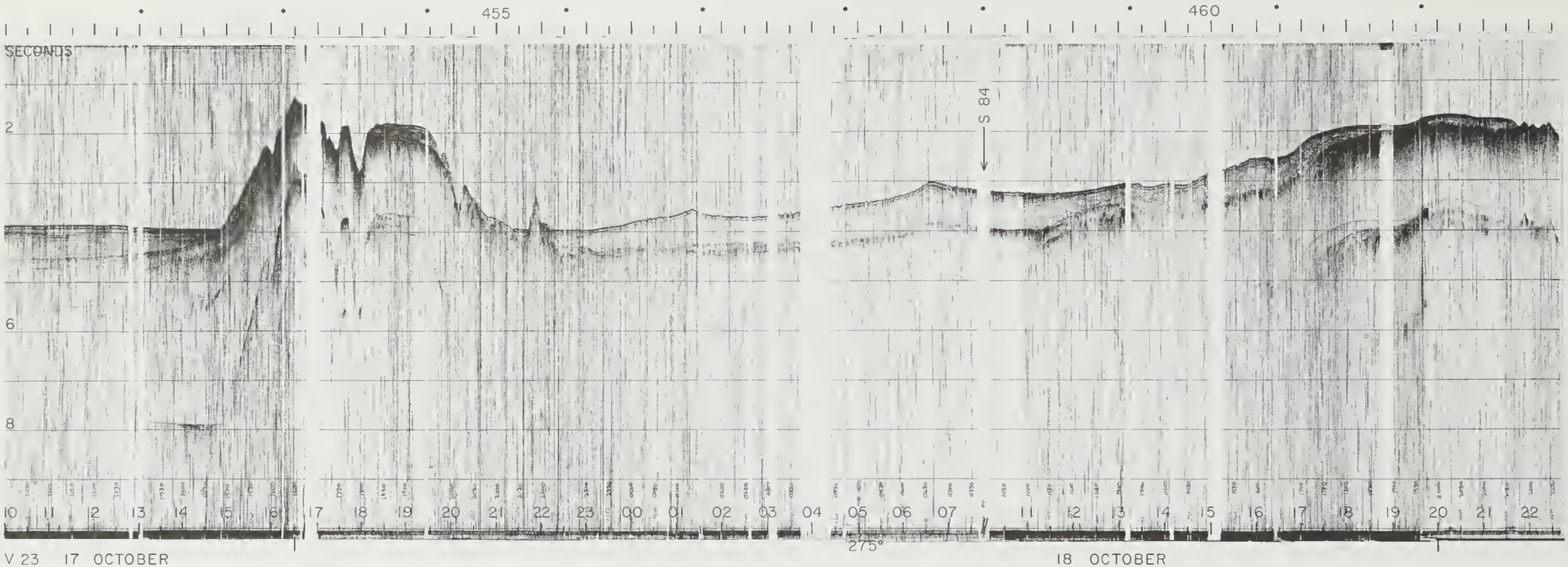

380
385
FATHOMS
800
1600
2400
3200
S 74 & S 75
04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
1
266°
1 OCTOBER
2 OCTOBER

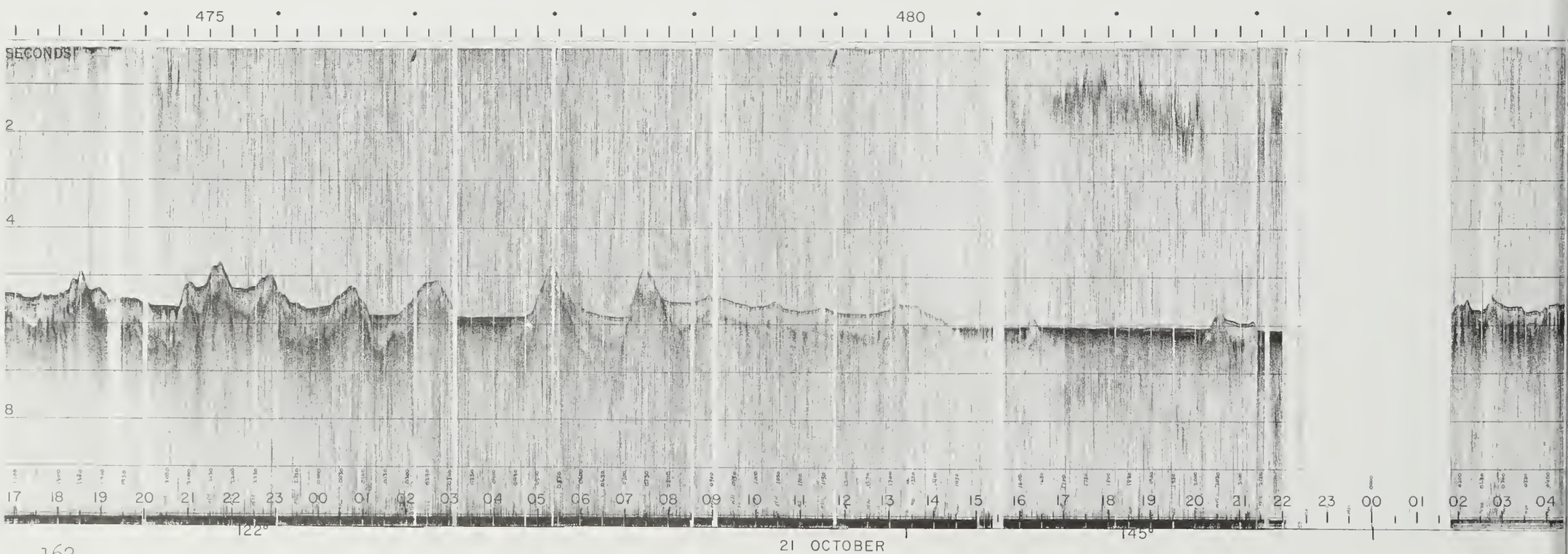

400
405
FATHOMS
S 78
S 79
2400
3200
13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 14 15 16 17 18 19 20 21 01 02
135°
4 OCTOBER
5 OCTOBER
1966

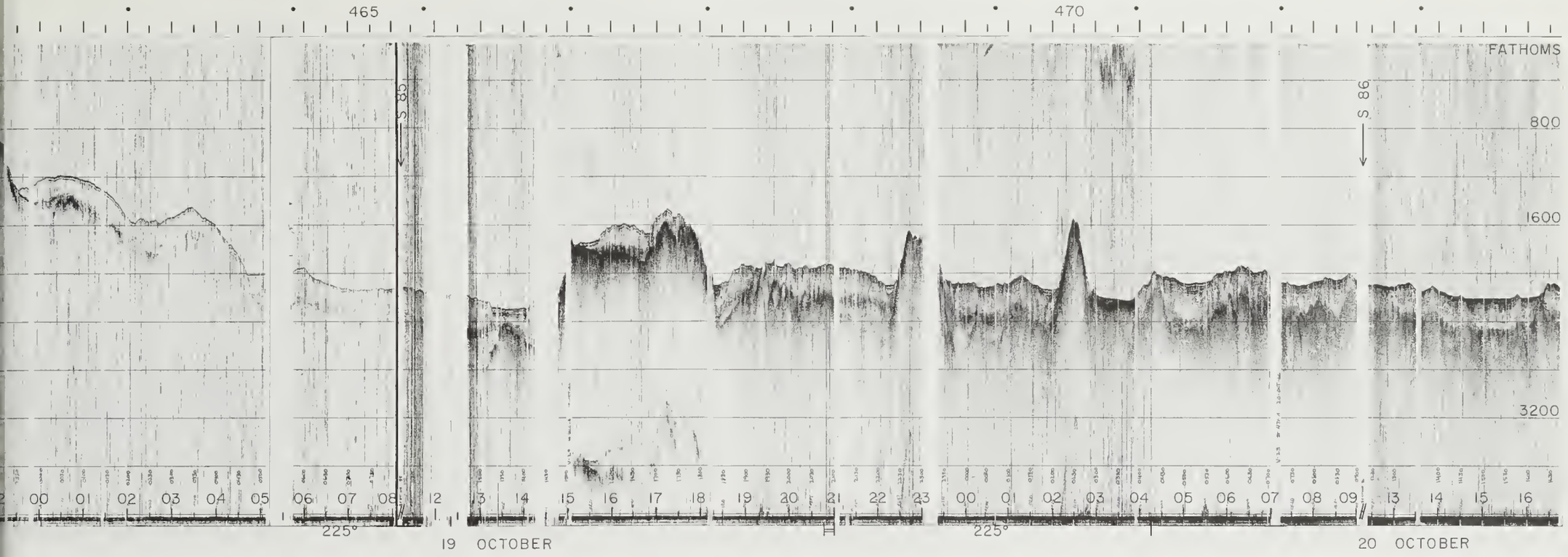

410
415
SECONDS
6
8
S 80
03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01
03 04 05 06 07 08 09 11 12 13 14
138°
265°
270°
275°
295°
275°
265°
085°
265°
V 23
6 OCTOBER
7 OCTOBER

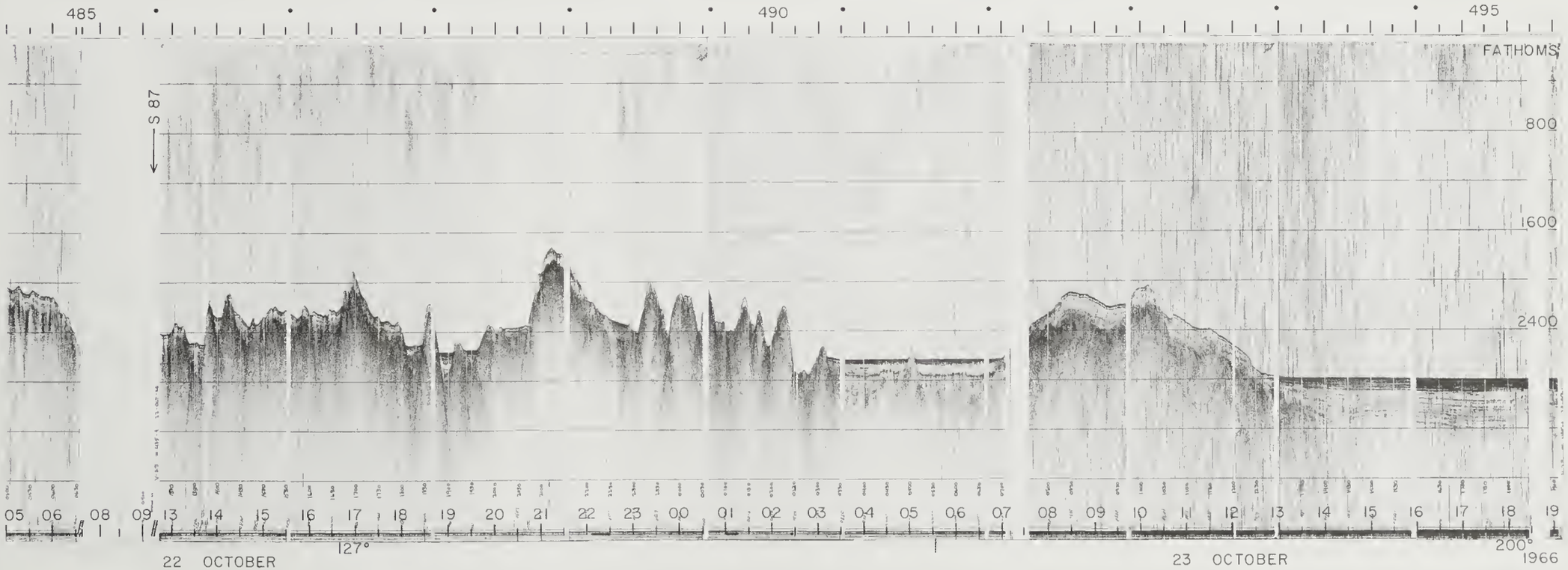

430
435
440
SECONDS
2
4
6
8
05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14
133°
120°
133°
9 OCTOBER
10 OCTOBER

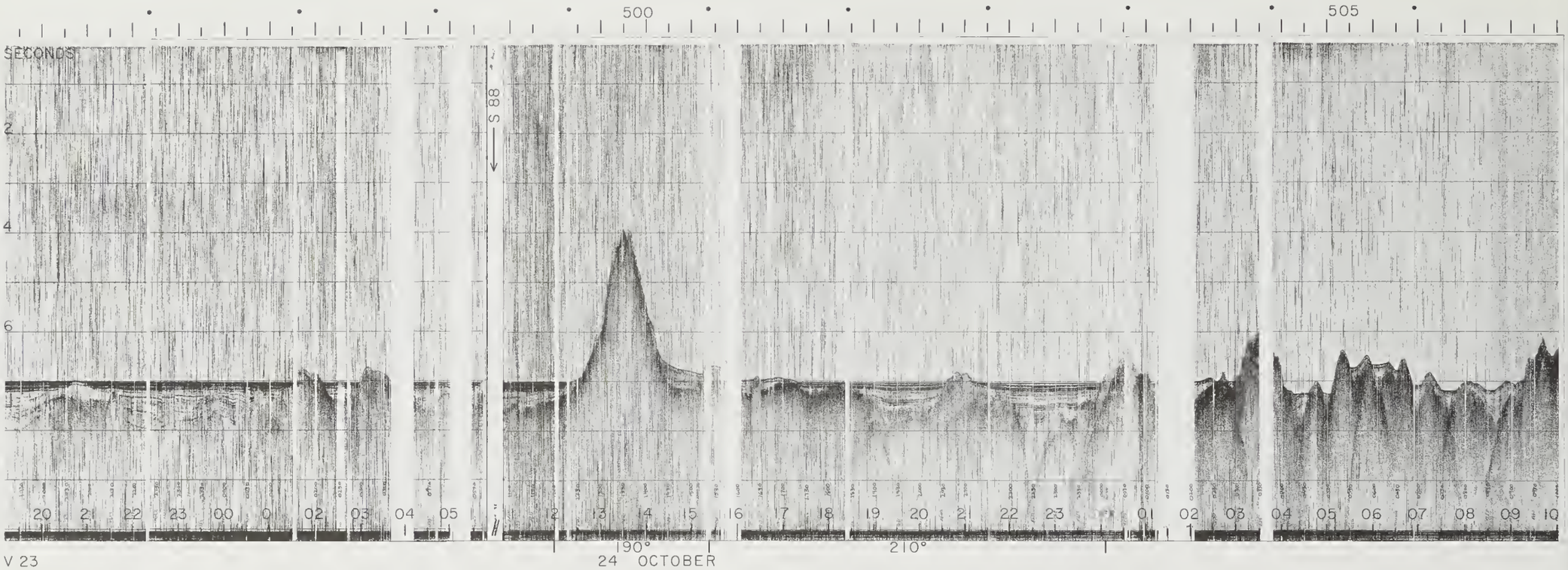

420
425
S 81
S 82
FATHOMS
800
2400
3200
15 16 17 18 19 20 21 22 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 21 22 23 00 01 02 03 04
270°
244°
135°
8 OCTOBER
445
450
S 83
GLASGOW, SCOTLAND
FATHOMS
800
2400
3200
15 16 17 18 19 20 21 22 23 08 09 10 11 12 13 17 18 19 20 21 22 23 24 00 01 02 03 04 05 06 07 08 09
128°
287°
164°
16 OCTOBER
1966

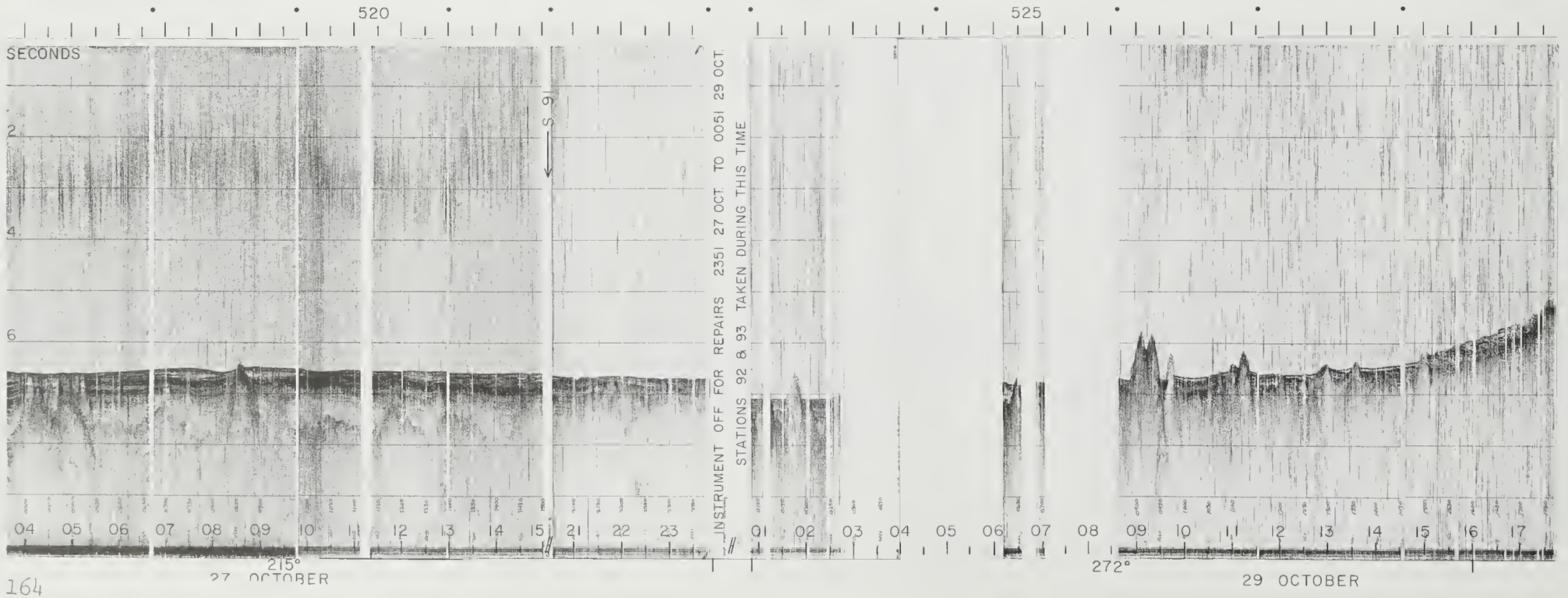

455
460
SECONDS
2
6
8
S 84
10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 11 12 13 14 15 16 17 18 19 20 21 22
V 23 17 OCTOBER
275°
18 OCTOBER

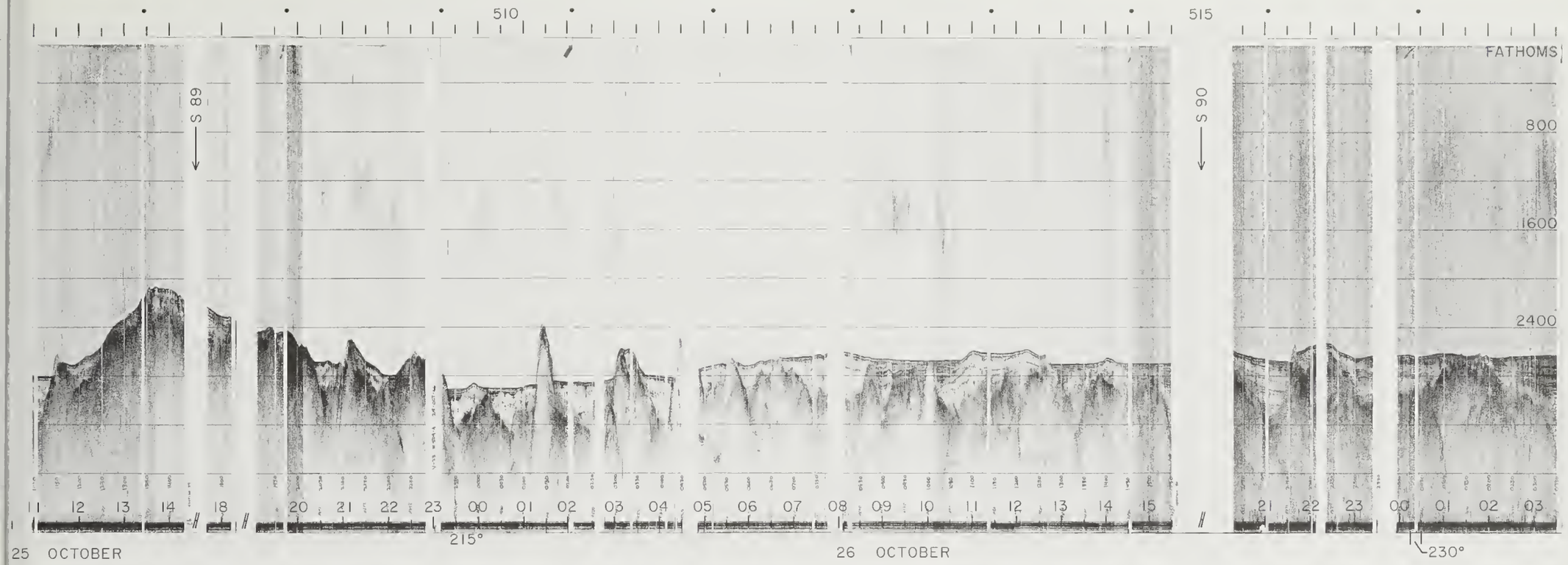

475
480
SECONDS
2
4
8
17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04
122°
145°
21 OCTOBER

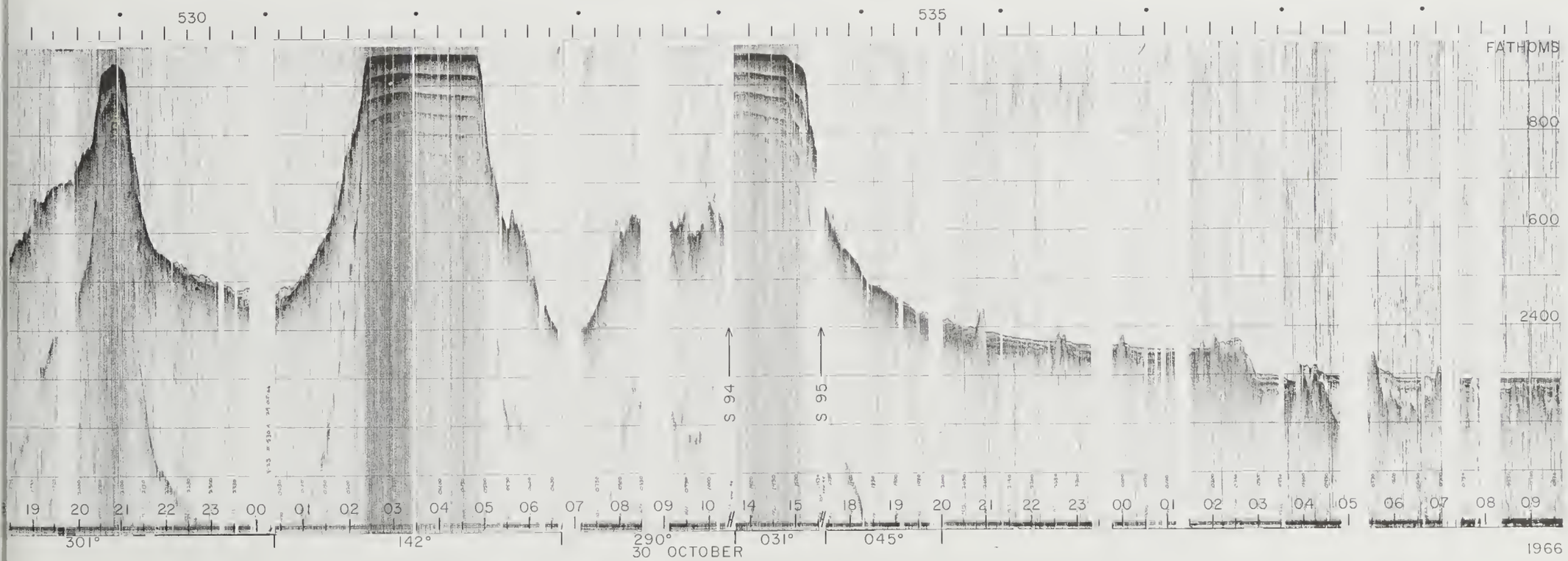

465
470
FATHOMS
S 85
S 86
800
1600
3200
225°
19 OCTOBER
225°
20 OCTOBER

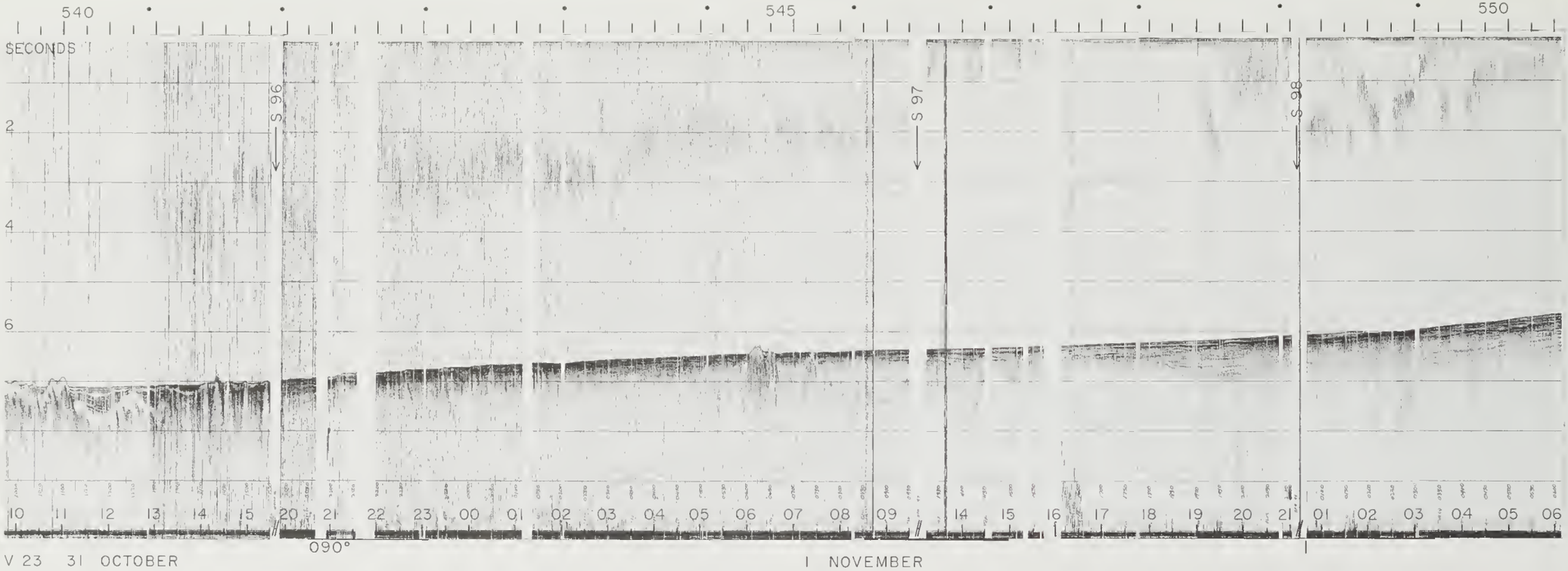

485
490
495
FATHOMS
S 87
800
1600
2400
127°
22 OCTOBER
23 OCTOBER
200°
1966

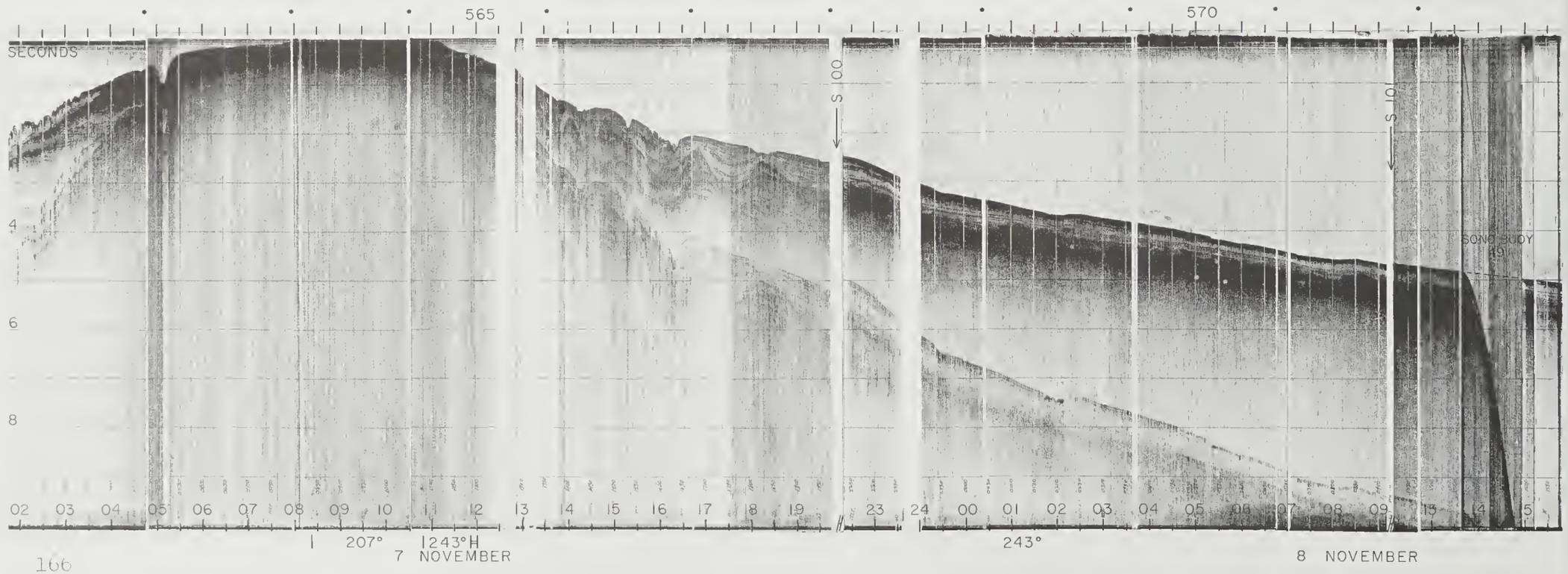

500
505
SECONDS
2
4
6
S 88
20 21 22 23 00 01 02 03 04 05 12 13 14 15 16 17 18 19 20 21 22 23 01 02 03 04 05 06 07 08 09 10
V 23
190°
210°
24 OCTOBER

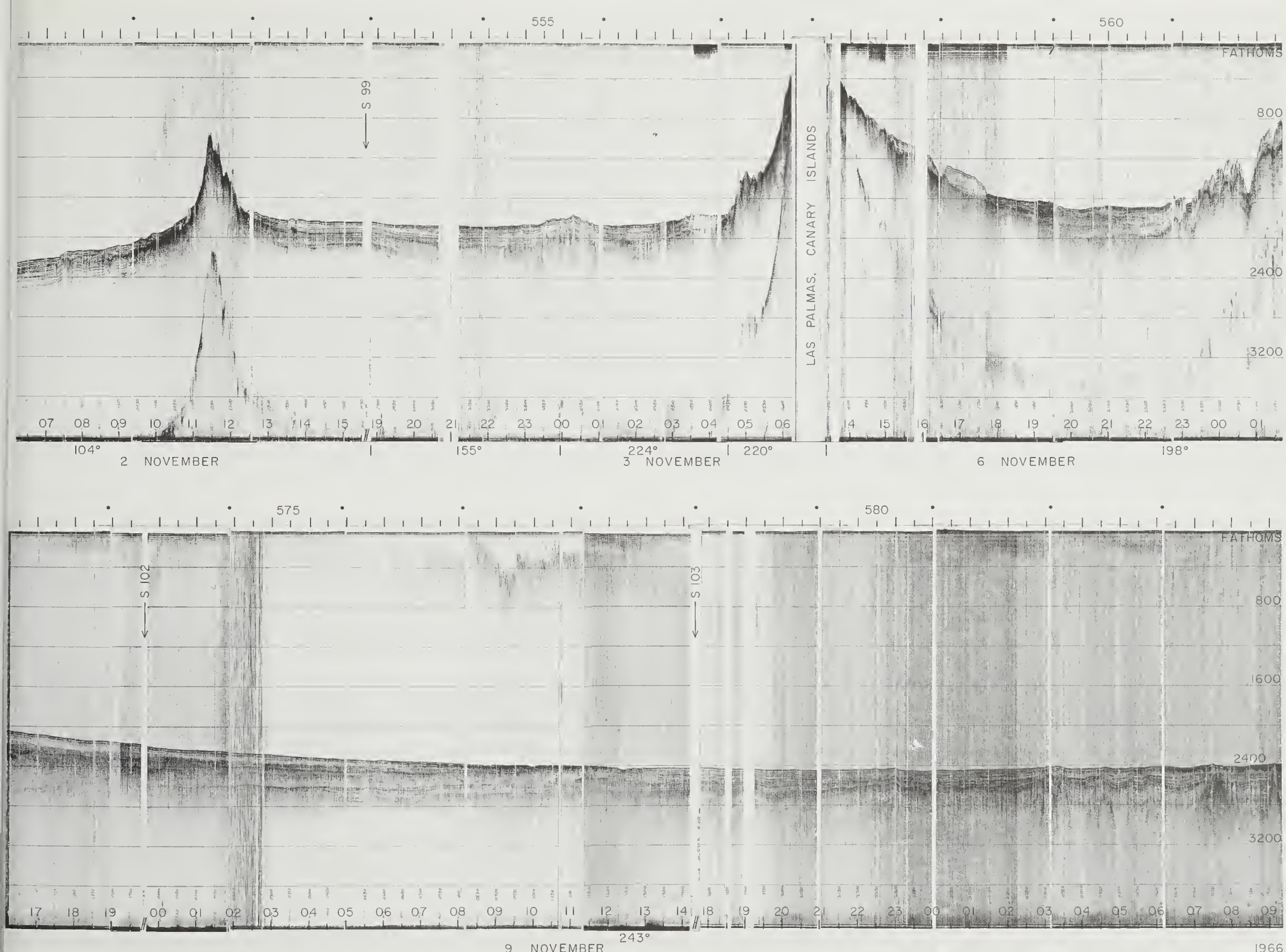

520
525
SECONDS
2
4
6
S 91
04 05 06 07 08 09 10 11 12 13 14 15 21 22 23 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17
215°
27 OCTOBER
INSTRUMENT OFF FOR REPAIRS 2351 27 OCT TO 0051 29 OCT
STATIONS 92 & 93 TAKEN DURING THIS TIME
272°
29 OCTOBER

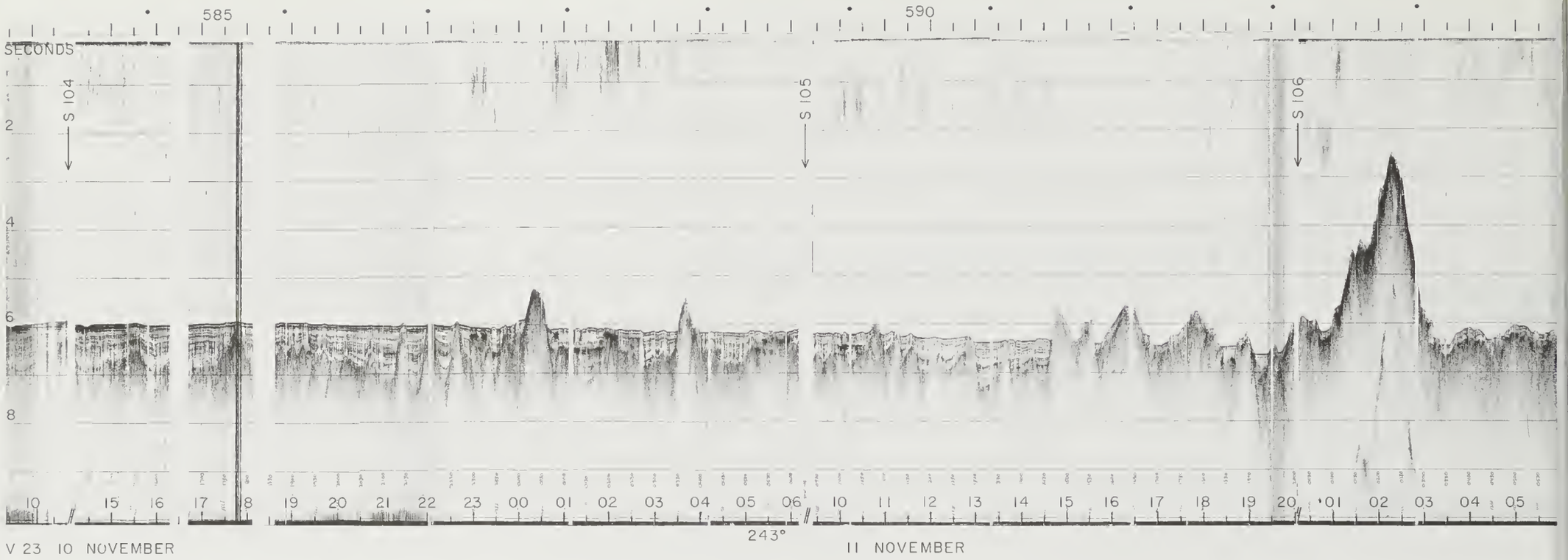

510
515
FATHOMS
800
1600
2400
S 89
S 90
11 12 13 14 18 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 21 22 23 00 01 02 03
215°
230°
25 OCTOBER
26 OCTOBER


530
535
FATHOMS
800
1600
2400
S 94
S 95
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 14 15 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
301°
142°
290°
031°
045°
30 OCTOBER
1966


540
545
550
SECONDS
2
4
6
S 96
S 97
S 98
10 11 12 13 14 15 20 21 22 23 00 01 02 03 04 05 06 07 08 09 14 15 16 17 18 19 20 21 01 02 03 04 05 06
090°
V 23 31 OCTOBER
1 NOVEMBER

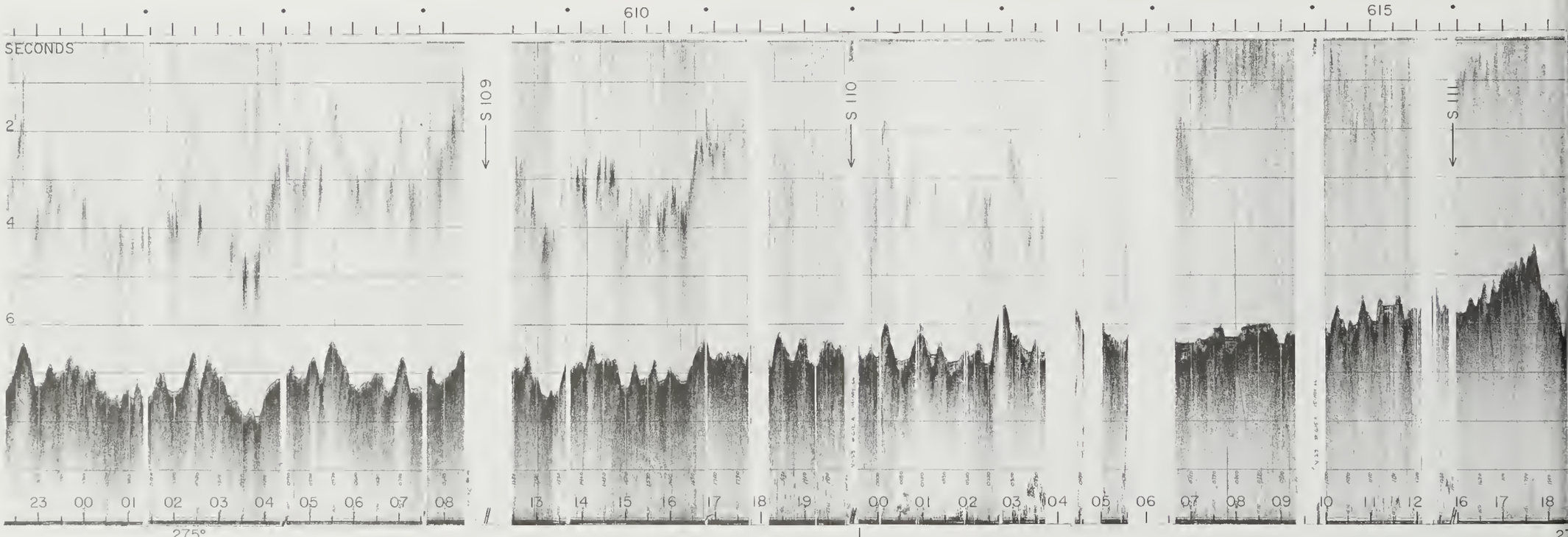

565
570
SECONDS
4
6
8
S 100
S 101
SONO BUOY
49
02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 23 24 00 01 02 03 04 05 06 07 08 09 13 14 15
207°
1243°H
7 NOVEMBER
243°
8 NOVEMBER


555
560
FATHOMS
800
2400
3200
S 99
LAS PALMAS, CANARY ISLANDS
07 08 09 10 11 12 13 14 15 19 20 21 22 23 00 01 02 03 04 05 06 14 15 16 17 18 19 20 21 22 23 00 01
104°
2 NOVEMBER
155°
224°
220°
3 NOVEMBER
6 NOVEMBER
198°
575
580
FATHOMS
800
1600
2400
3200
S 102
S 103
17 18 19 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
243°
9 NOVEMBER
1966



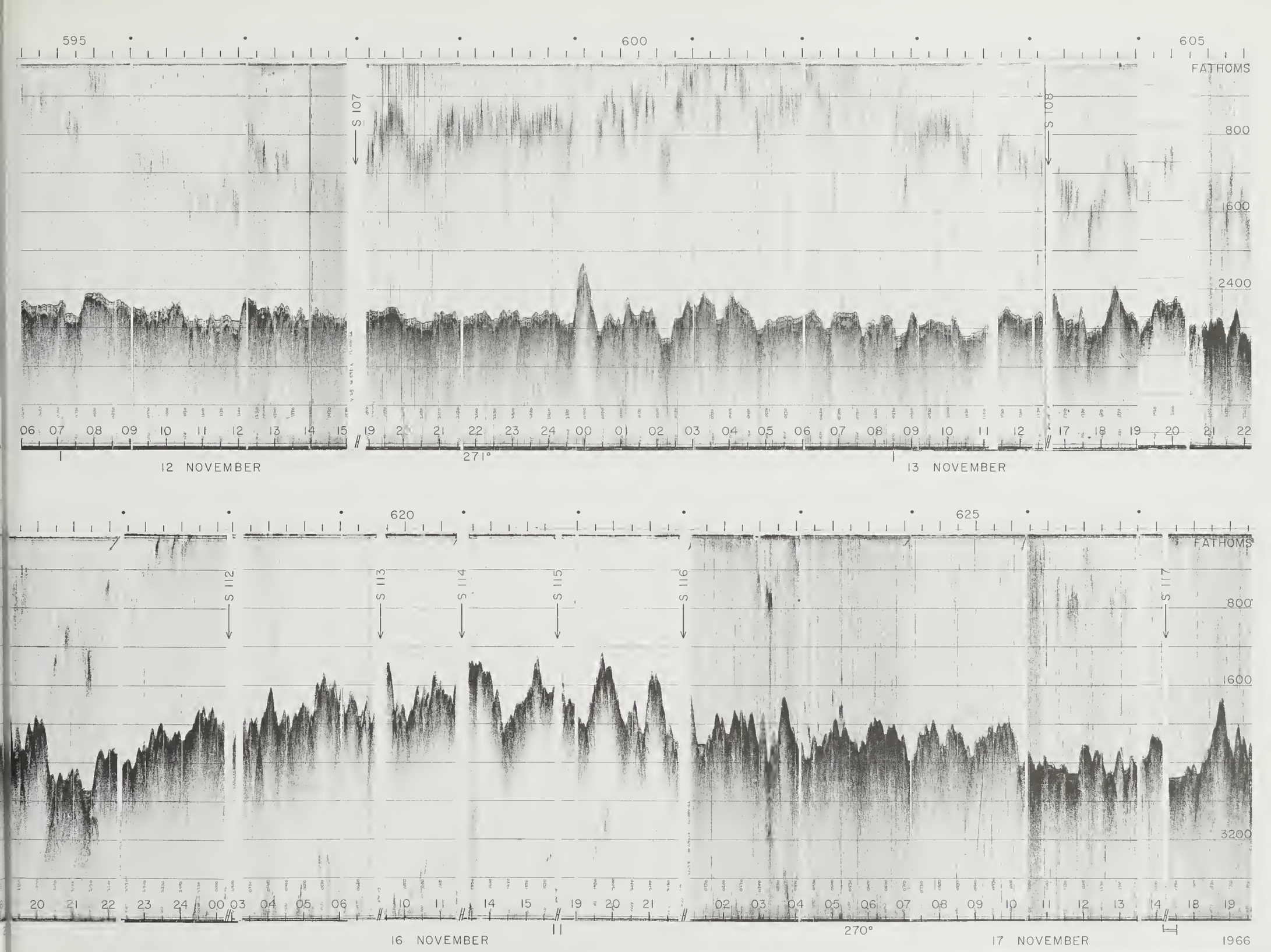
V 23 10 NOVEMBER

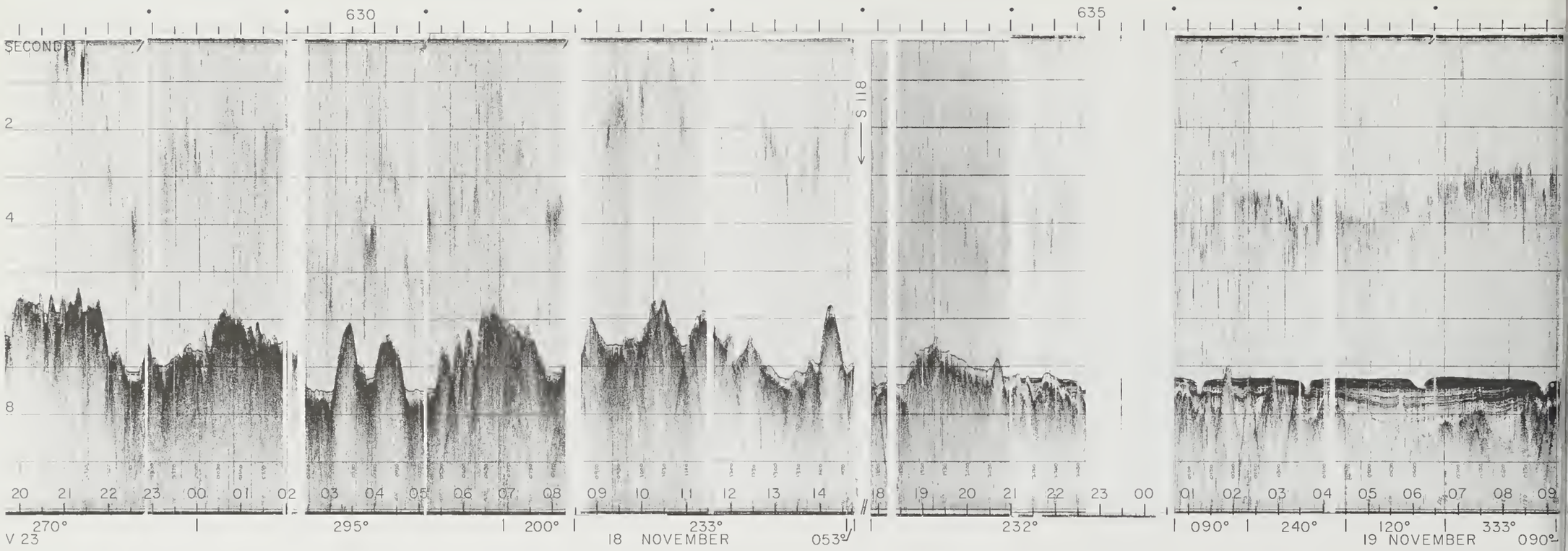
11 NOVEMBER

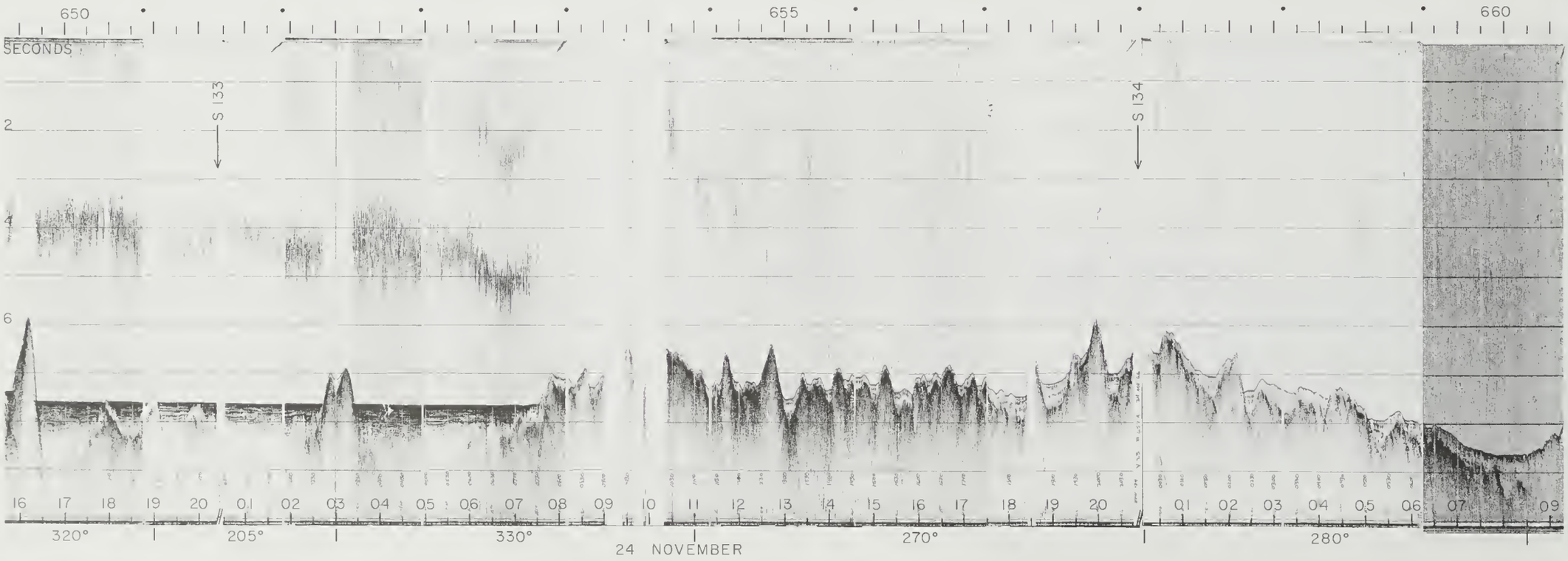


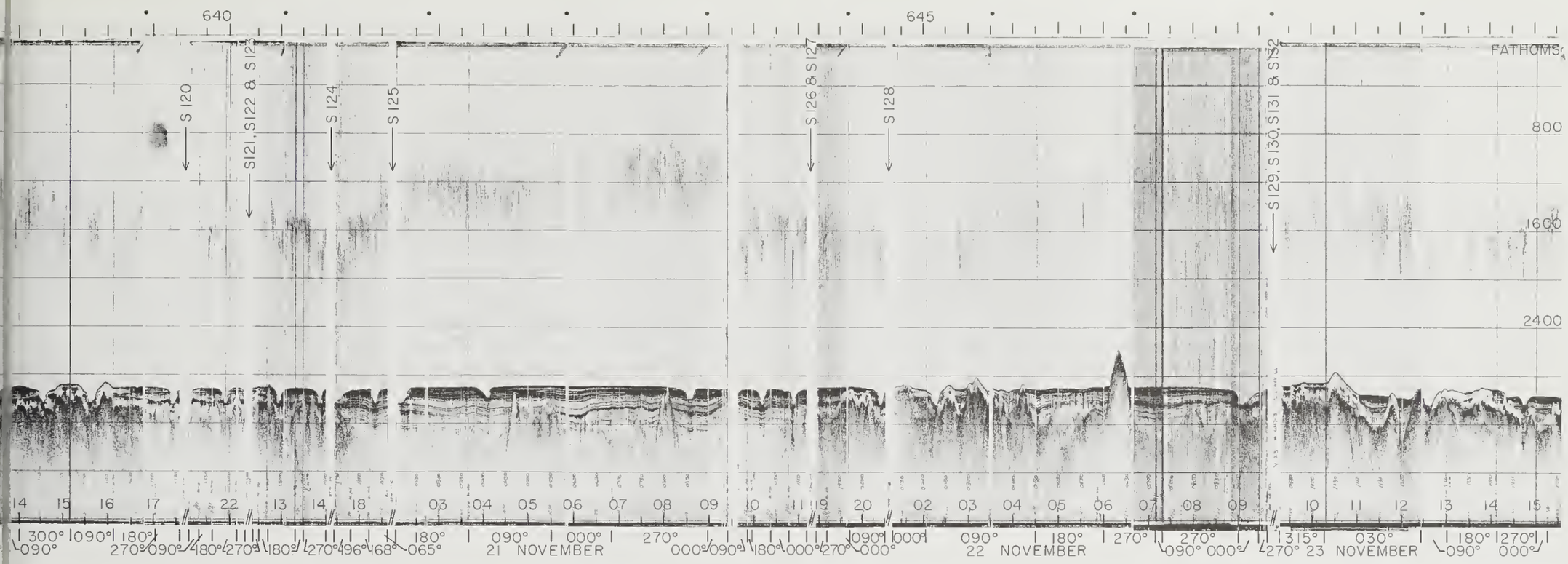
14 NOVEMBER

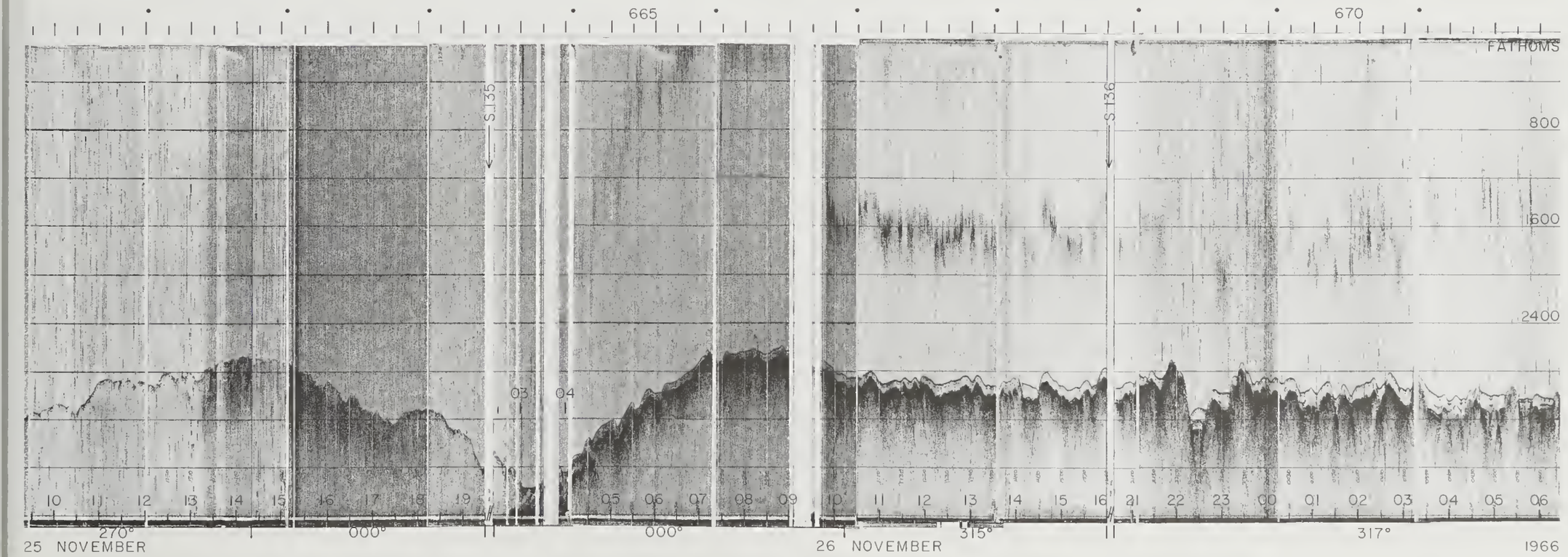
15 NOVEMBER

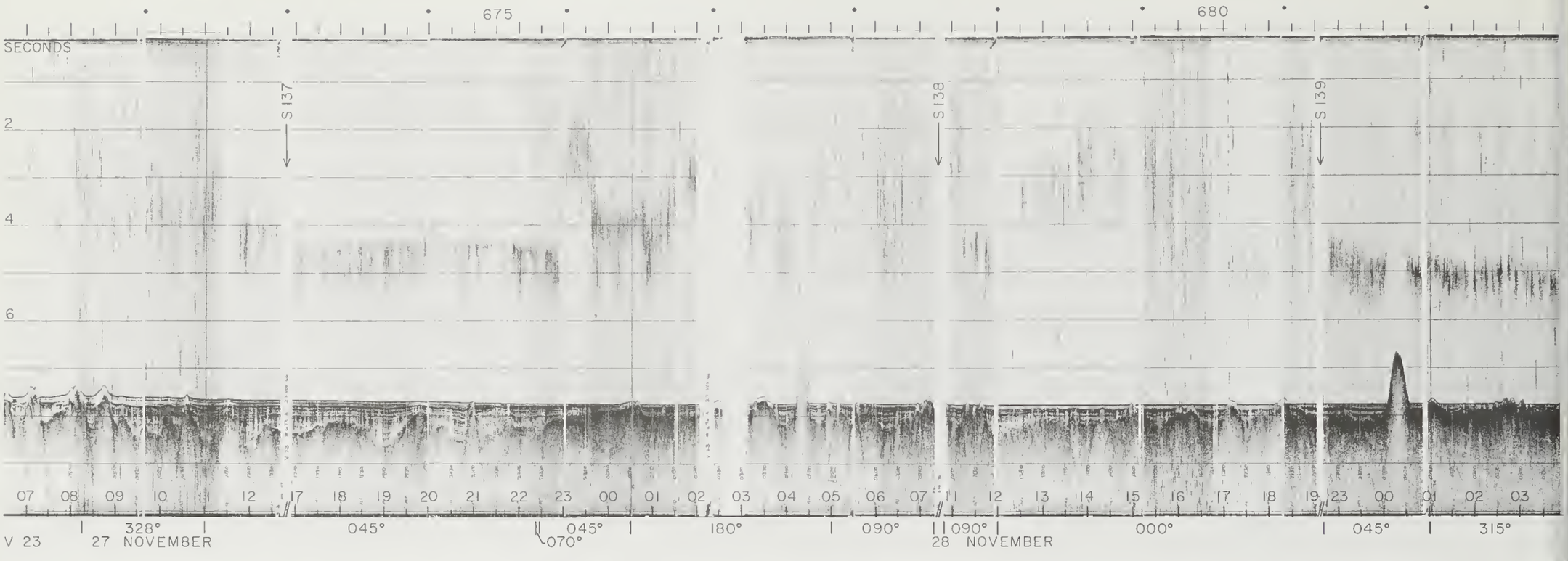

595
600
605
FATHOMS
S 107
S 108
800
1600
2400
06 07 08 09 10 11 12 13 14 15
19 2 21 22 23 24 00 01 02 03 04 05 06 07 08 09 10 11 12
17 18 19 20 21 22
271°
12 NOVEMBER
13 NOVEMBER
620
625
FATHOMS
S 112
S 113
S 114
S 115
S 116
S 117
800
1600
3200
20 21 22 23 24 00 03 04 05 06
10 11 14 15 19 20 21
02 03 04 05 06 07 08 09 10 11 12 13 14 18 19
270°
16 NOVEMBER
17 NOVEMBER
1966

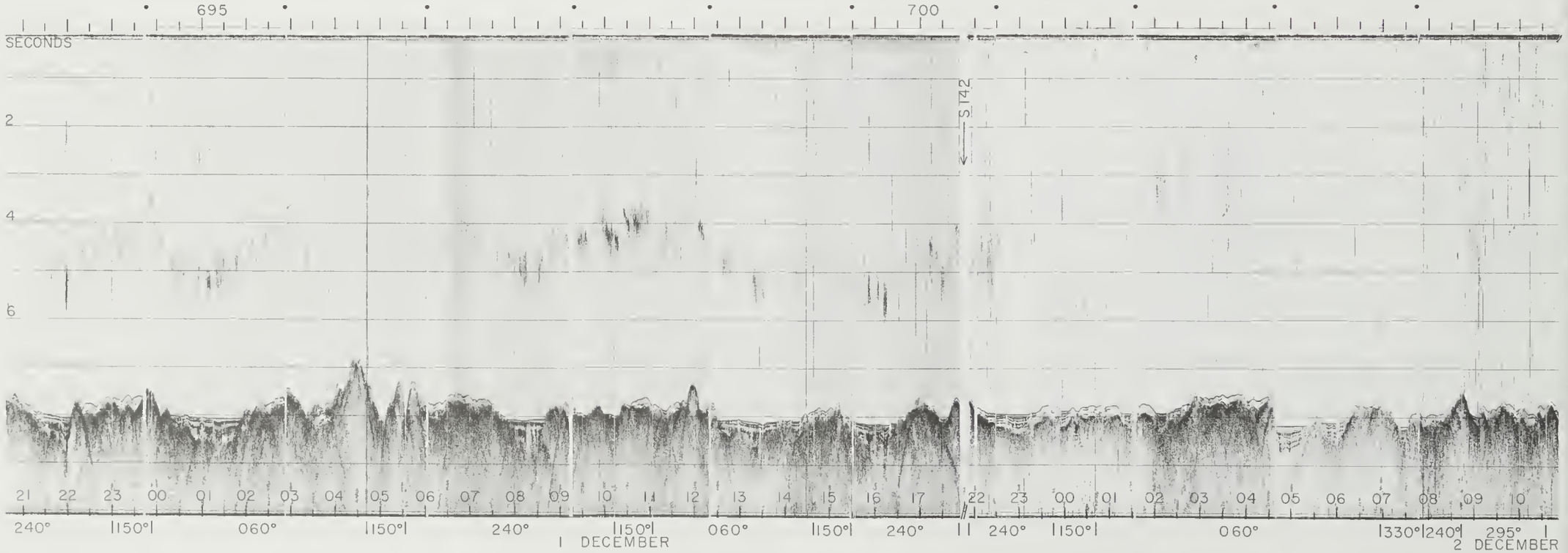

630
635
SECONDS
2
4
8
S 118
20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
270°
295°
200°
233°
053°
232°
090°
240°
120°
333°
090°
V 23
18 NOVEMBER
19 NOVEMBER

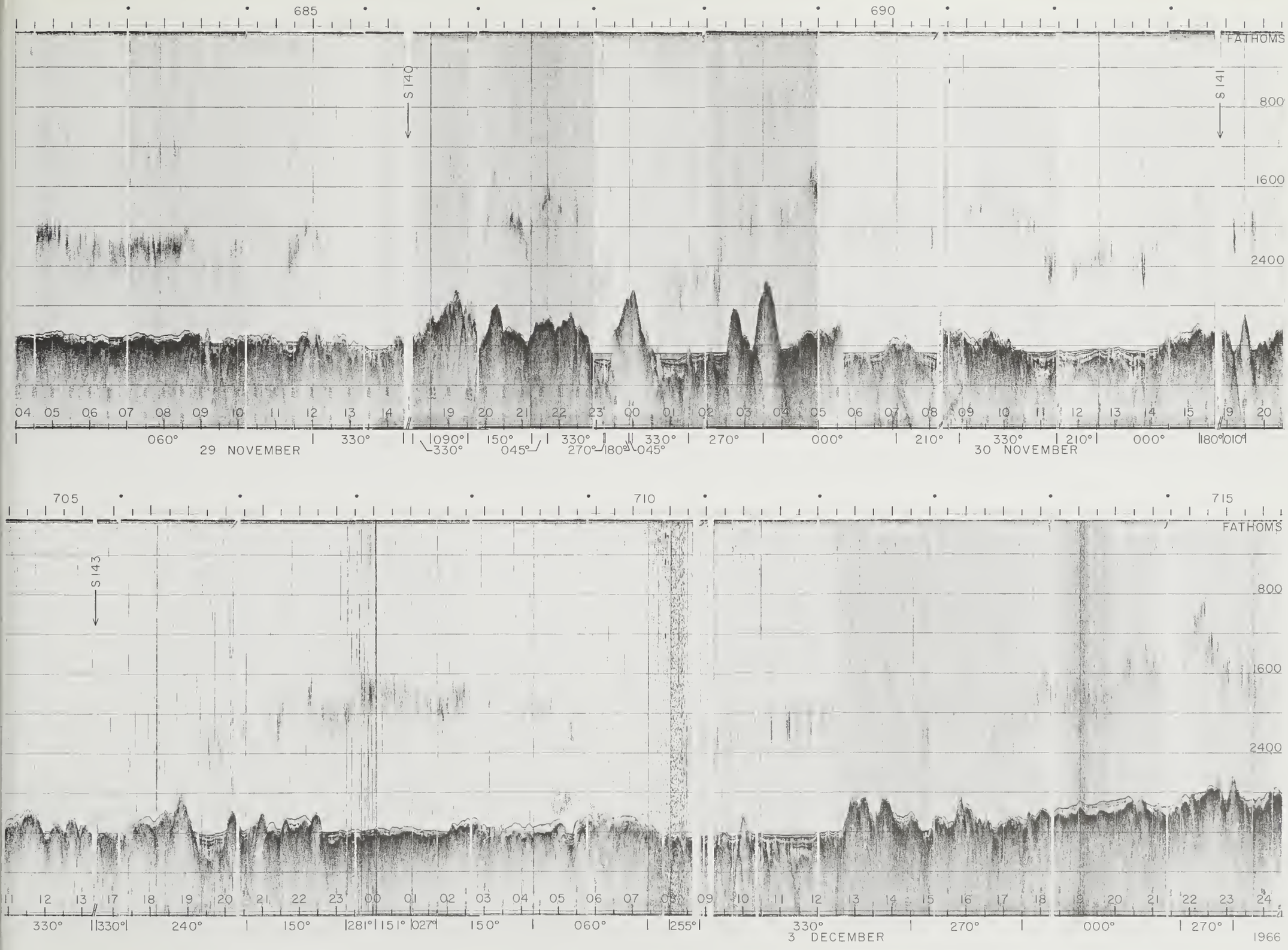

650
655
660
SECONDS
2
4
6
S 133
S 134
16 17 18 19 20 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 01 02 03 04 05 06 07 09
320°
205°
330°
270°
280°
24 NOVEMBER

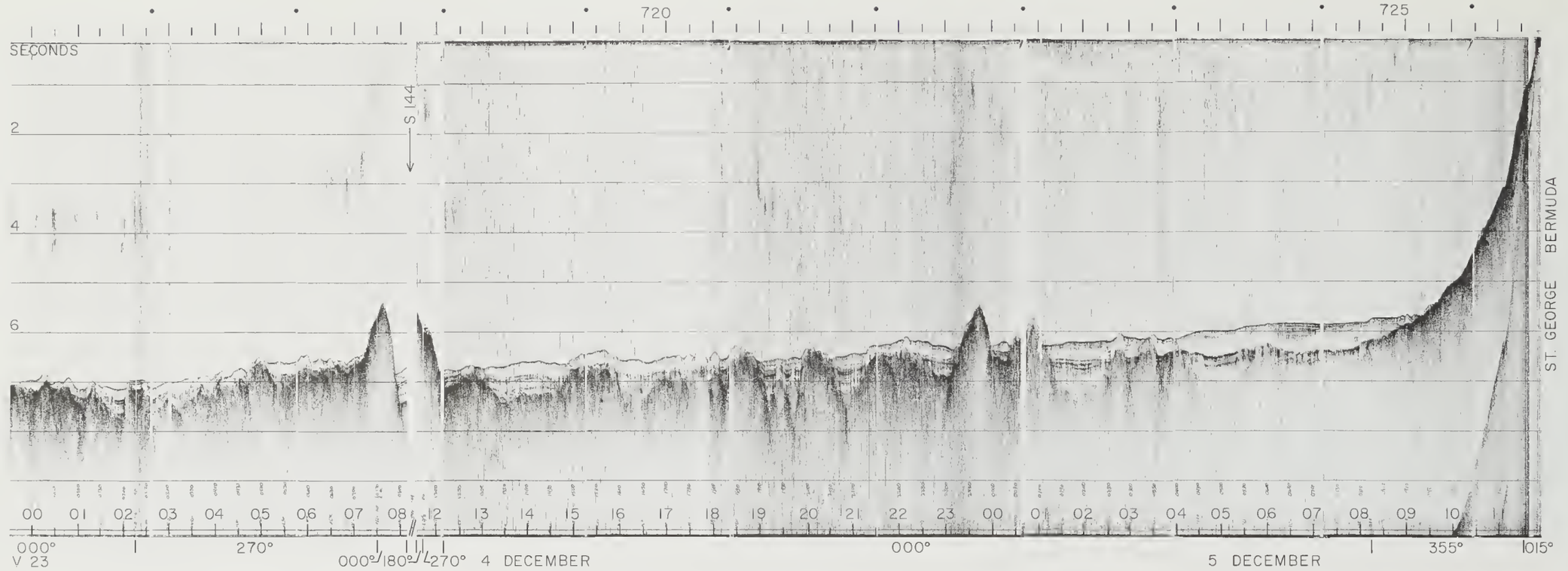

640
645
FATHOMS
800
1600
2400
S 120
S121, S122 & S123
S 124
S 125
S 126 & S 127
S 128
S 129, S 130, S 131 & S 132
14 15 16 17 22 13 14 18 03 04 05 06 07 08 09 10 11 19 20 02 03 04 05 06 07 08 09 10 11 12 13 14 15
300° 090° 180° 180° 090° 000° 270° 090° 090° 180° 270° 090° 000° 090° 000° 270° 180° 270° 180° 270° 270° 315° 030° 180° 270°
090° 270° 090° 180° 270° 180° 270° 496° 168° 065° 000° 090° 180° 000° 270° 000° 090° 180° 270° 090° 000° 270° 090° 000°
21 NOVEMBER
22 NOVEMBER
23 NOVEMBER

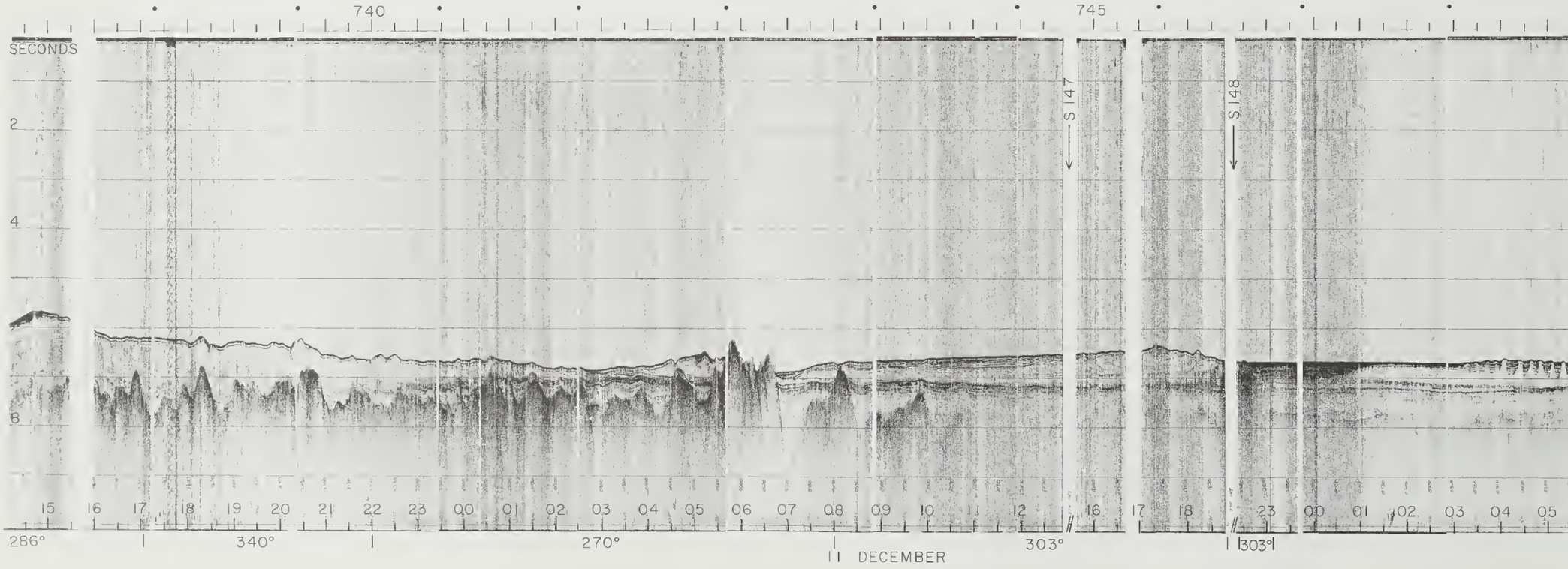

665
670
FATHOMS
800
1600
2400
S 135
S 136
03
04
10 11 12 13 14 15 16 17 18 19 05 06 07 08 09 10 11 12 13 14 15 16 21 22 23 00 01 02 03 04 05 06
270° 000° 000° 315° 317°
25 NOVEMBER
26 NOVEMBER
1966

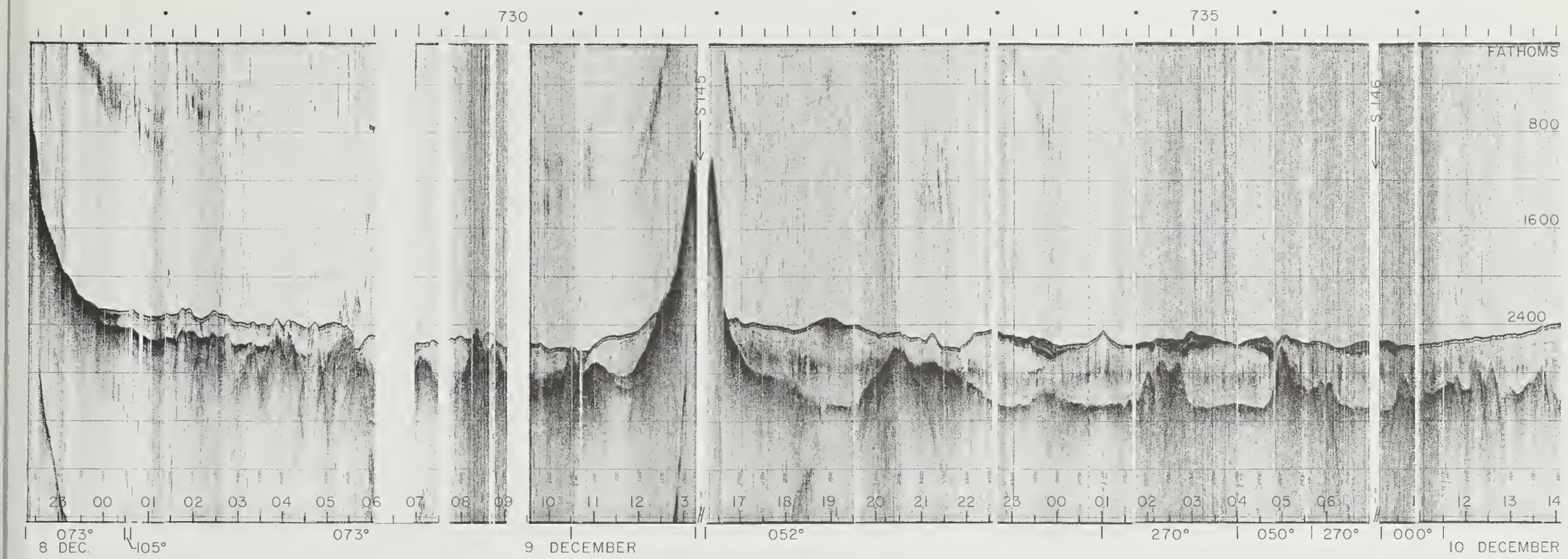

675
680
SECONDS
2
4
6
S 137
S 138
S 139
07 08 09 10 12 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 11 12 13 14 15 16 17 18 19 23 00 01 02 03
328° 045° 045° 070° 180° 090° 090° 000° 045° 315°
V 23 27 NOVEMBER
28 NOVEMBER

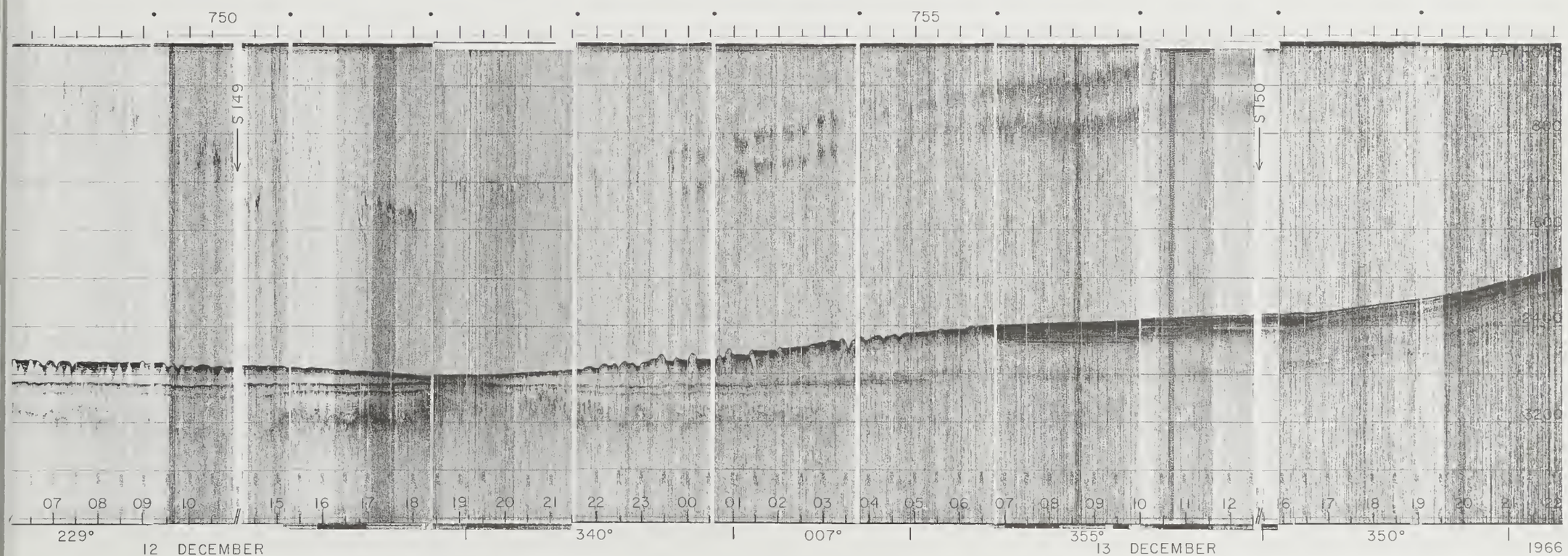

695
700
SECONDS
2
4
6
S 142
21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 22 23 00 01 02 03 04 05 06 07 08 09 10
240° 150° 060° 150° 240° 150° 060° 150° 240° 240° 150° 060° 330° 240° 295°
1 DECEMBER
2 DECEMBER

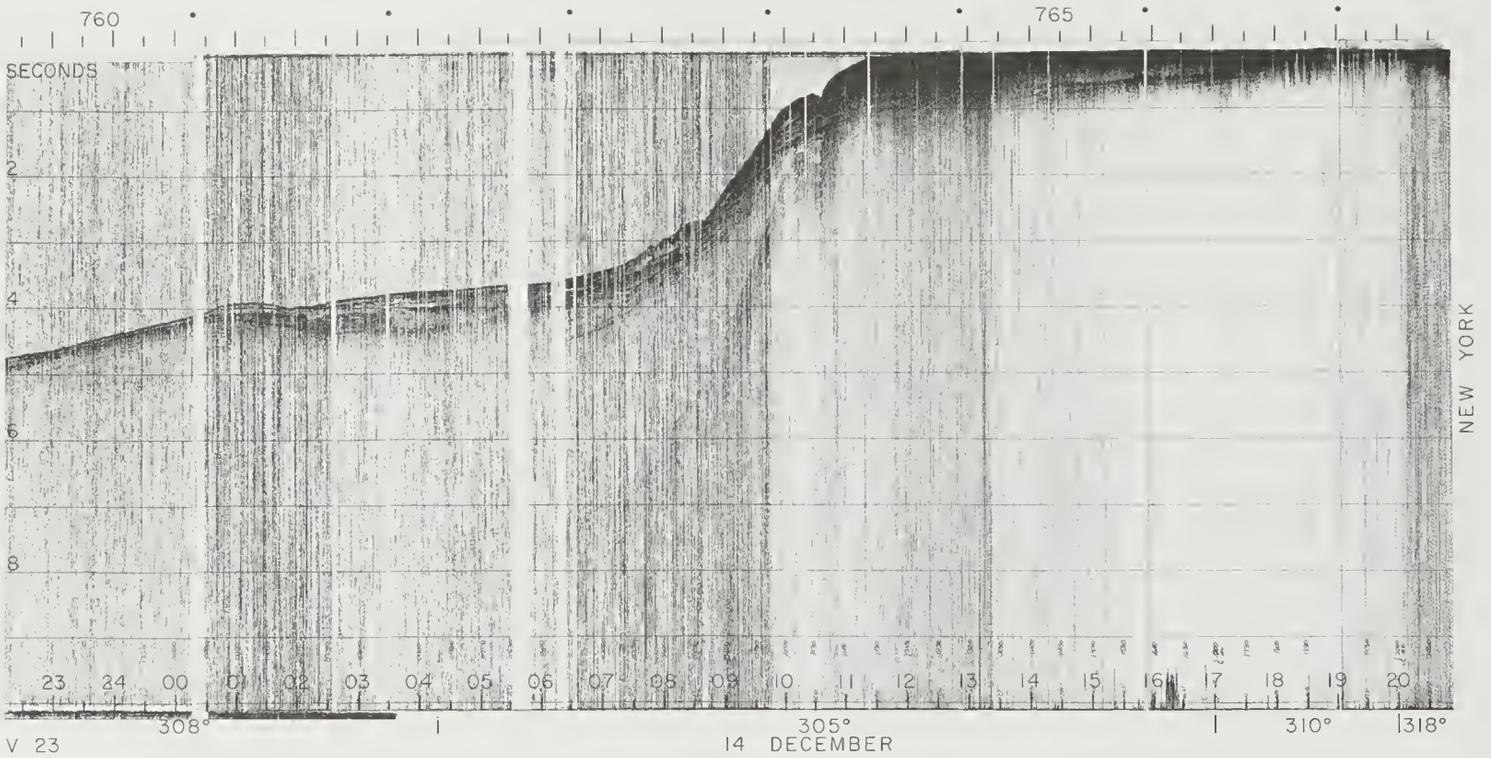

685
690
FATHOMS
800
1600
2400
S140
S141
04 05 06 07 08 09 10 11 12 13 14 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 19 20
060° 330° 090° 330° 150° 045° 330° 270° 180° 330° 045° 270° 000° 210° 330° 210° 000° 180° 010°
29 NOVEMBER
30 NOVEMBER
705
710
715
FATHOMS
800
1600
2400
S143
11 12 13 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
330° 330° 240° 150° 281° 151° 027° 150° 060° 255° 330° 270° 000° 270°
3 DECEMBER
1966

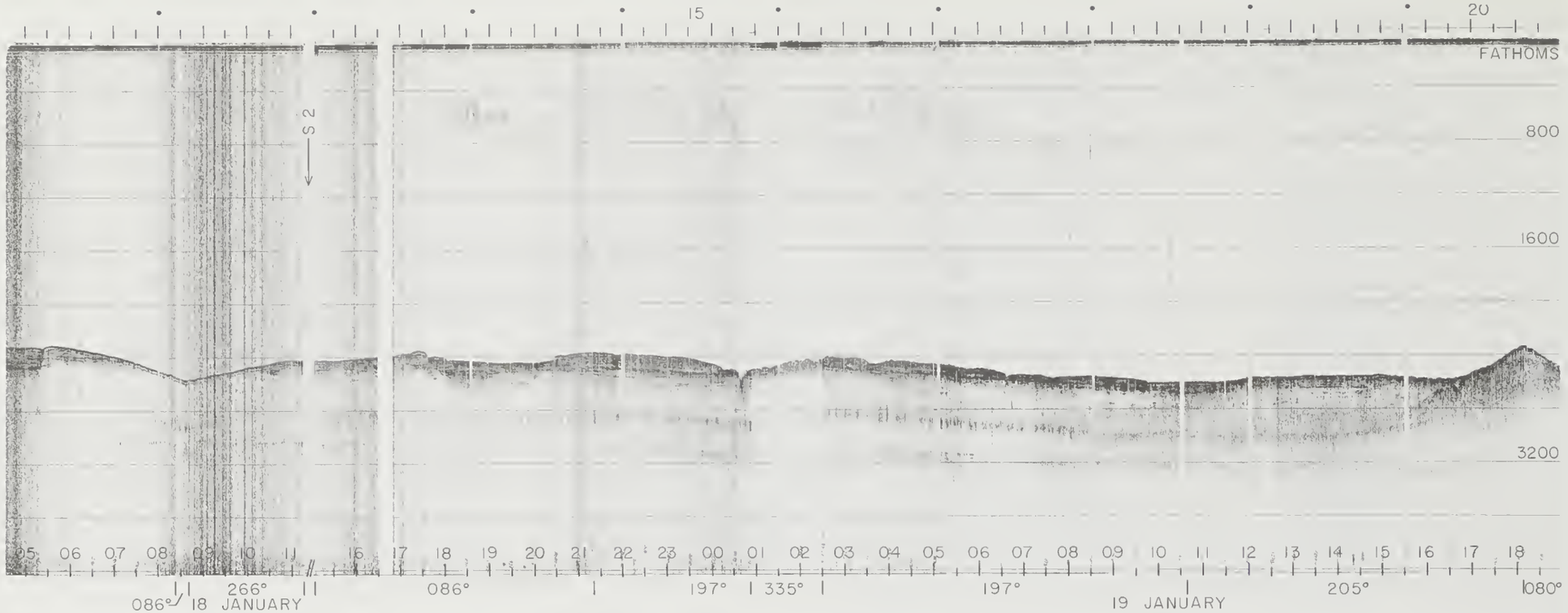

720
725
SECONDS
2
4
6
S 144
ST. GEORGE BERMUDA
00 01 02 03 04 05 06 07 08 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11
000°
V 23
270°
000°/180°/270° 4 DECEMBER
000°
5 DECEMBER
355°
015°

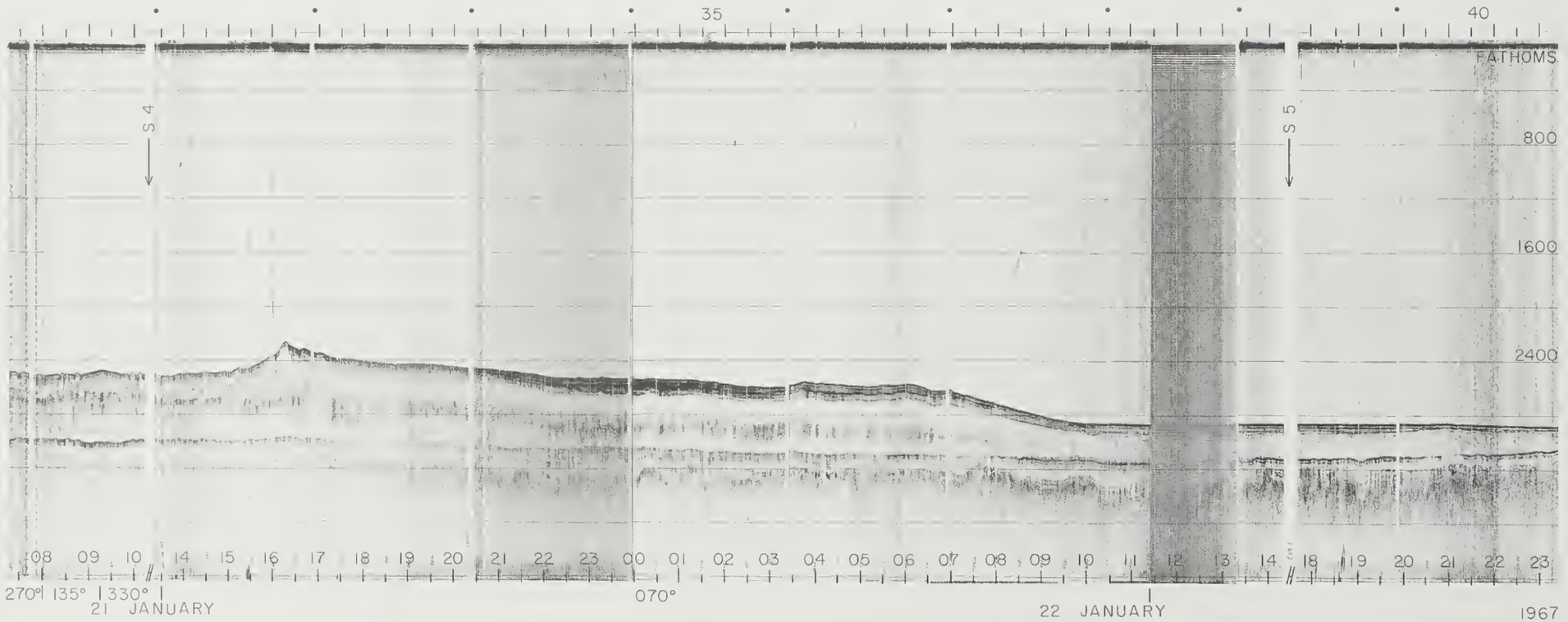

740
745
SECONDS
2
4
6
S 147
S 148
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 16 17 18 23 00 01 02 03 04 05 06
286°
340°
270°
303°
11 DECEMBER
303°

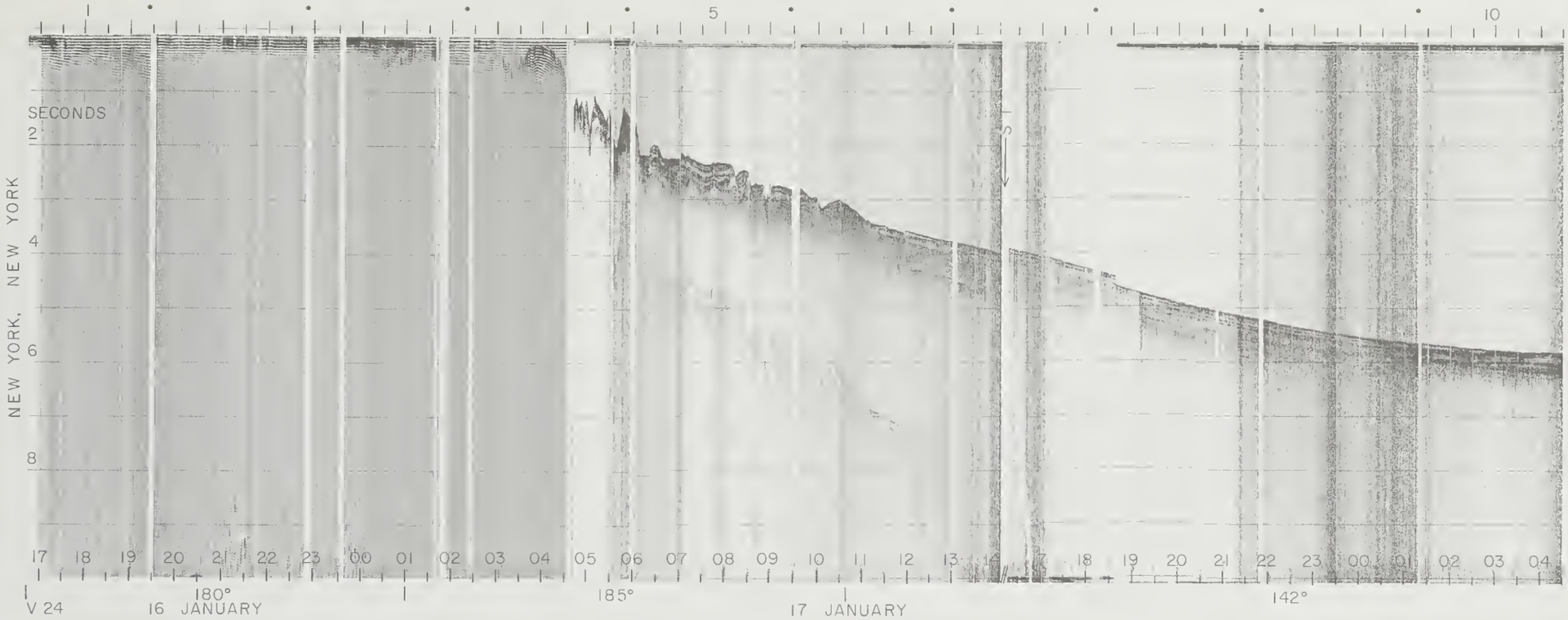

730
735
FATHOMS
800
1600
2400
S 145
S 146
23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 17 18 19 20 21 22 23 00 01 02 03 04 05 06 1 12 13 14
073°
105°
073°
052°
270°
050°
270°
000°
8 DEC.
9 DECEMBER
10 DECEMBER

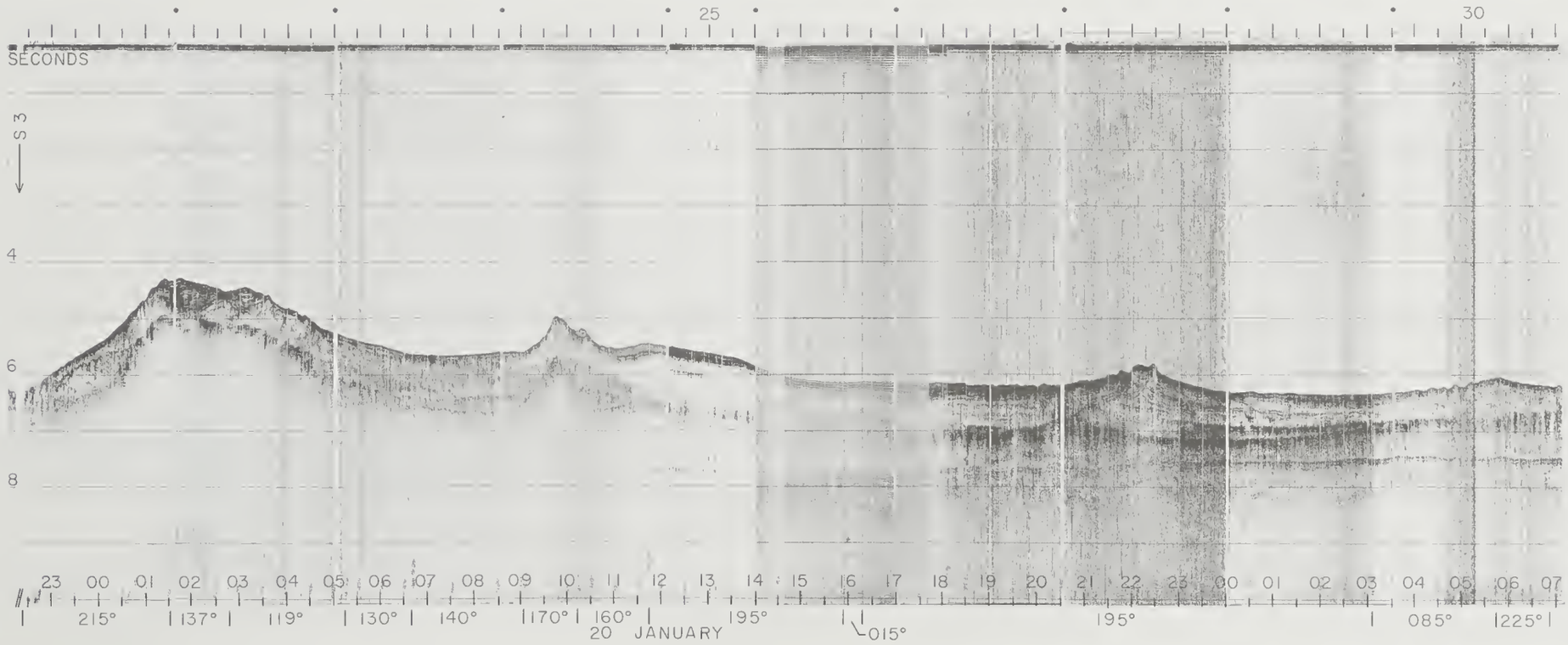

750
755
S 149
S 150
07 08 09 10 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 6 17 18 19 20 21 22
229°
340°
007°
355°
350°
12 DECEMBER
13 DECEMBER
1966

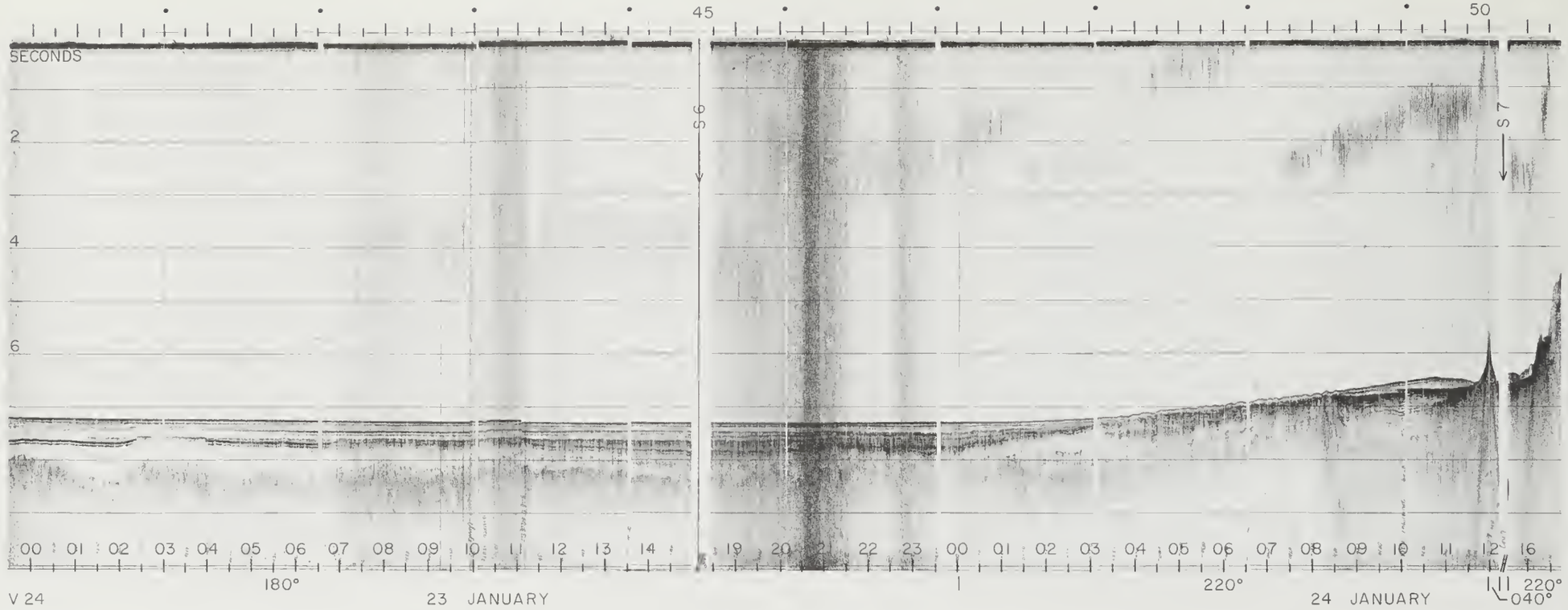

760
765
SECONDS
2
4
6
8
23 24 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20
308°
305°
310°
318°
V 23
14 DECEMBER
NEW YORK

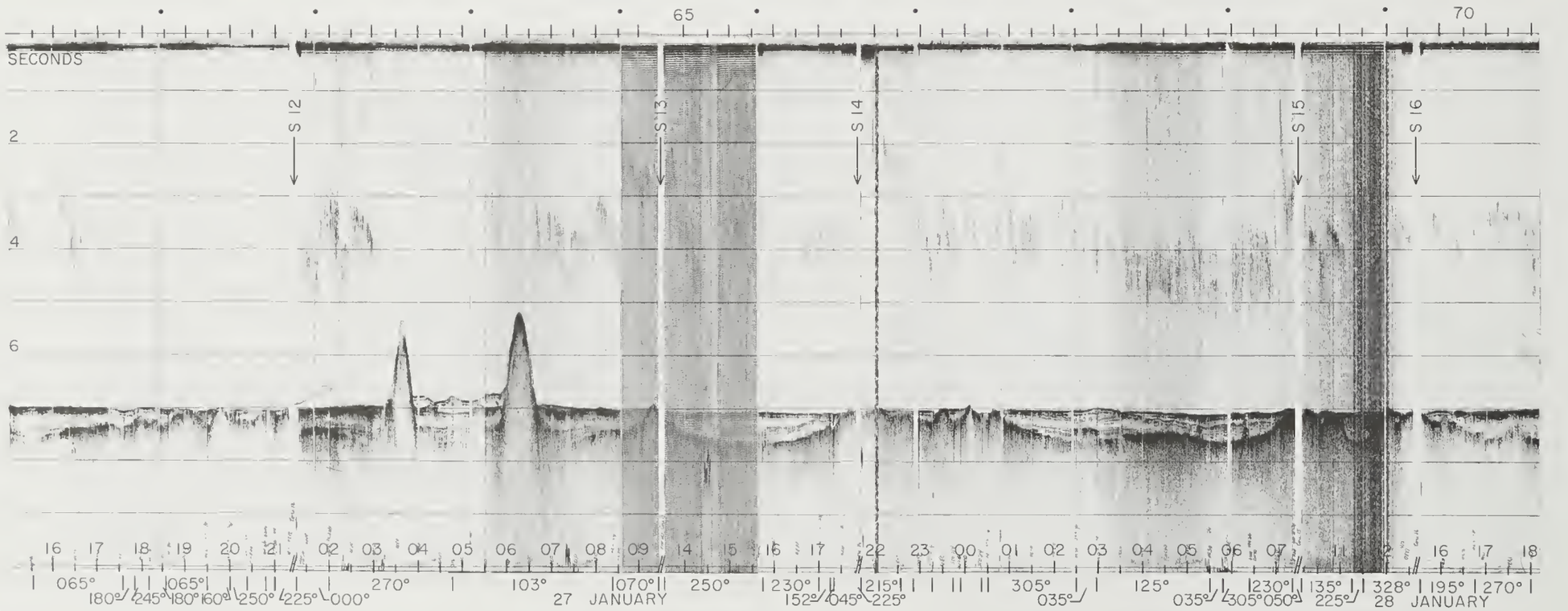

15
20
FATHOMS
800
1600
3200
S 2
05 06 07 08 09 10 11 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
086°
266°
18 JANUARY
086°
197°
335°
197°
19 JANUARY
205°
080°

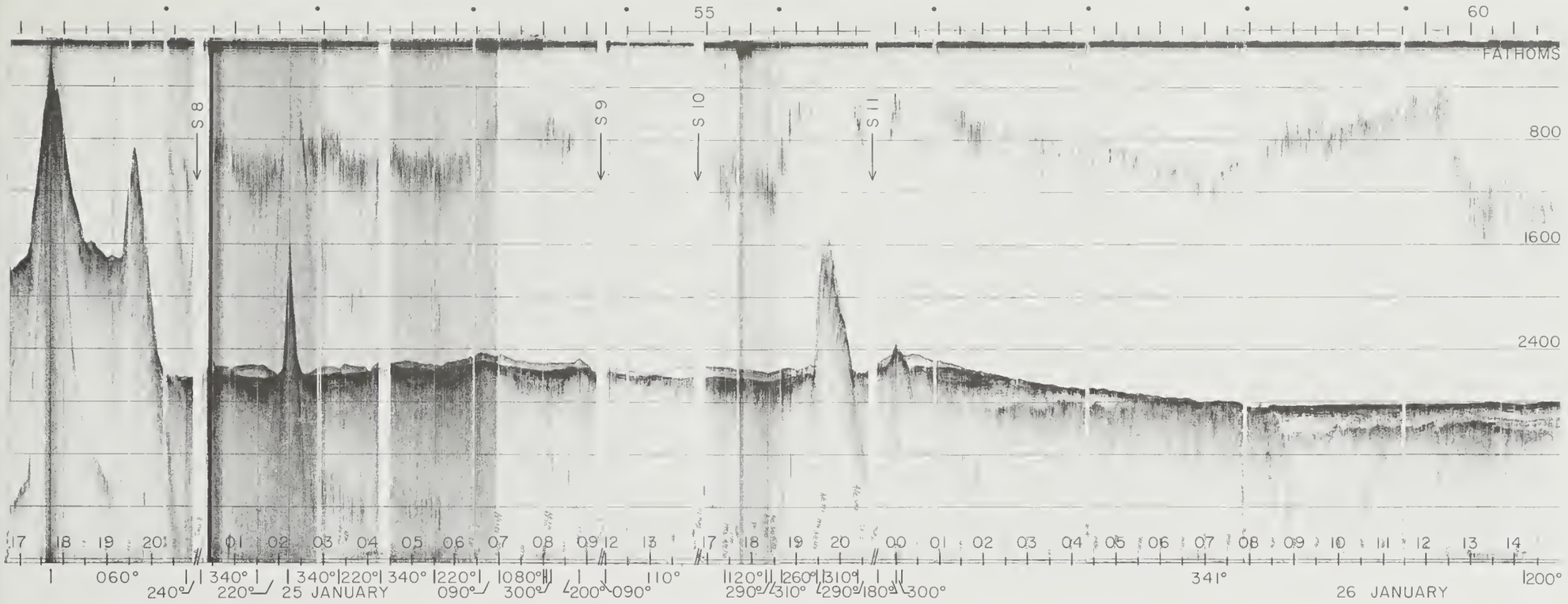

35
40
FATHOMS
800
1600
2400
S 4
S 5
08 09 10 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 18 19 20 21 22 23
270°
135°
330°
21 JANUARY
070°
22 JANUARY
1967

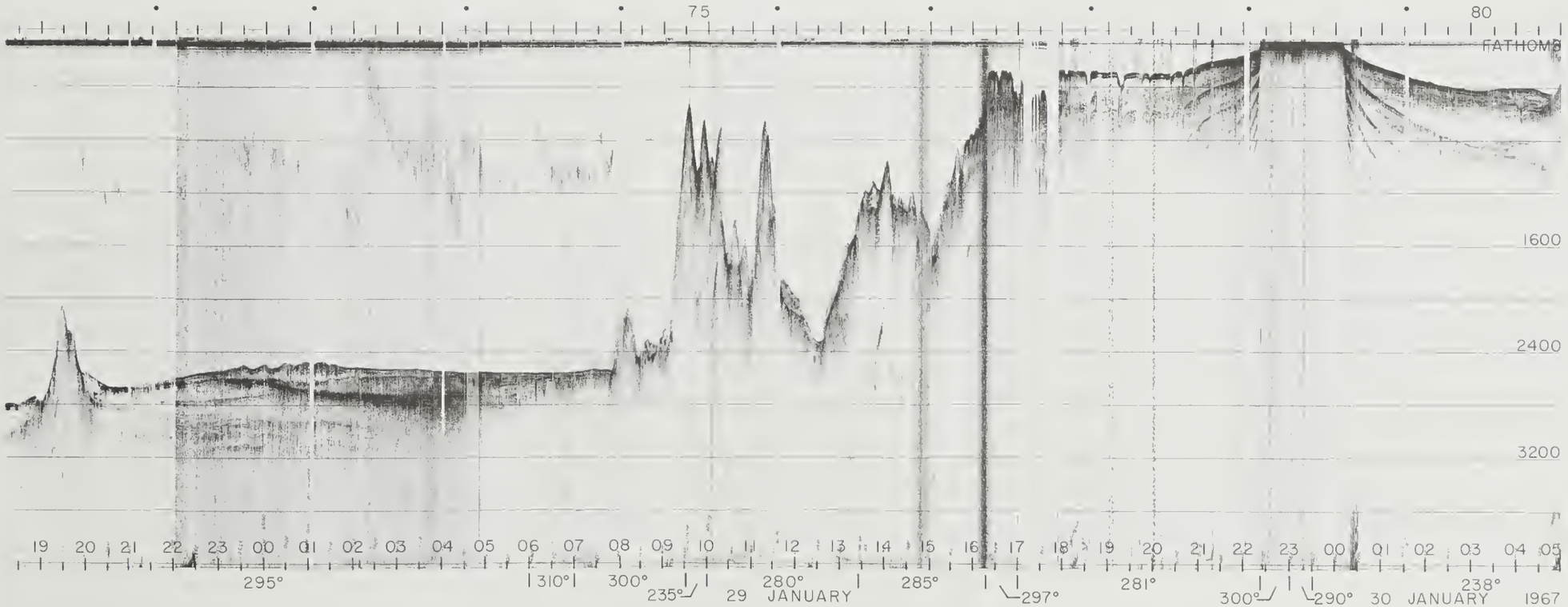

5
10
SECONDS
2
4
6
8
NEW YORK, NEW YORK
S1
17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 17 18 19 20 21 22 23 00 01 02 03 04
180°
185°
142°
V 24
16 JANUARY
17 JANUARY

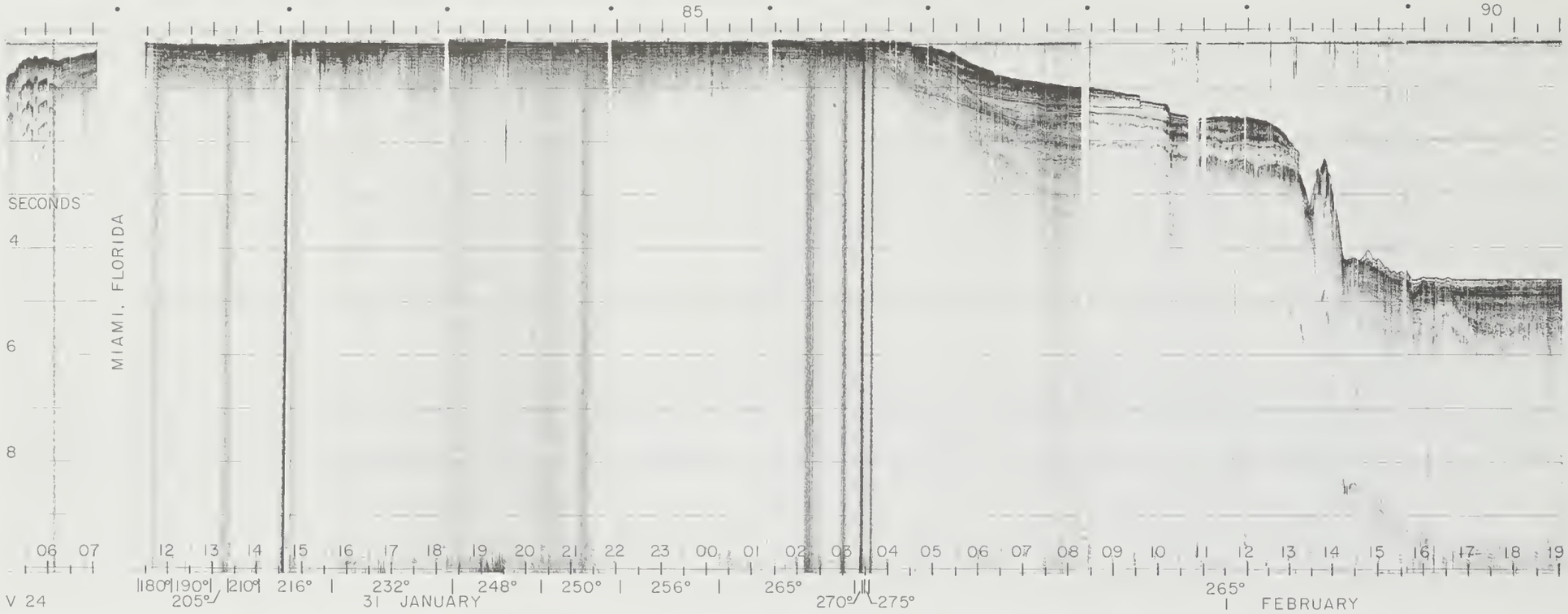

25
30
SECONDS
S3
4
6
8
23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07
215°
137°
119°
130°
140°
170°
160°
195°
015°
195°
085°
225°
20 JANUARY

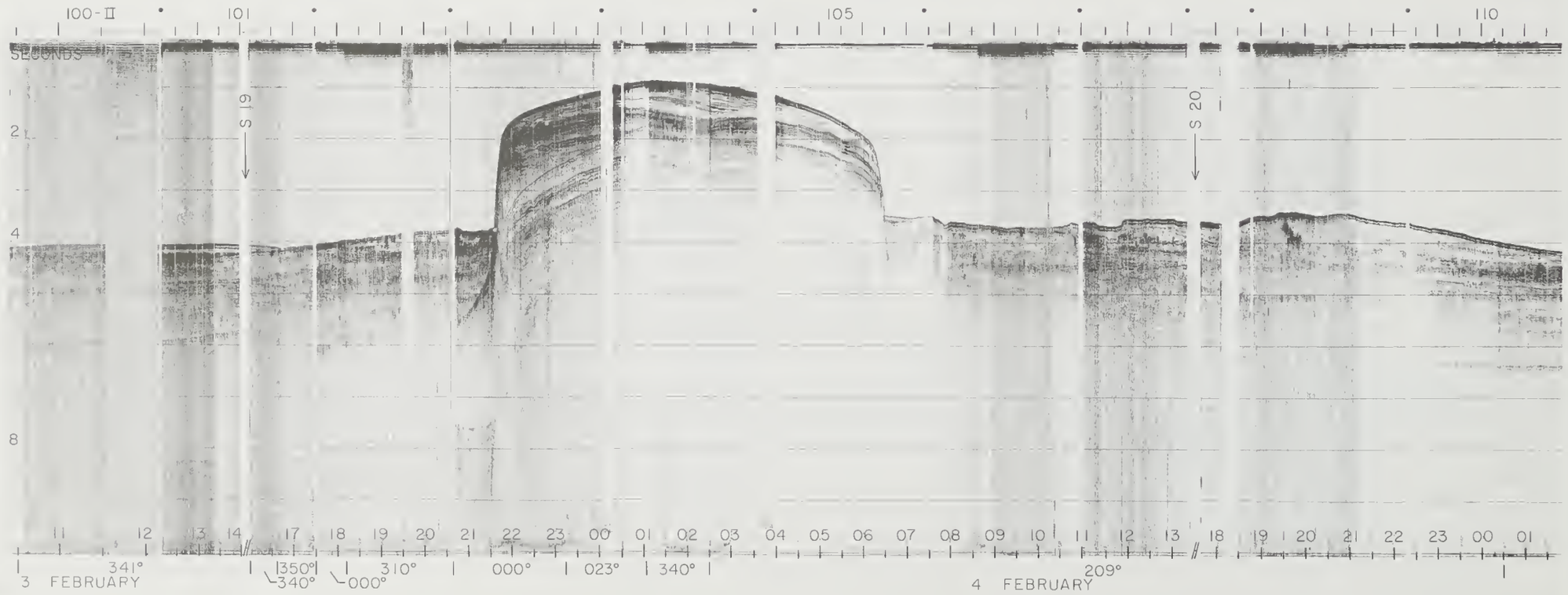

45
50
SECONDS
2
4
6
S 6
S 7
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14
180°
V 24
23 JANUARY
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 16
220°
24 JANUARY
220°
040°

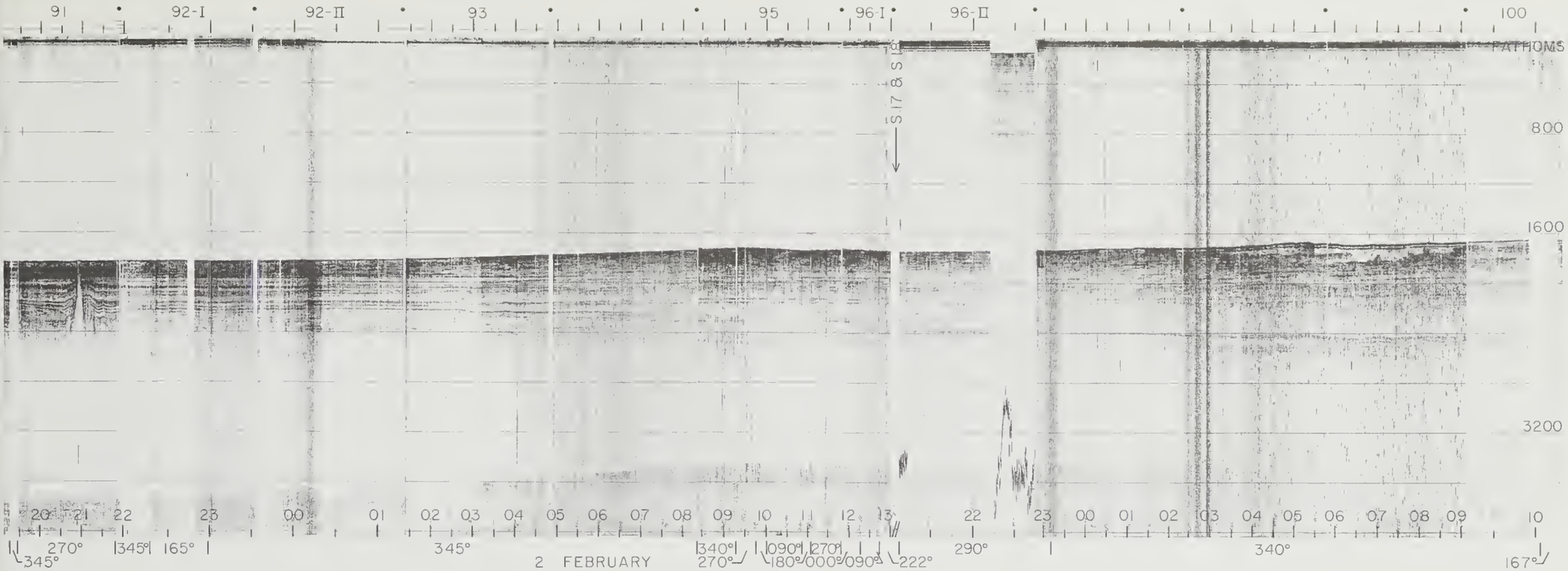

65
70
SECONDS
2
4
6
S 12
S 13
S 14
S 15
S 16
16 17 18 19 20 21 02 03 04 05 06 07 08 09 14 15 16 17 22 23 00 01 02 03 04 05 06 07 11 12 16 17 18
065° 065° 270° 103° 070° 250° 230° 215° 305° 125° 230° 135° 328° 195° 270°
180° 245° 180° 160° 250° 225° 000°
27 JANUARY
152° 045° 225°
035°
035° 305° 050° 225°
28 JANUARY

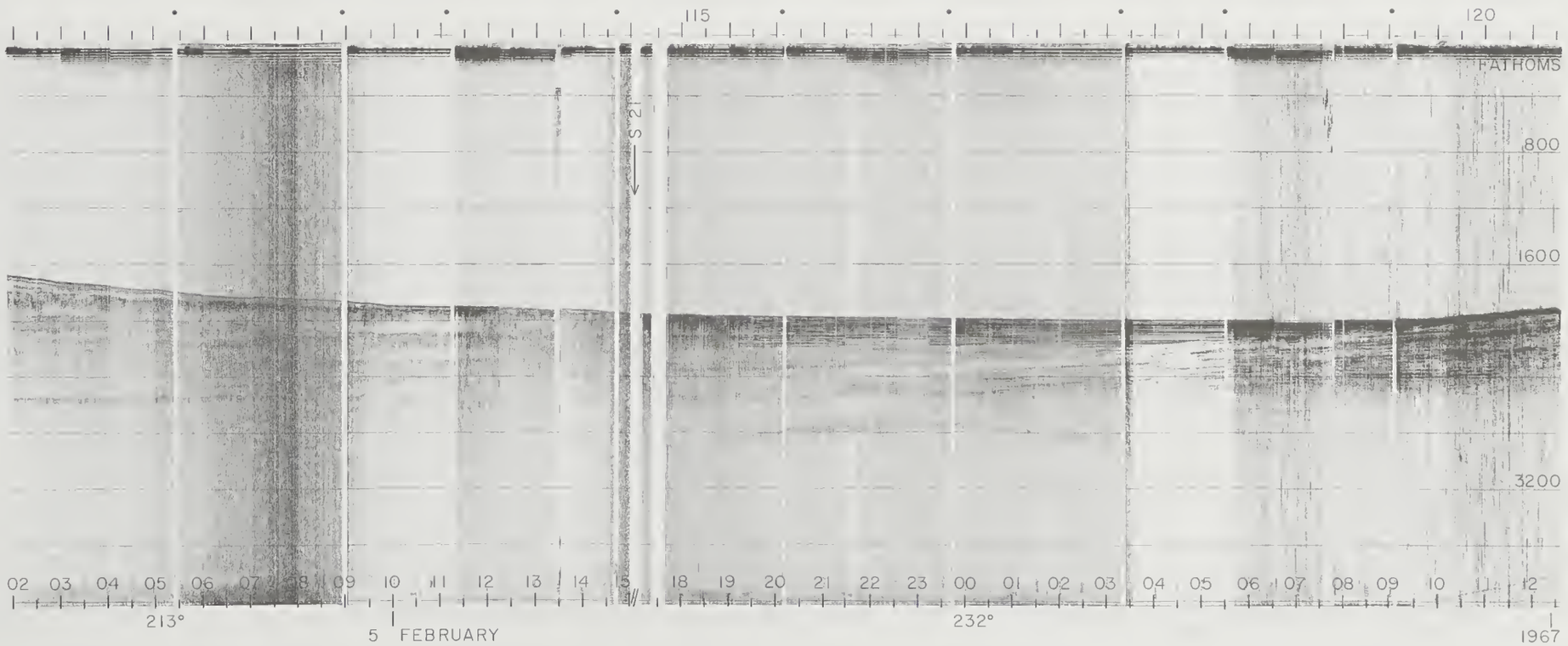

55
60
FATHOMS
800
1600
2400
S 8
S 9
S 10
S 11
17 18 19 20 01 02 03 04 05 06 07 08 09 12 13 17 18 19 20 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14
060° 340° 340° 220° 340° 220° 080° 110° 120° 260° 310° 341° 200°
240° 220° 25 JANUARY 090° 300° 200° 090° 290° 310° 290° 180° 300°
26 JANUARY

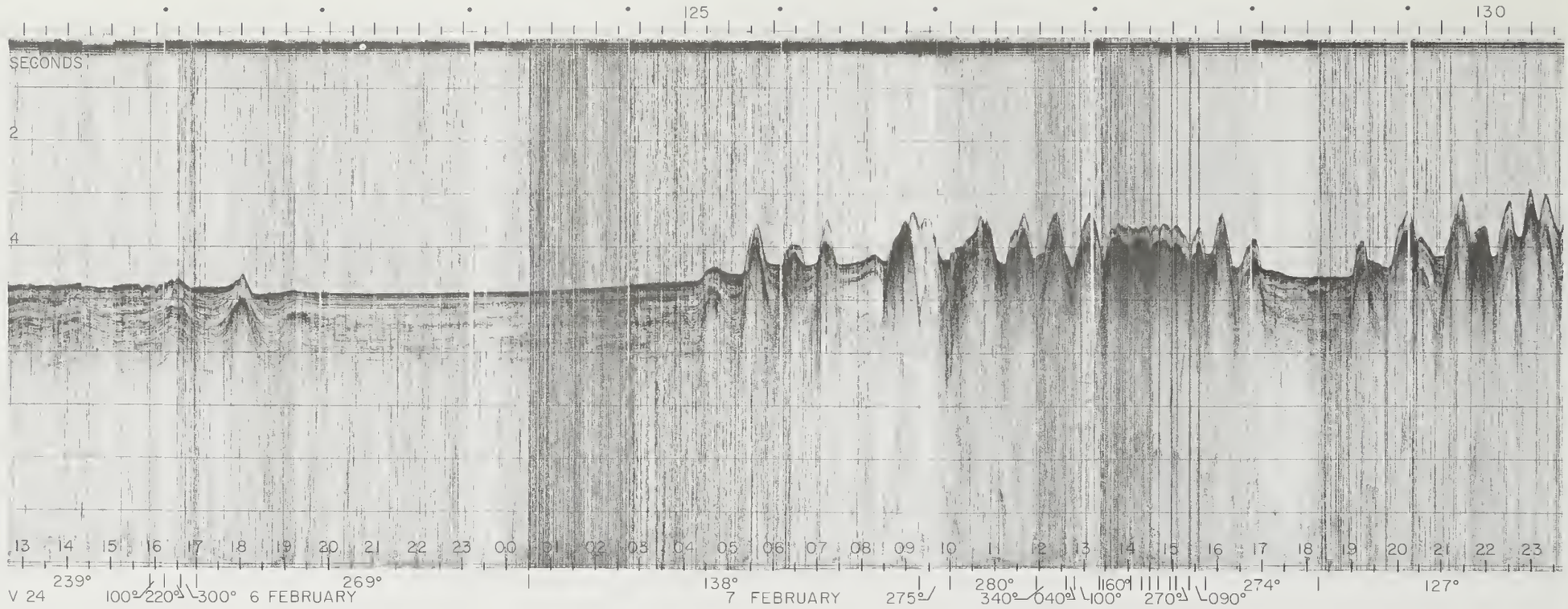

75
80
FATHOMS
1600
2400
3200
19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05
295° 310° 300° 280° 285° 281° 238°
235° 29 JANUARY 297° 300° 290° 30 JANUARY 1967

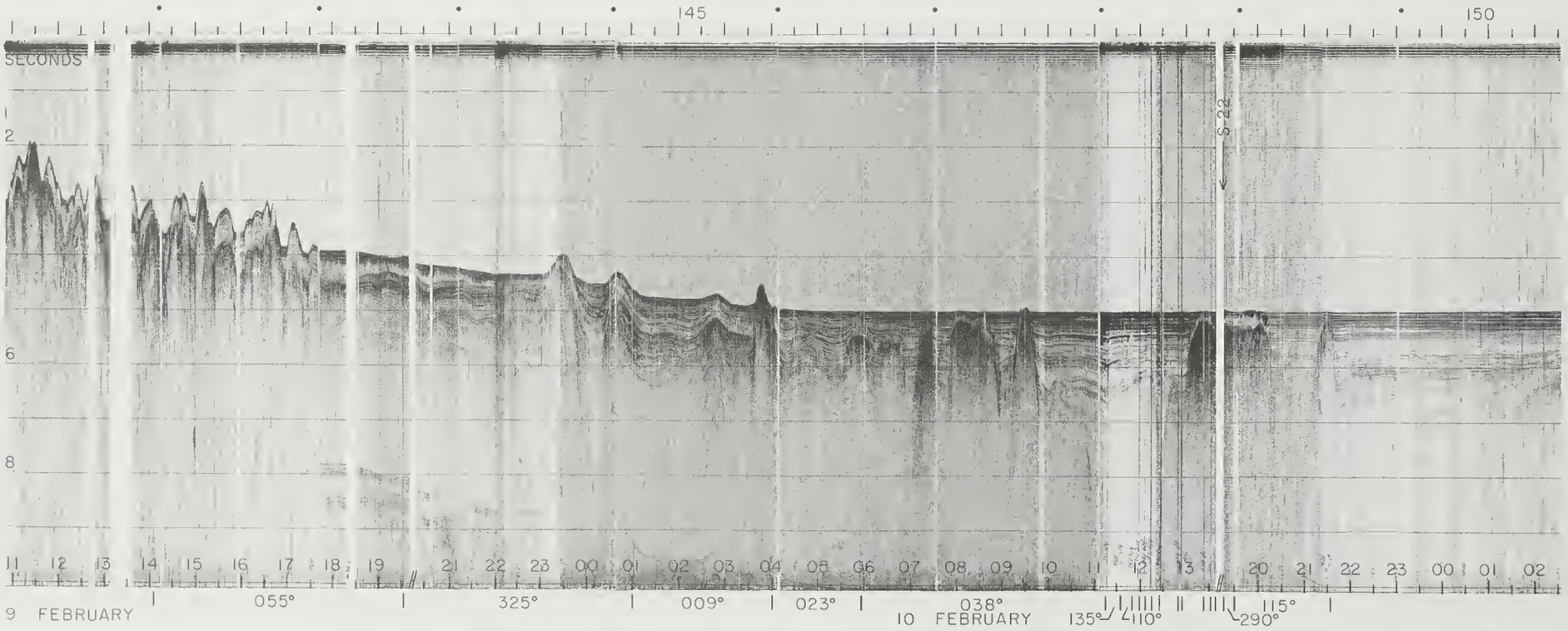

85
90
SECONDS
4
6
8
MIAMI, FLORIDA
06 07 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19
180° 190° 210° 216° 232° 248° 250° 256° 265° 270° 275° 265°
205°
V 24
31 JANUARY
1 FEBRUARY

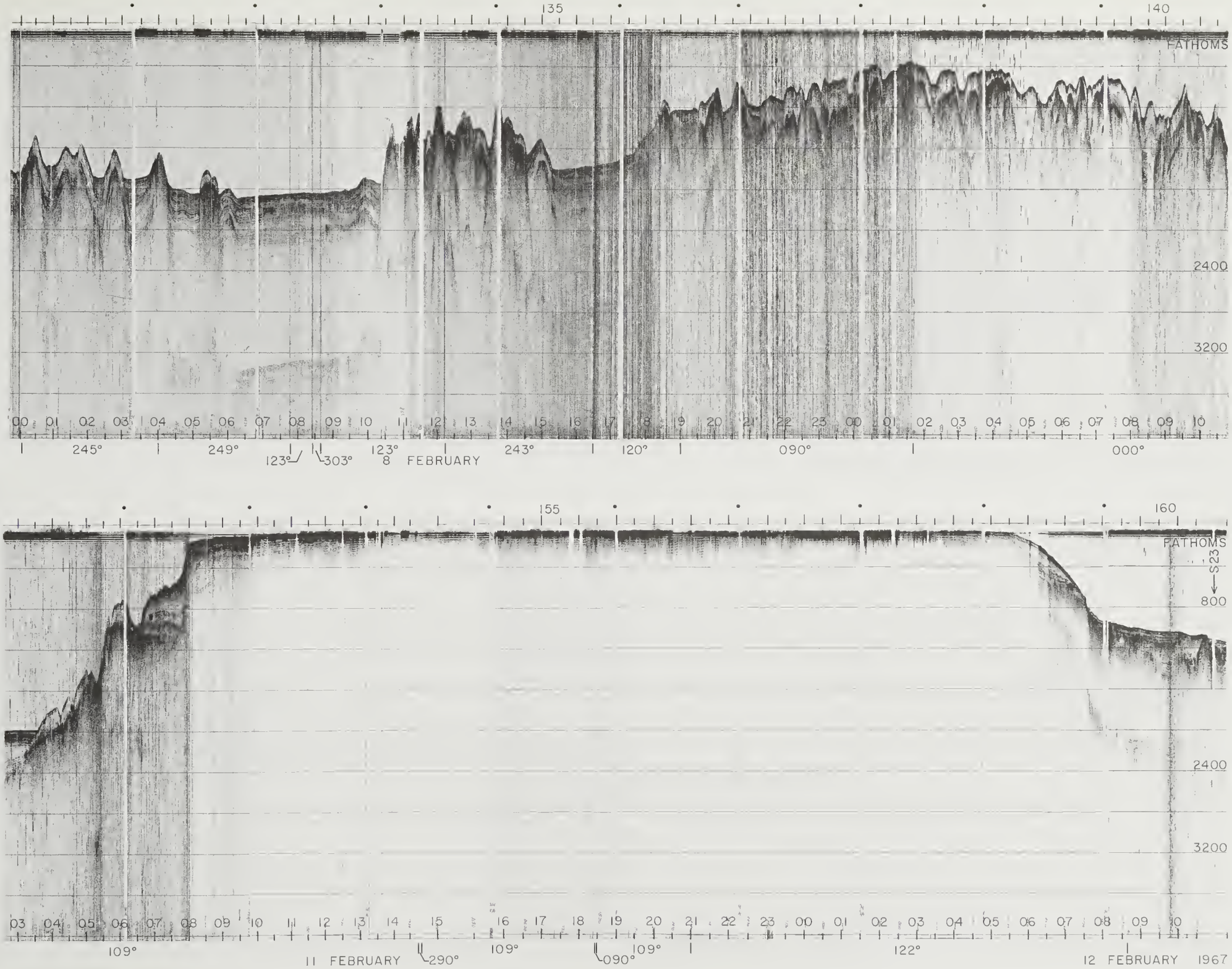

100-II
101
105
110
SECONDS
2
4
8
S 19
S 20
11 12 13 14 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 18 19 20 21 22 23 00 01
341° 350° 340° 310° 000° 023° 340° 209°
000°
3 FEBRUARY
4 FEBRUARY

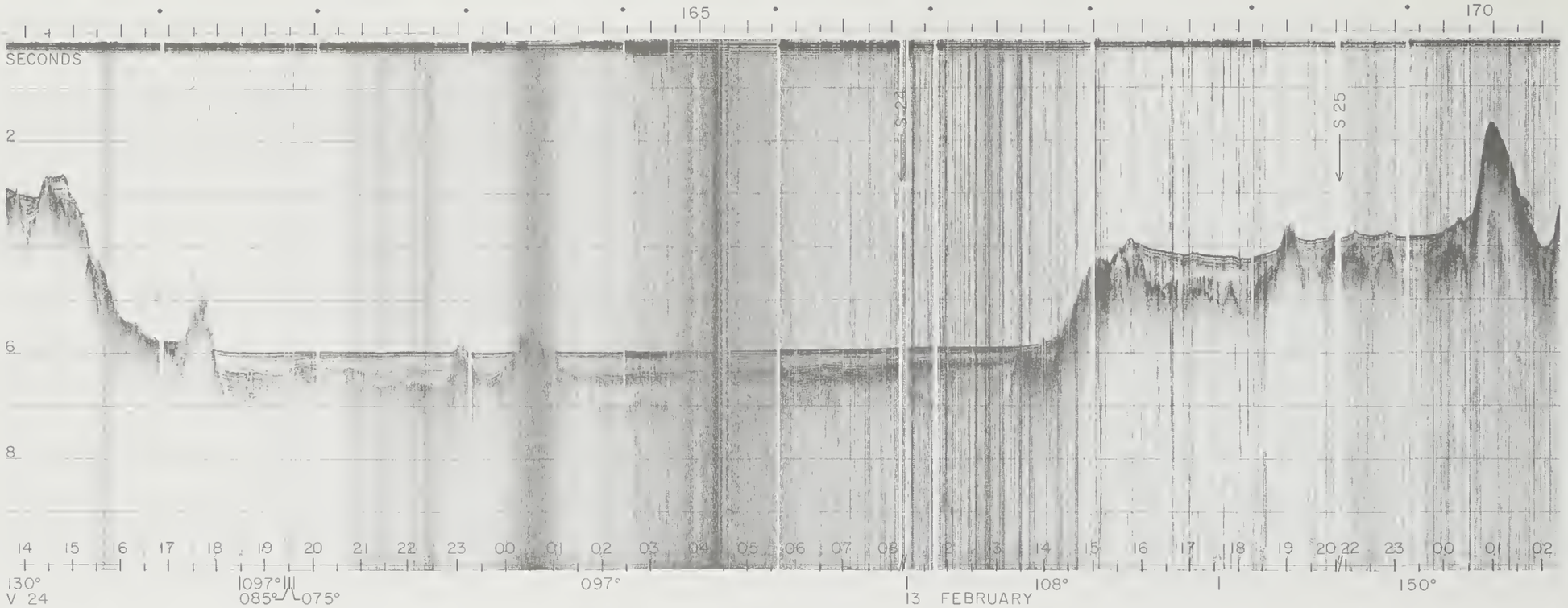

91
92-I
92-II
93
95
96-I
96-II
100
FATHOMS
800
1600
3200
S 17 & S 18
20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 22 23 00 01 02 03 04 05 06 07 08 09 10
345° 270° 345° 165° 345° 340° 270° 090° 270° 180° 000° 090° 222° 290° 340° 167°
2 FEBRUARY

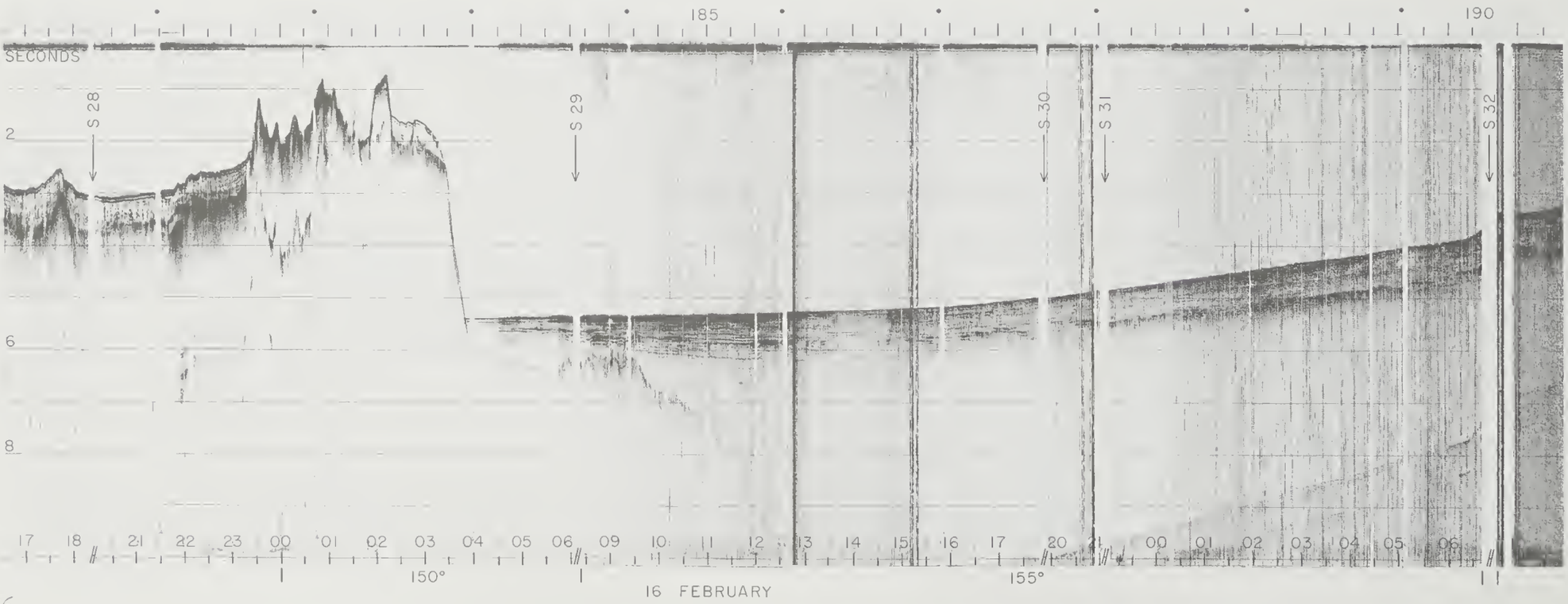

115
120
FATHOMS
800
1600
3200
S 21
02 03 04 05 06 07 08 09 10 11 12 13 14 15 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12
213° 232°
5 FEBRUARY
1967

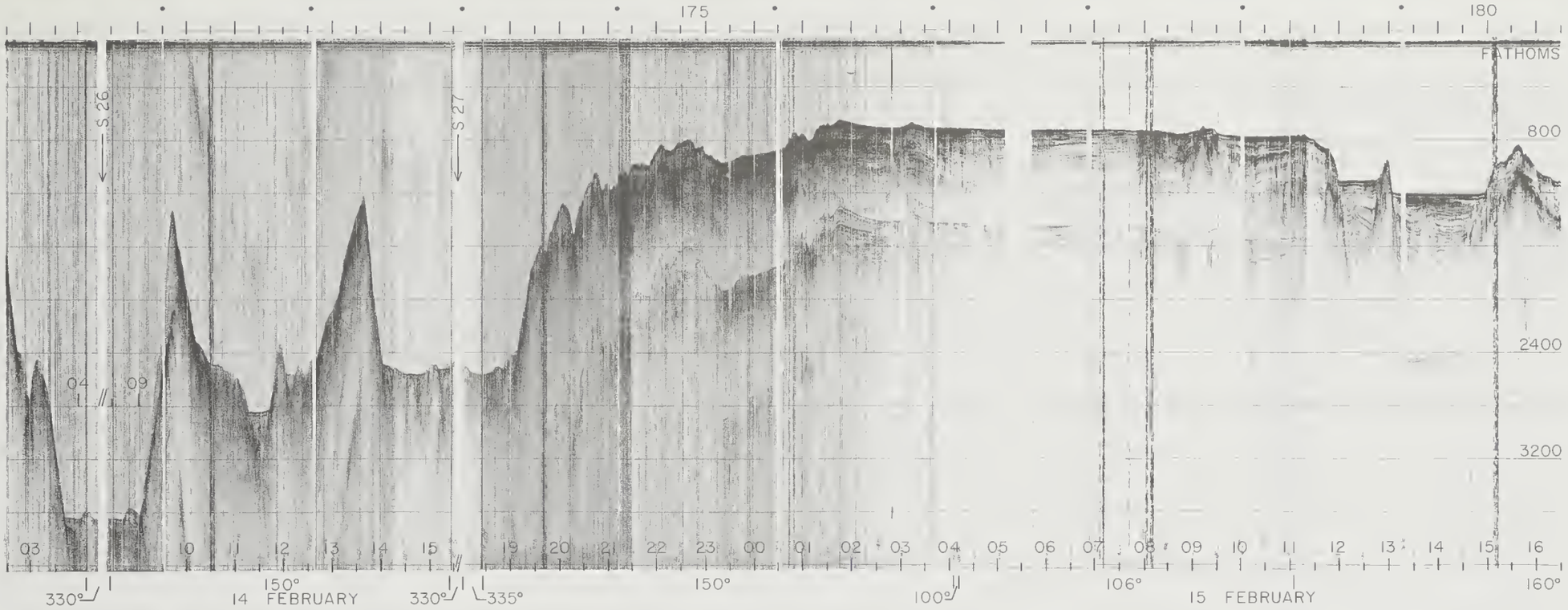

125
130
SECONDS
2
4
13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
239°
269°
138°
280°
160°
274°
127°
V 24
100°
220°
300°
6 FEBRUARY
7 FEBRUARY
275°
340°
040°
100°
270°
090°

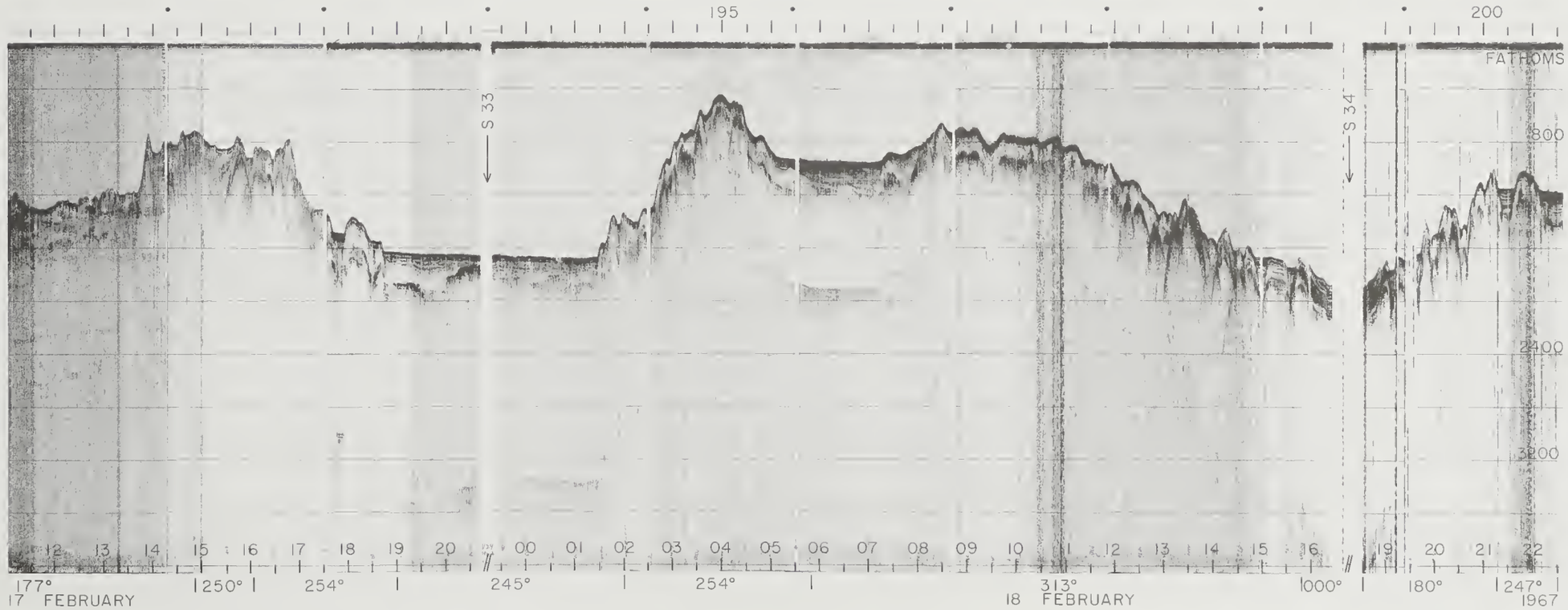

145
150
SECONDS
1
2
6
8
S-22
11 12 13 14 15 16 17 18 19 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 20 21 22 23 00 01 02
055°
325°
009°
023°
038°
115°
9 FEBRUARY
10 FEBRUARY
135°
110°
290°

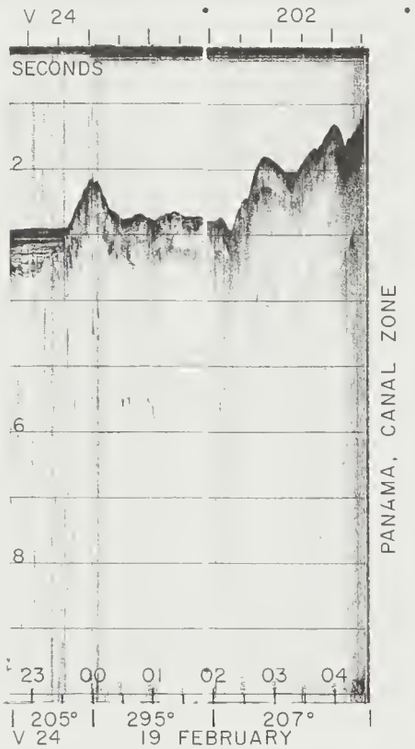

135
140
FATHOMS
2400
3200
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10
245°
249°
123°
303°
123°
8 FEBRUARY
243°
120°
090°
000°
155
160
FATHOMS
S23
800
2400
3200
03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10
109°
11 FEBRUARY
290°
109°
090°
109°
122°
12 FEBRUARY 1967

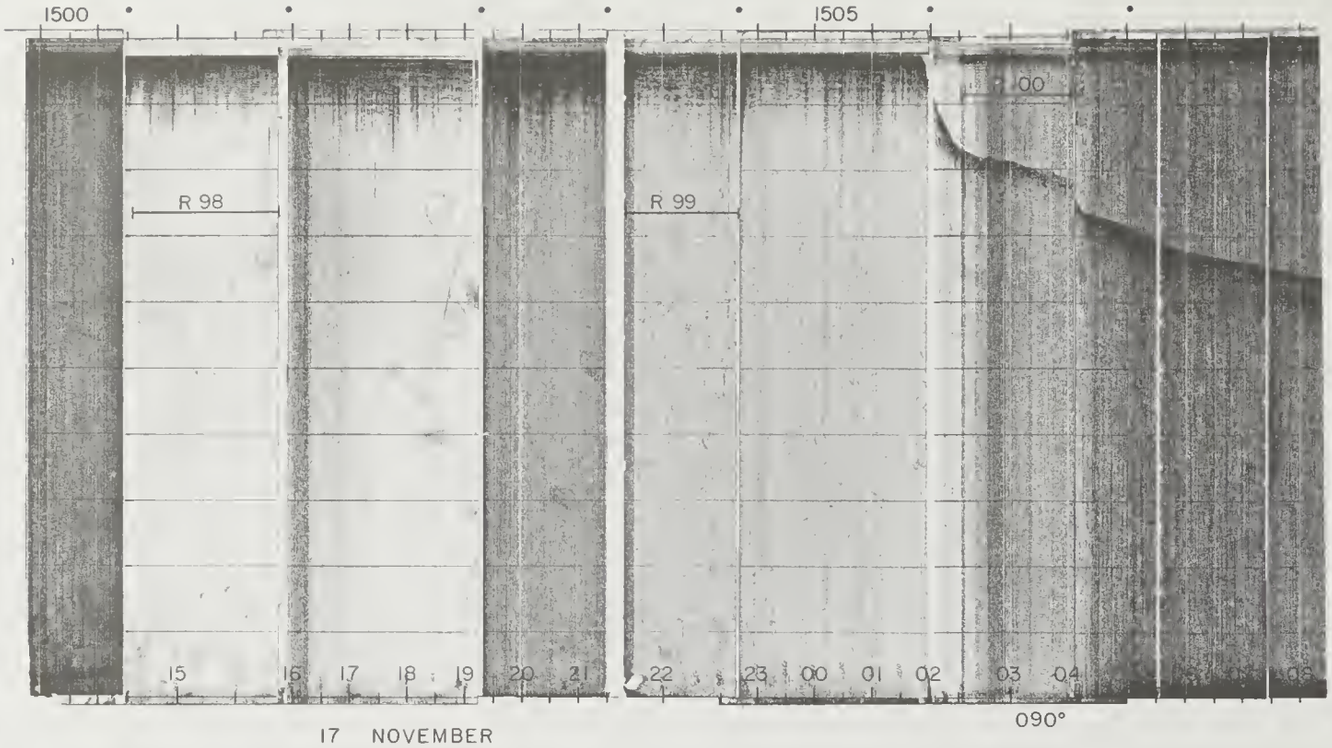

165
170
SECONDS
2
6
8
S-22
S 25
14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 12 13 14 15 16 17 18 19 20 22 23 00 01 02
130°
V 24
097°
085°
075°
097°
108°
150°
13 FEBRUARY

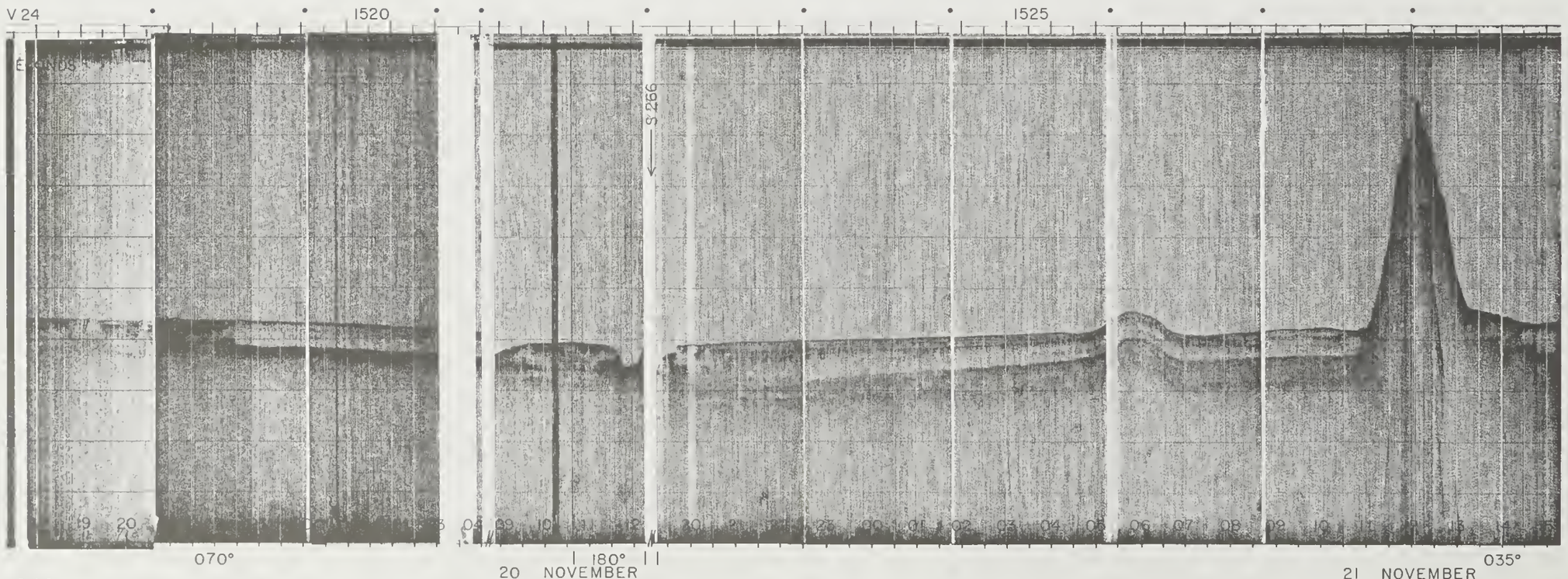

185
190
SECONDS
2
6
8
S 28
S 29
S-30
S 31
S 32
17 18 21 22 23 00 01 02 03 04 05 06 09 10 11 12 13 14 15 16 17 20 21 00 01 02 03 04 05 06
150°
155°
16 FEBRUARY

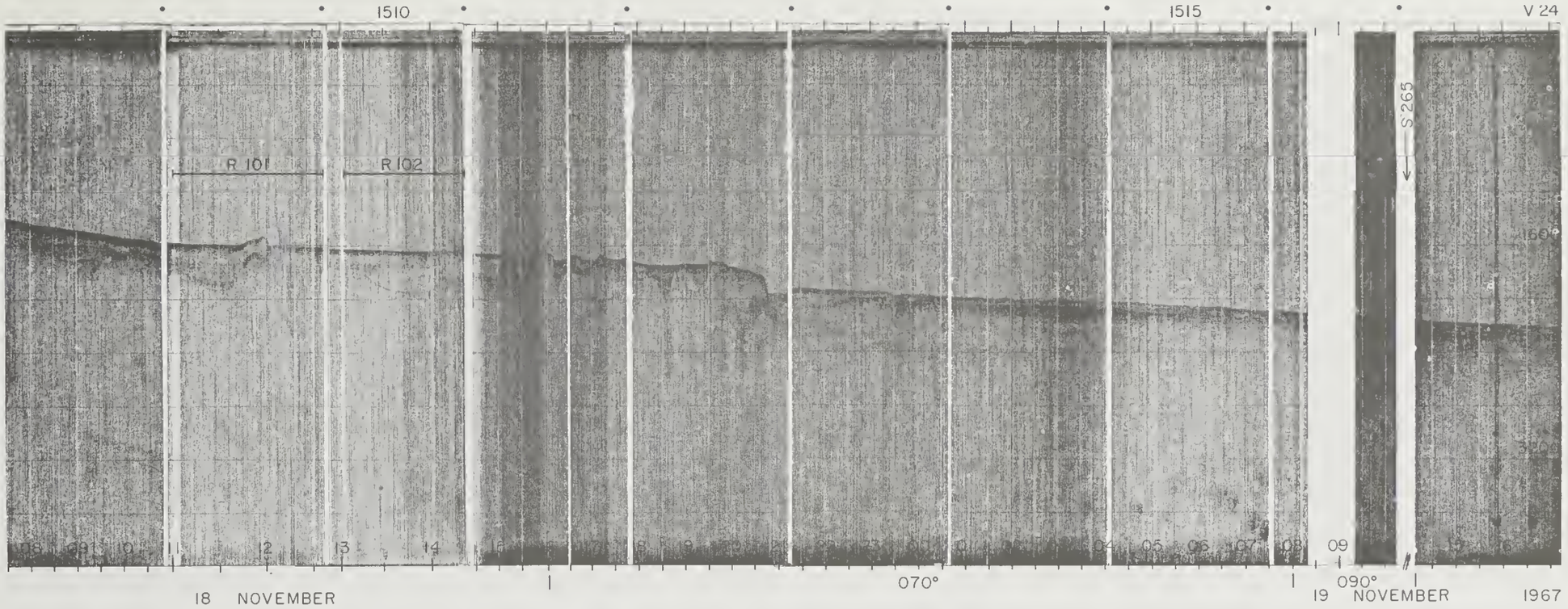

175
180
FATHOMS
800
2400
3200
S 26
S 27
04
09
03
10
11
12
13
14
15
19
20
21
22
23
00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
330°
150°
14 FEBRUARY
330°
335°
150°
100°
106°
15 FEBRUARY
160°

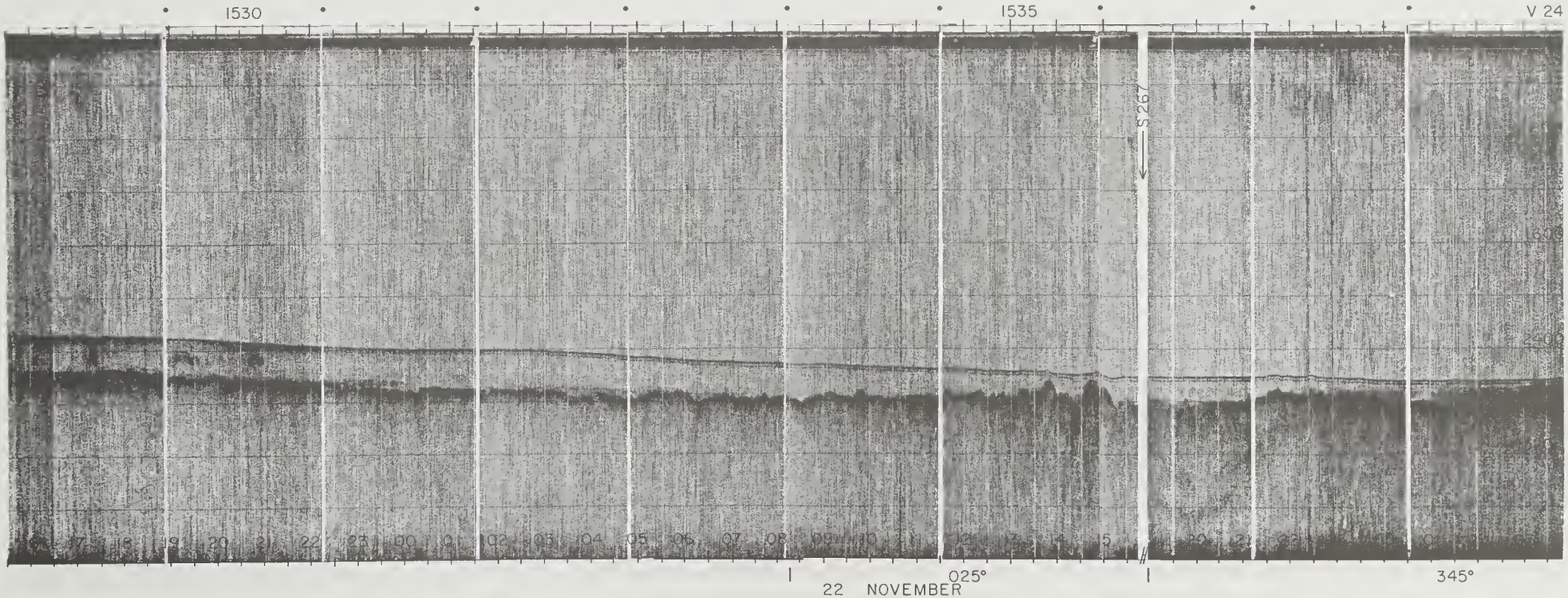

195
200
FATHOMS
800
2400
3200
S 33
S 34
12
13
14
15
16
17
18
19
20
00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
19
20
21
22
177°
17 FEBRUARY
250°
254°
245°
254°
313°
18 FEBRUARY
1000°
180°
247°
1967

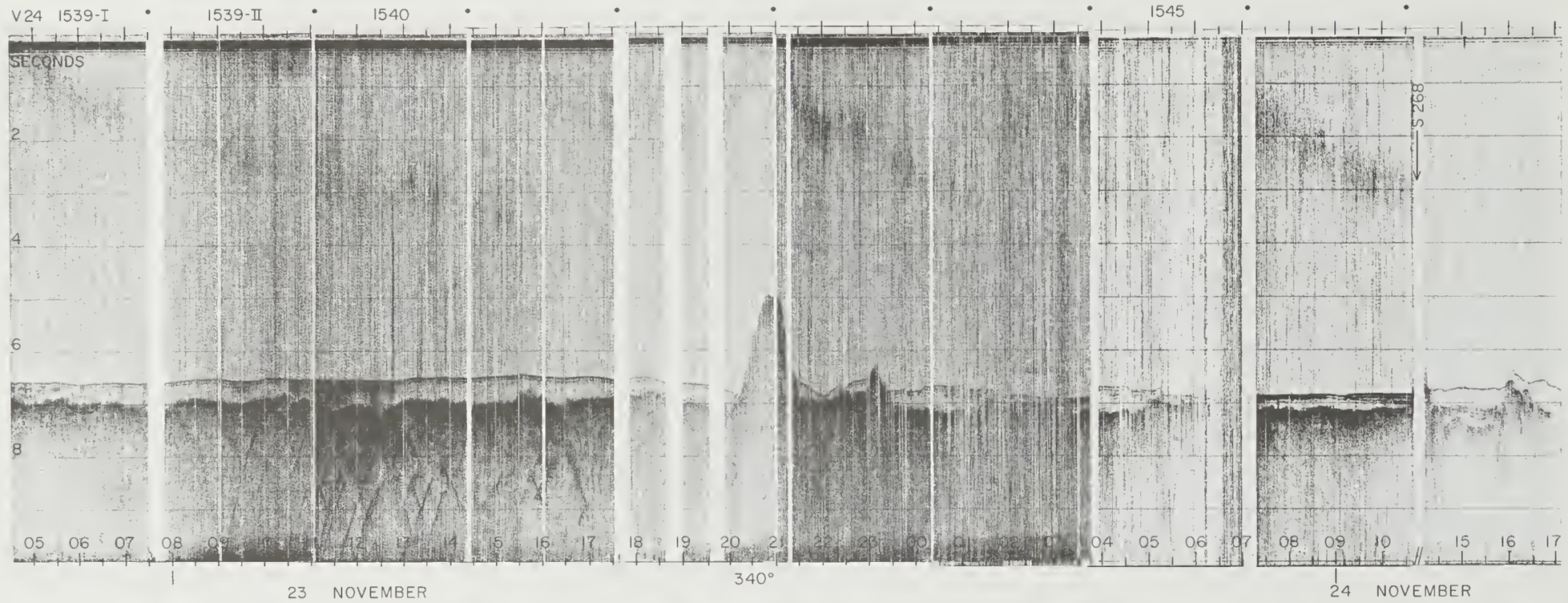

V 24
202
SECONDS
2
6
8
PANAMA, CANAL ZONE
23
00
01
02
03
04
205°
295°
207°
V 24
19 FEBRUARY

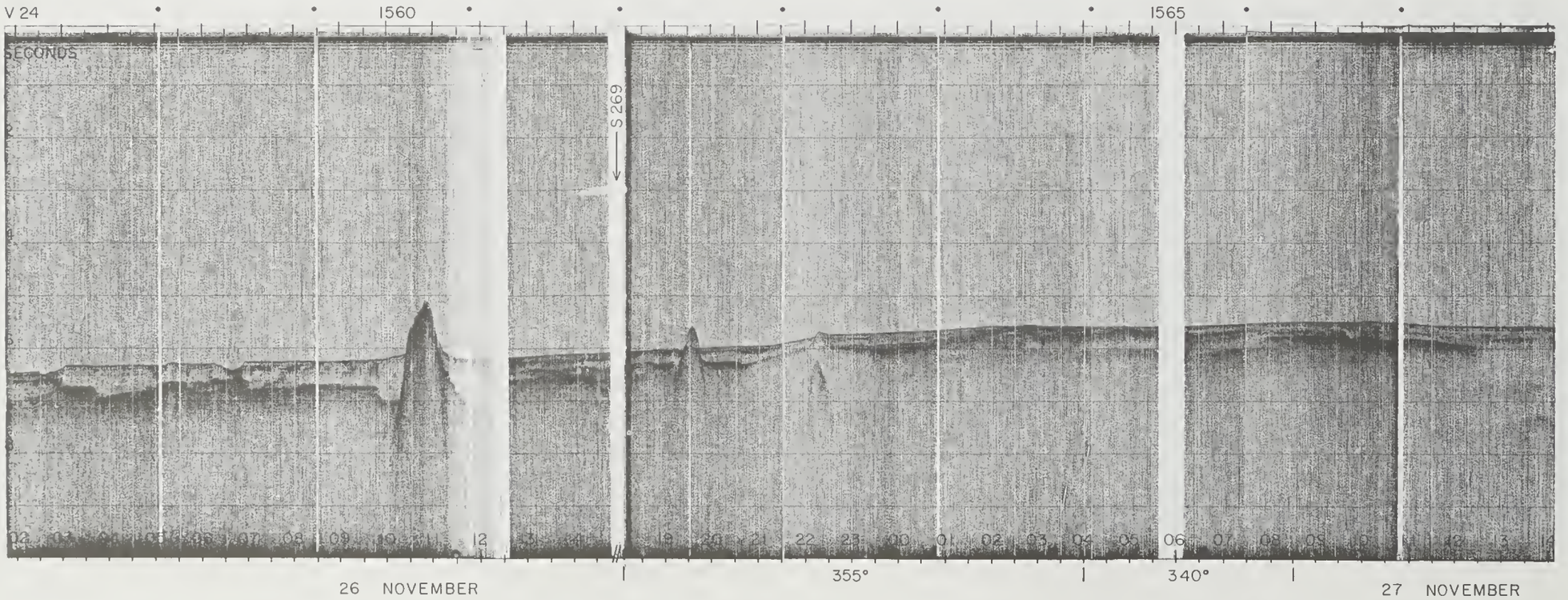

1500
1505
R 98
R 99
00
15
16
17
18
19
20
21
22
23
00
01
02
03
04
090°
17 NOVEMBER

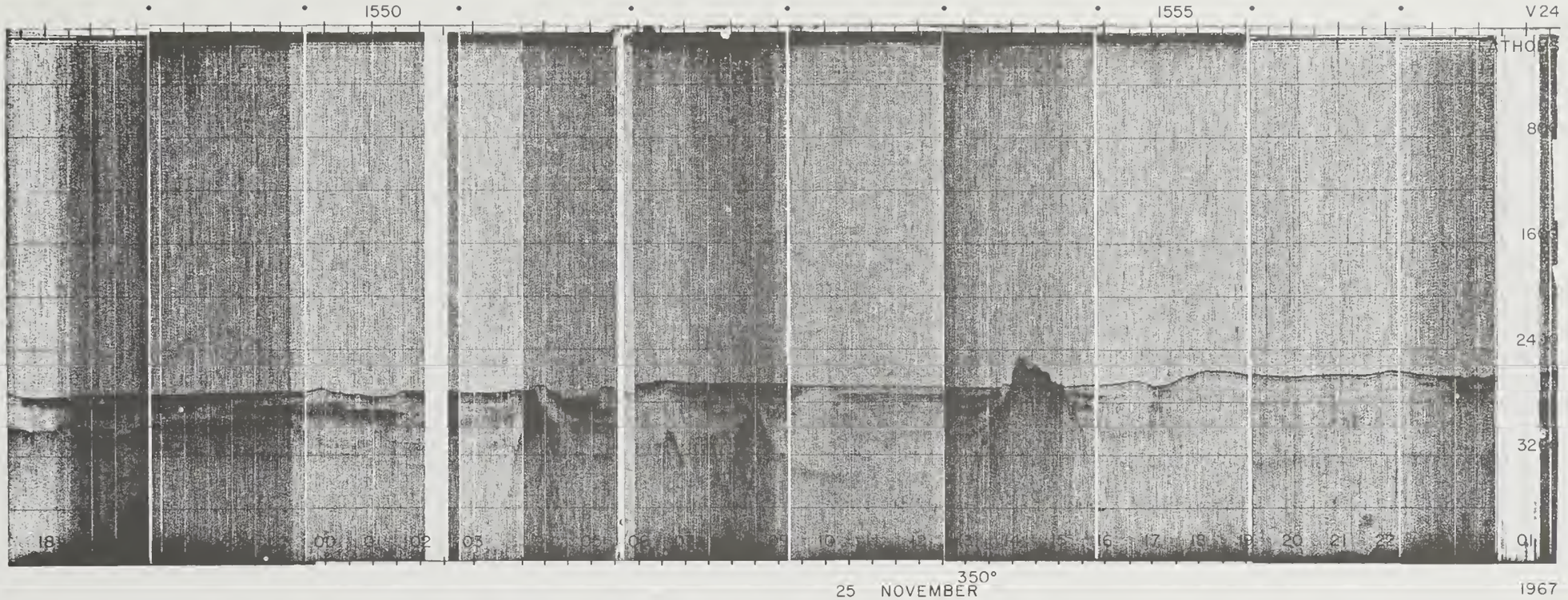

V 24
1520
1525
S 266
070°
180°
035°
20 NOVEMBER
21 NOVEMBER

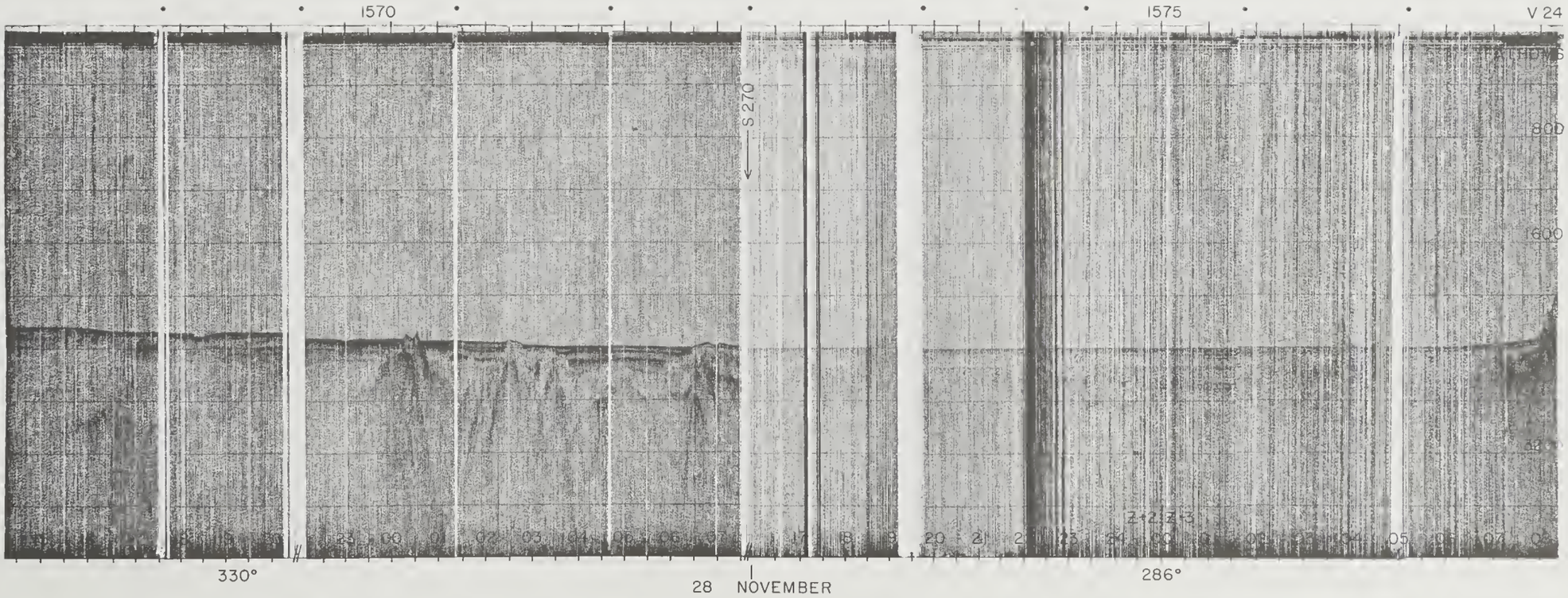

1510
1515
V 24
R 101
R 102
S 265
160°
320
09
070°
090°
18 NOVEMBER
19 NOVEMBER
1967

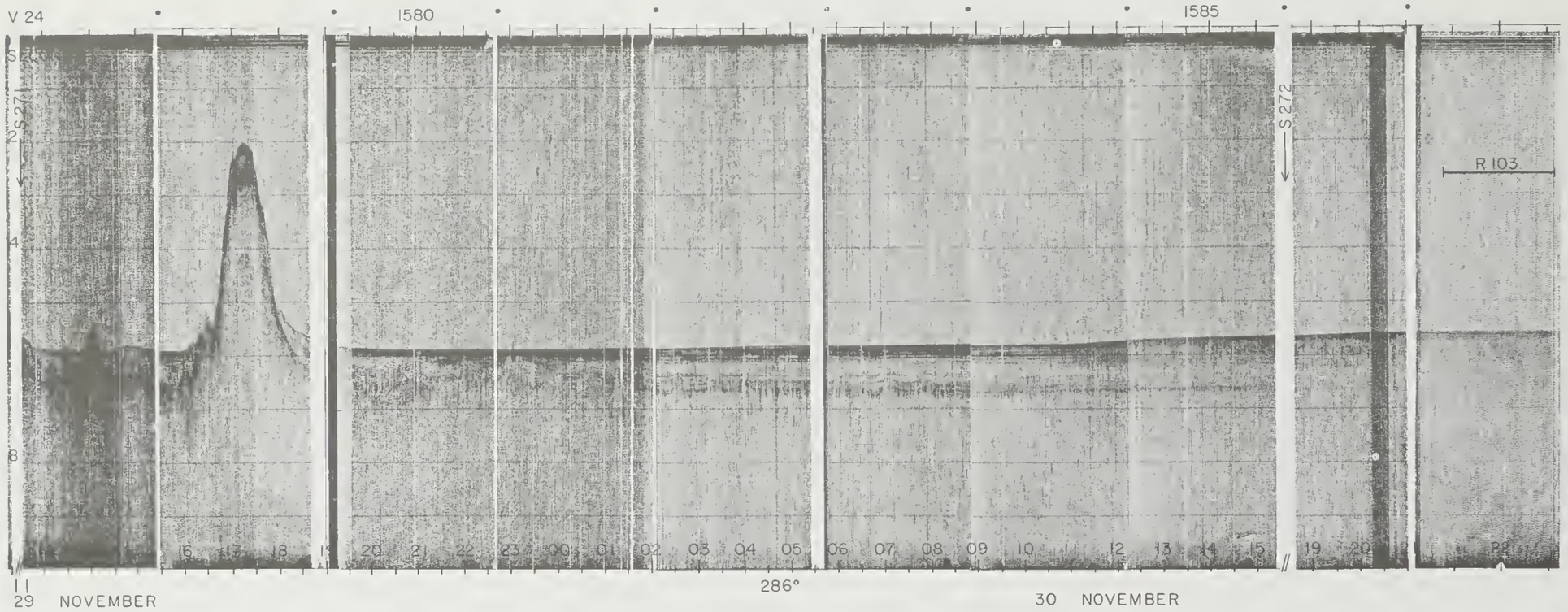

1530
1535
V 24
S 297
025°
345°
22 NOVEMBER

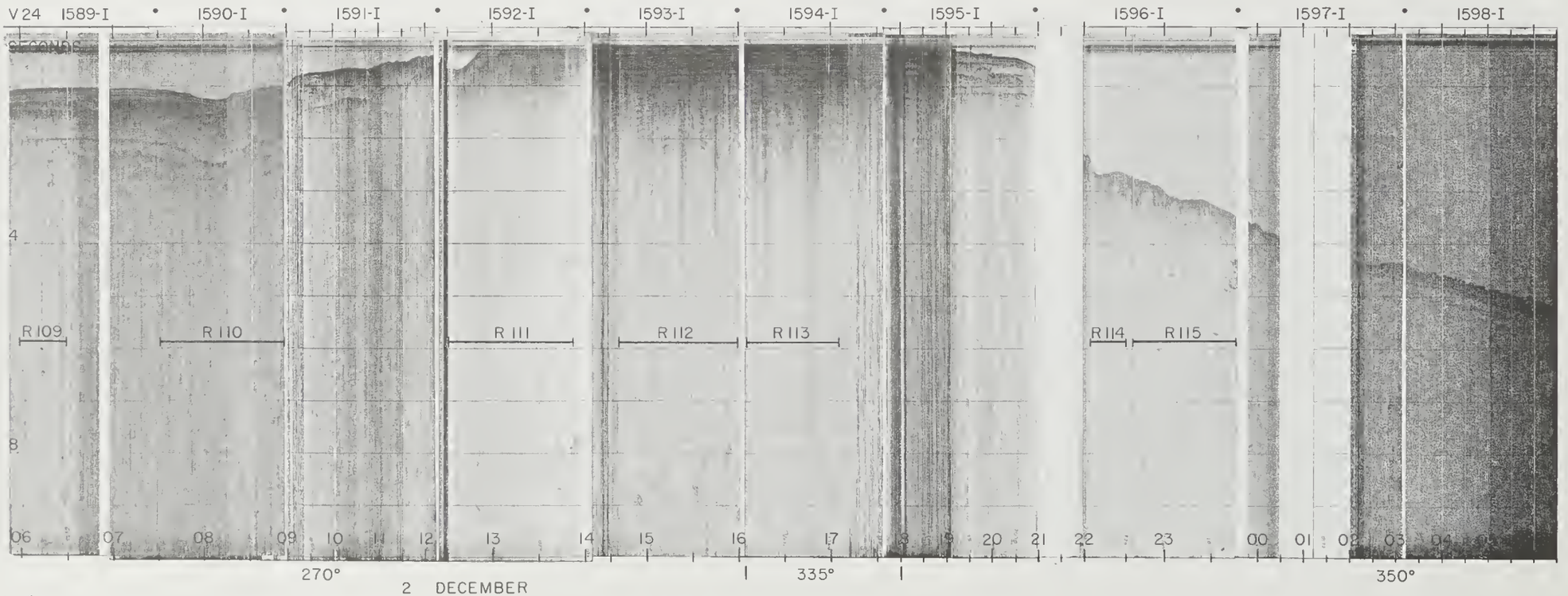

V24 1539-I
1539-II
1540
1545
SECONDS
2
4
6
8
S 268
05 06 07 08 09 10 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 15 16 17
23 NOVEMBER
340°
24 NOVEMBER

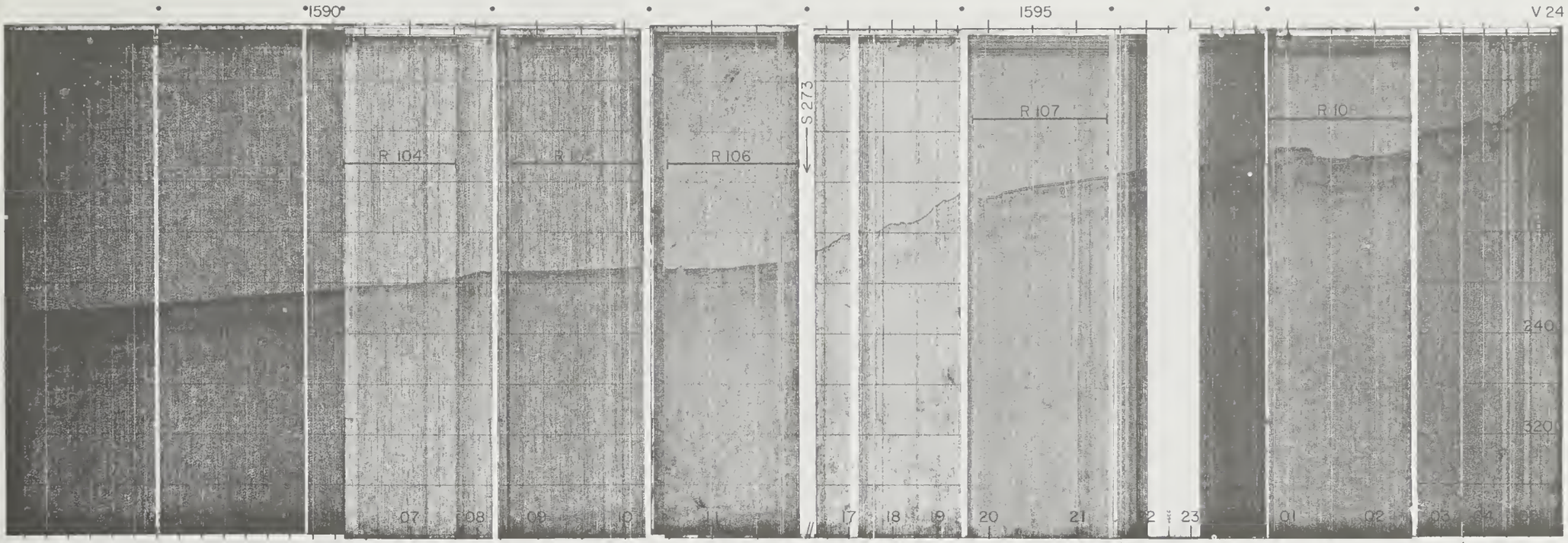

V 24
1560
1565
SECONDS
S 269
02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 12 13 14
26 NOVEMBER
355°
340°
27 NOVEMBER


1550
1555
V 24
FATHOMS
80
160
240
320
350°
25 NOVEMBER
1967

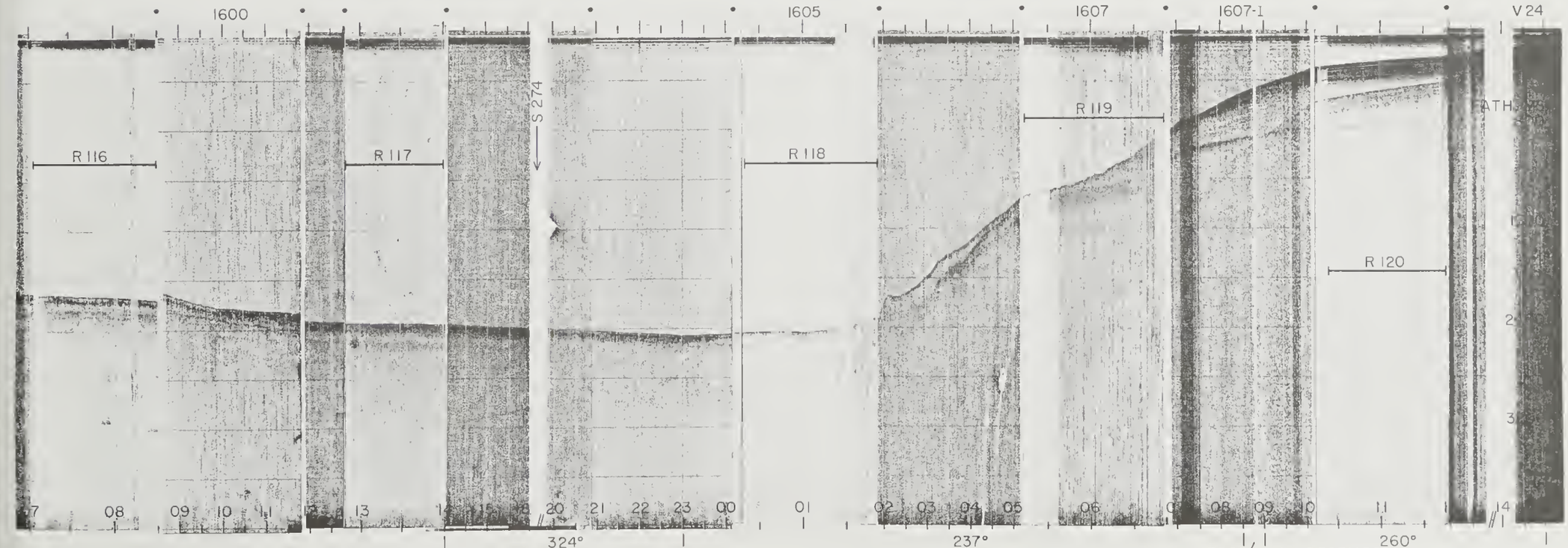

1570
1575
V 24
FATHOMS
S 270
800
1600
330°
286°
28 NOVEMBER


V 24
1580
1585
SECONDS
4
8
S 271
S 272
R 103
16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 19 20 21 22
29 NOVEMBER
286°
30 NOVEMBER

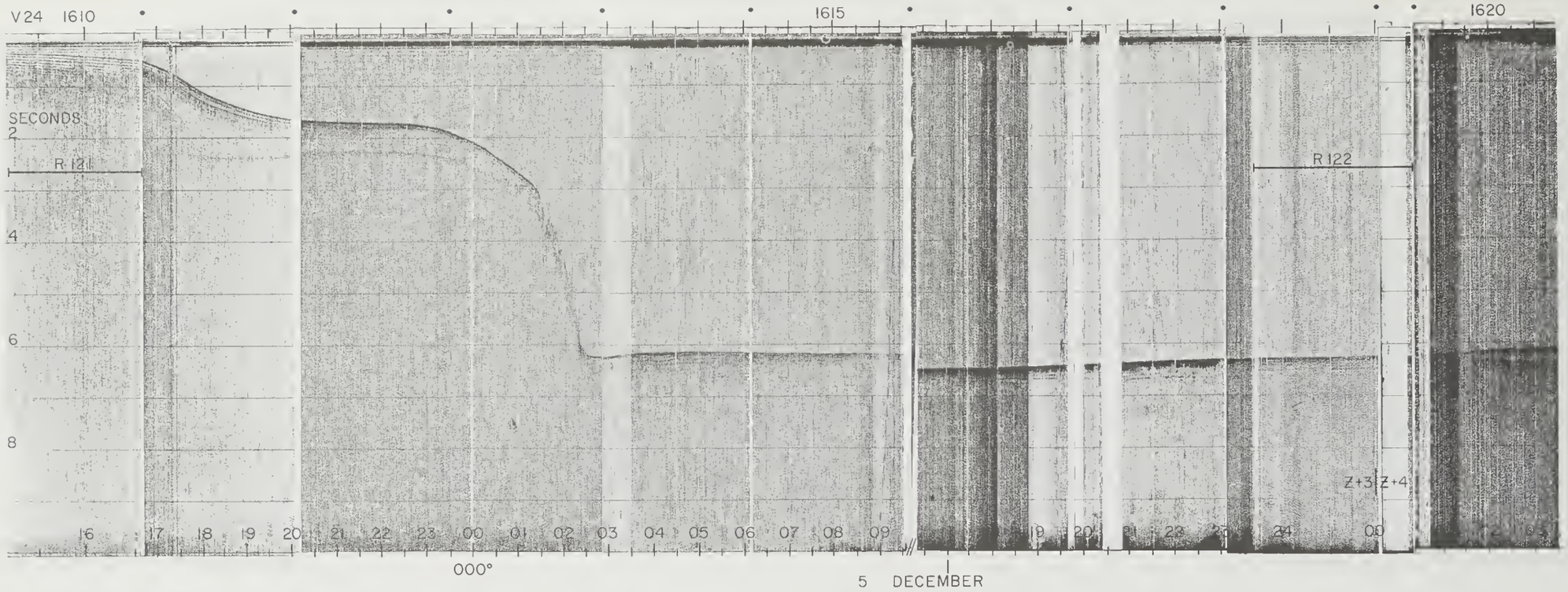

V 24
1589-I
1590-I
1591-I
1592-I
1593-I
1594-I
1595-I
1596-I
1597-I
1598-I
SECONDS
4
8
R 109
R 110
R 111
R 112
R 113
R 114
R 115
06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05
270°
2 DECEMBER
335°
350°

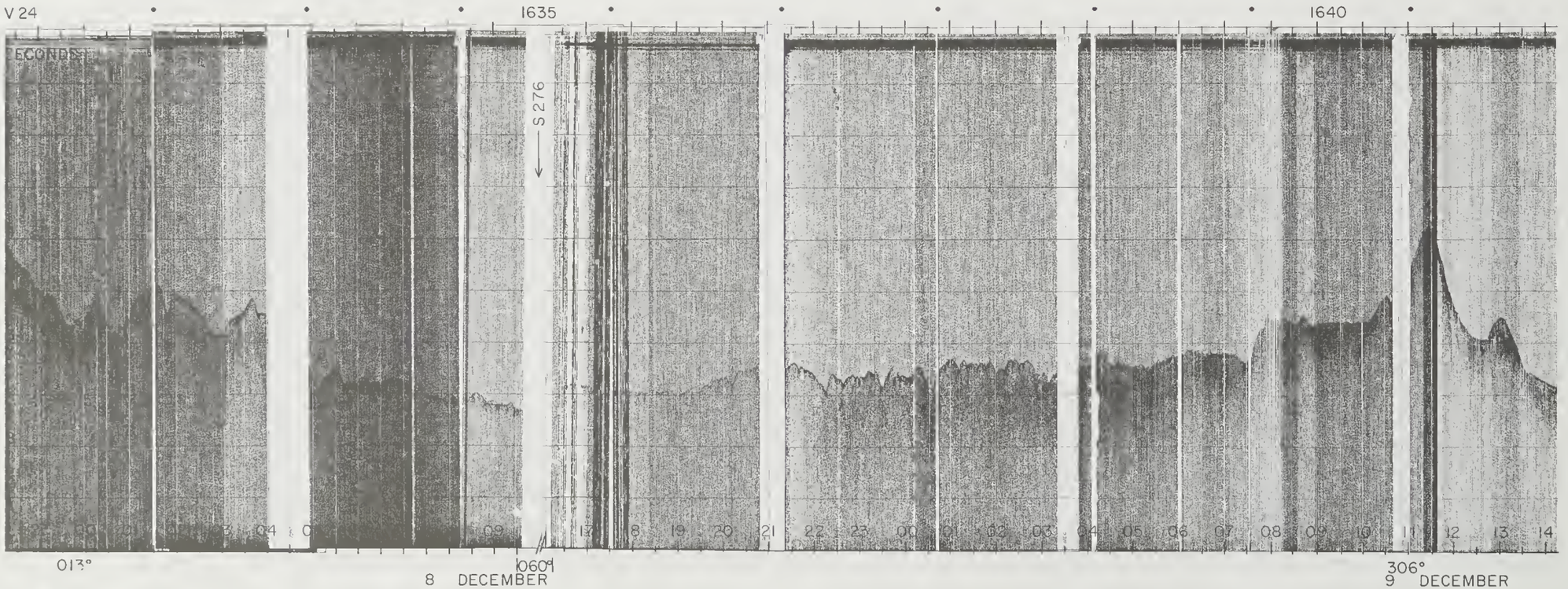


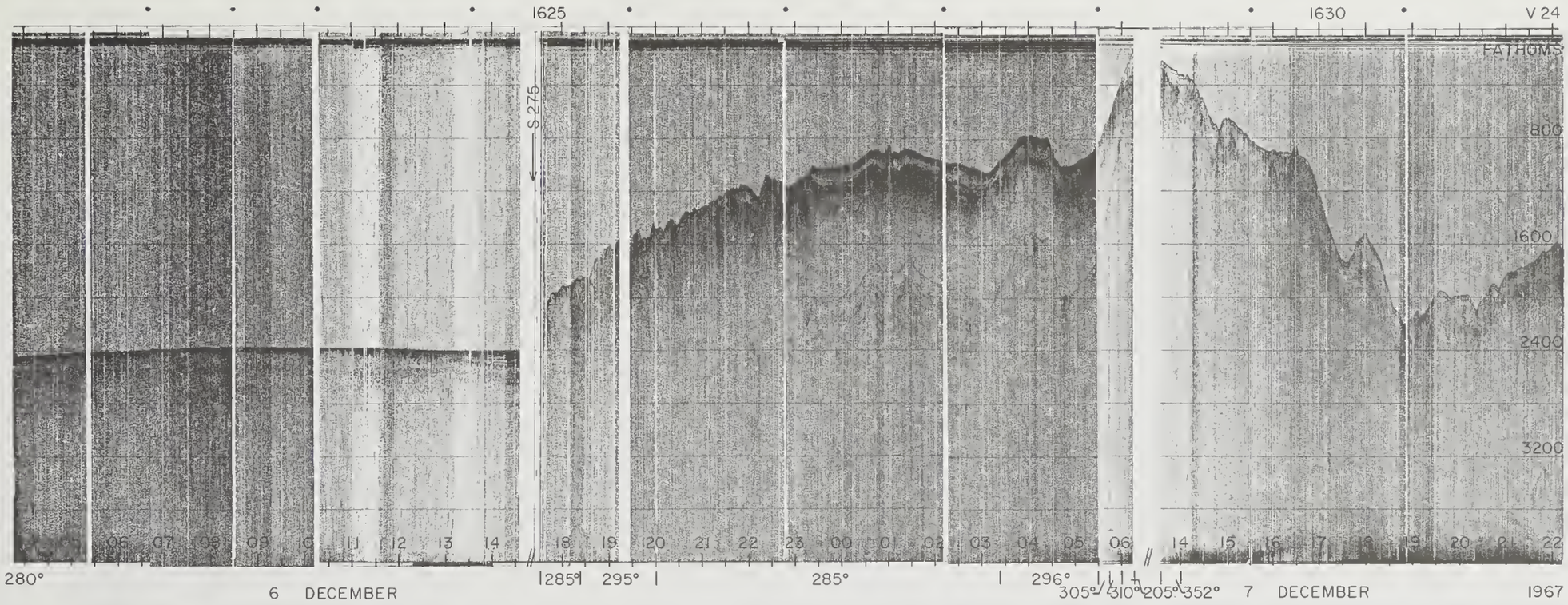
1 DECEMBER 1967

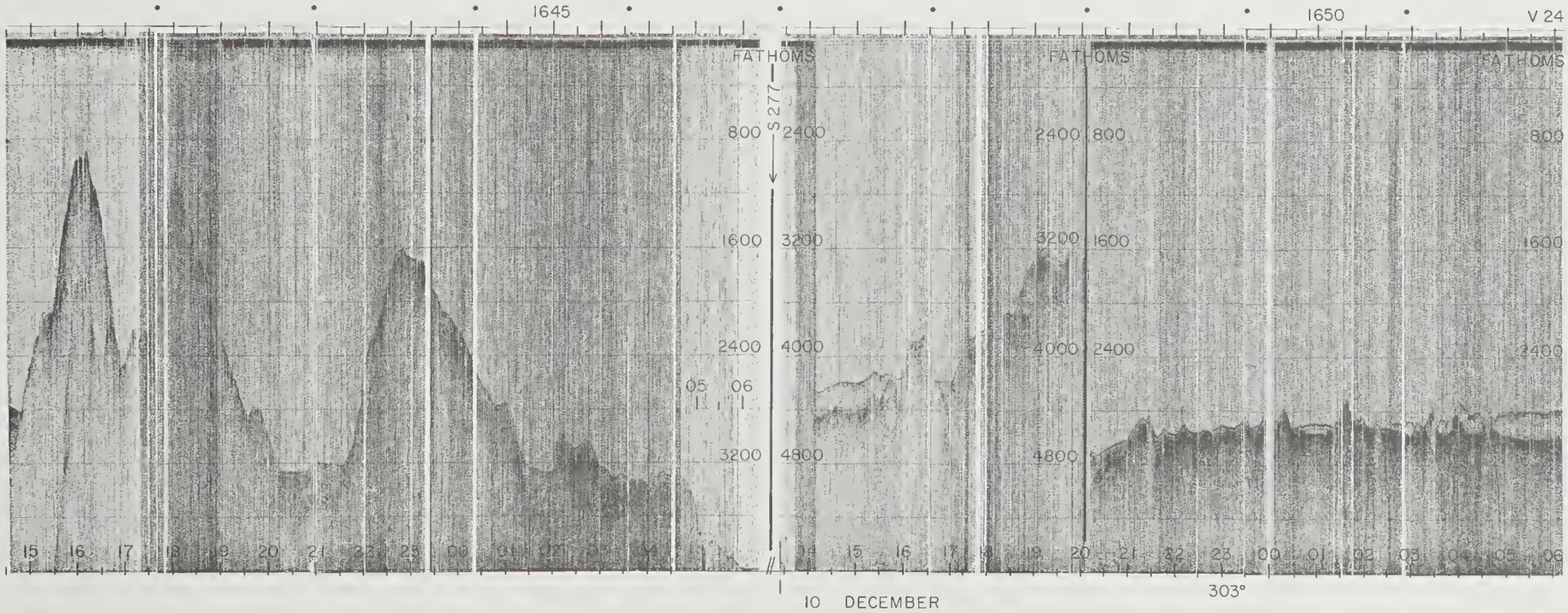


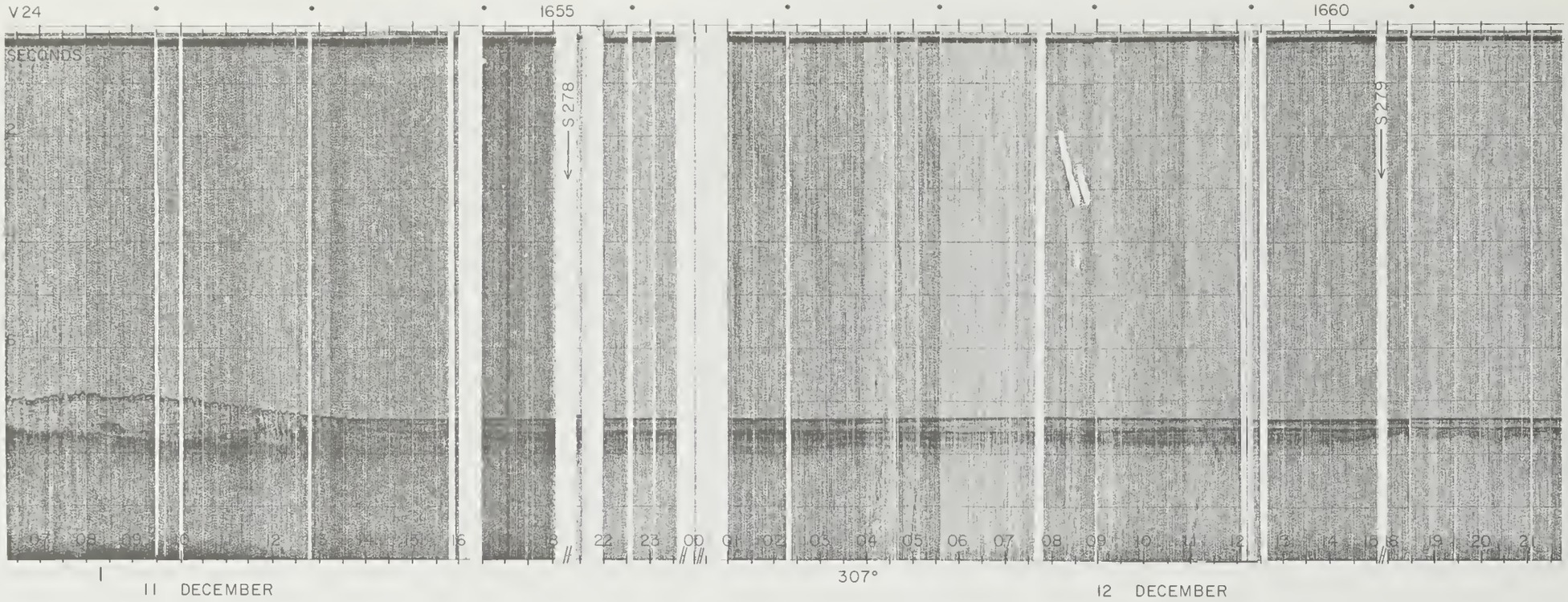
3 DECEMBER 4 DECEMBER

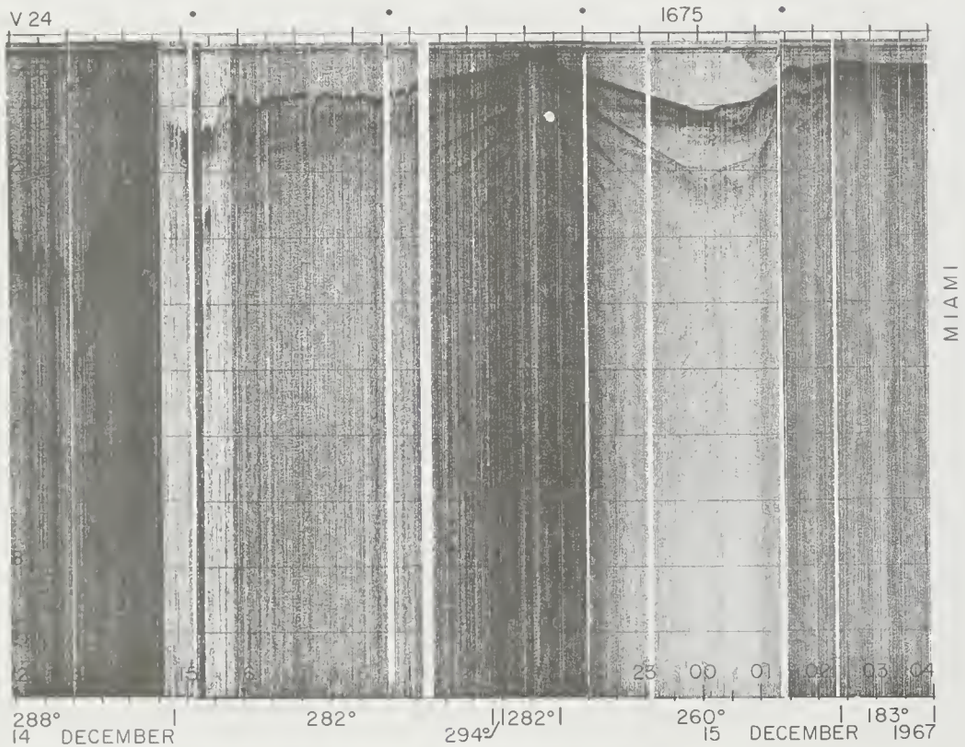

V24 1610
1615
1620
SECONDS
2
4
6
8
R 121
R 122
Z+3
Z+4
16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
19 20 21 23 24 00
000°
5 DECEMBER

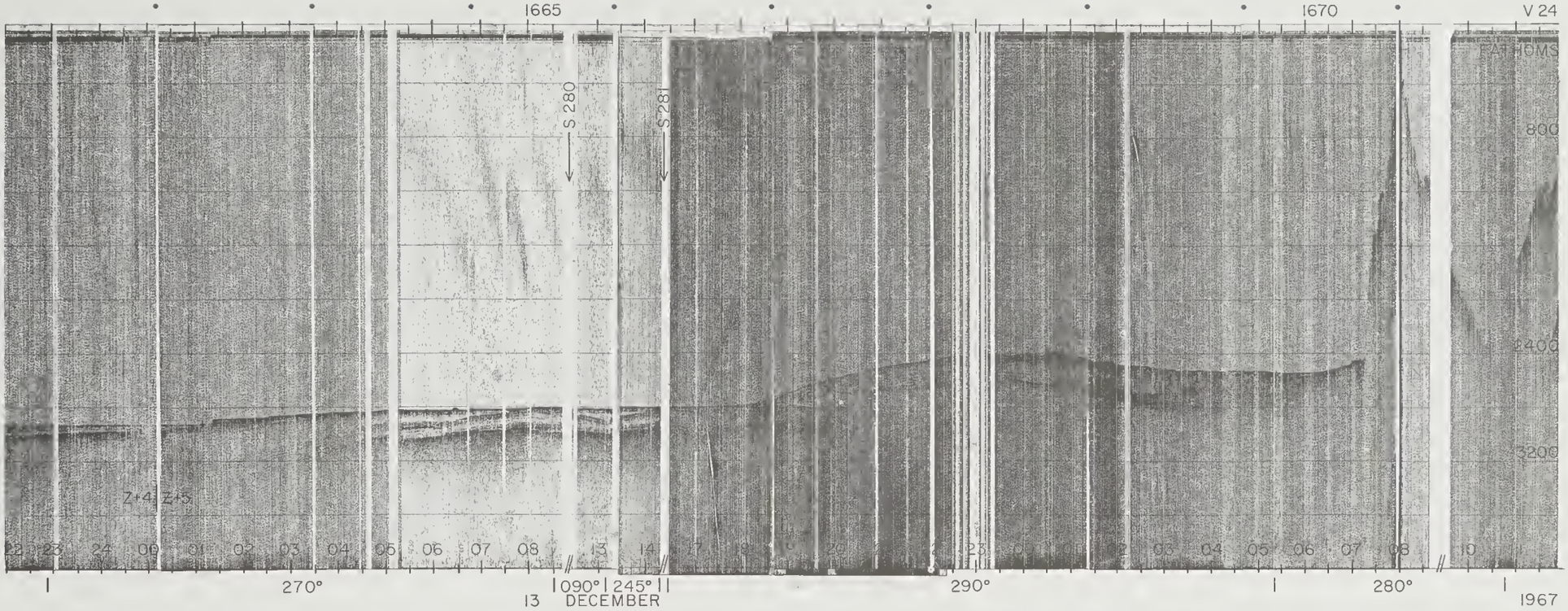

V24
1635
1640
SECONDS
S 276
8 9 10 11 12 13 14
013°
1060
306°
8 DECEMBER
9 DECEMBER

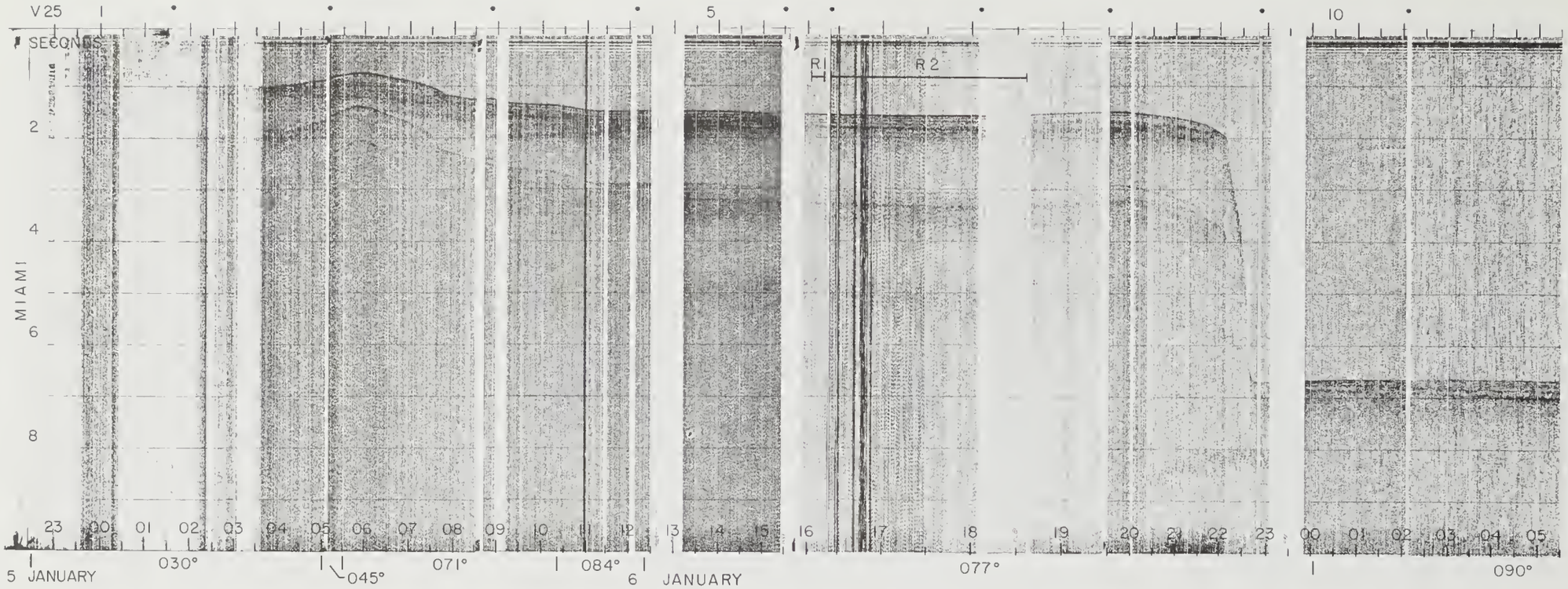

1625
1630
V 24
FATHOMS
800
1600
2400
3200
S 275
280°
285°
295°
296°
305°
310°
205°
352°
6 DECEMBER
7 DECEMBER
1967

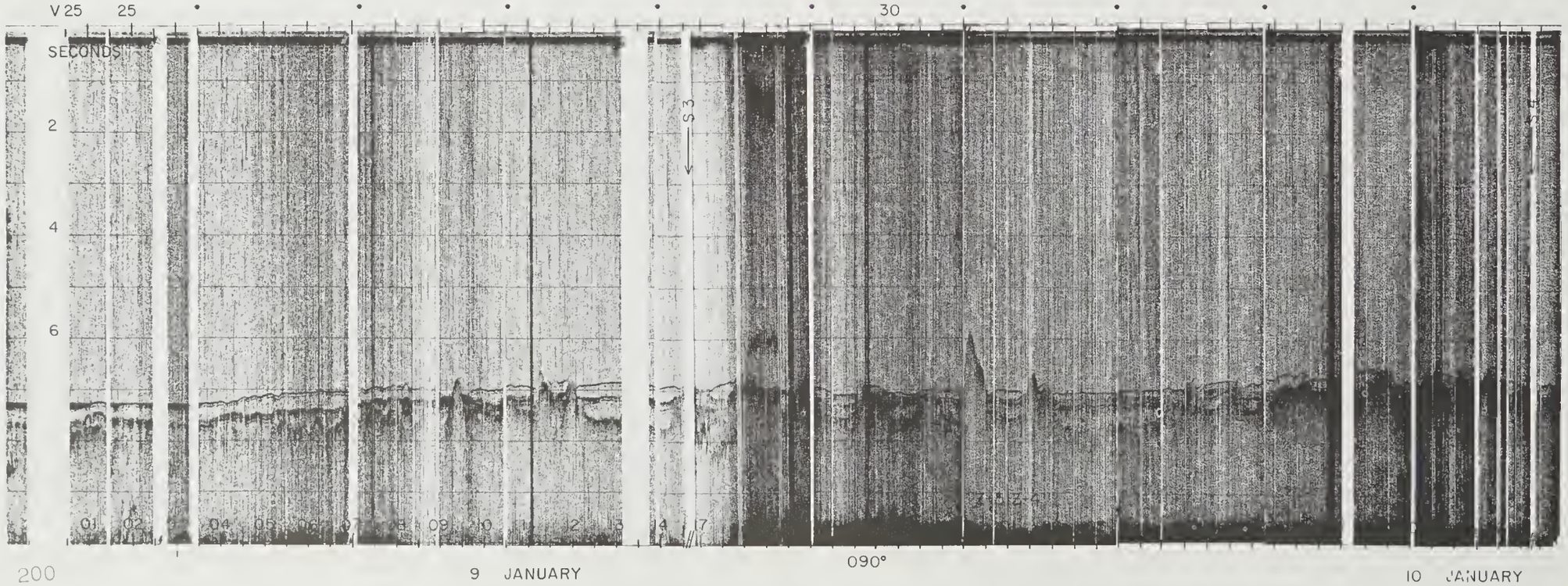

1645
1650
V 24
FATHOMS
800
1600
2400
3200
4000
4800
S 277
303°
10 DECEMBER

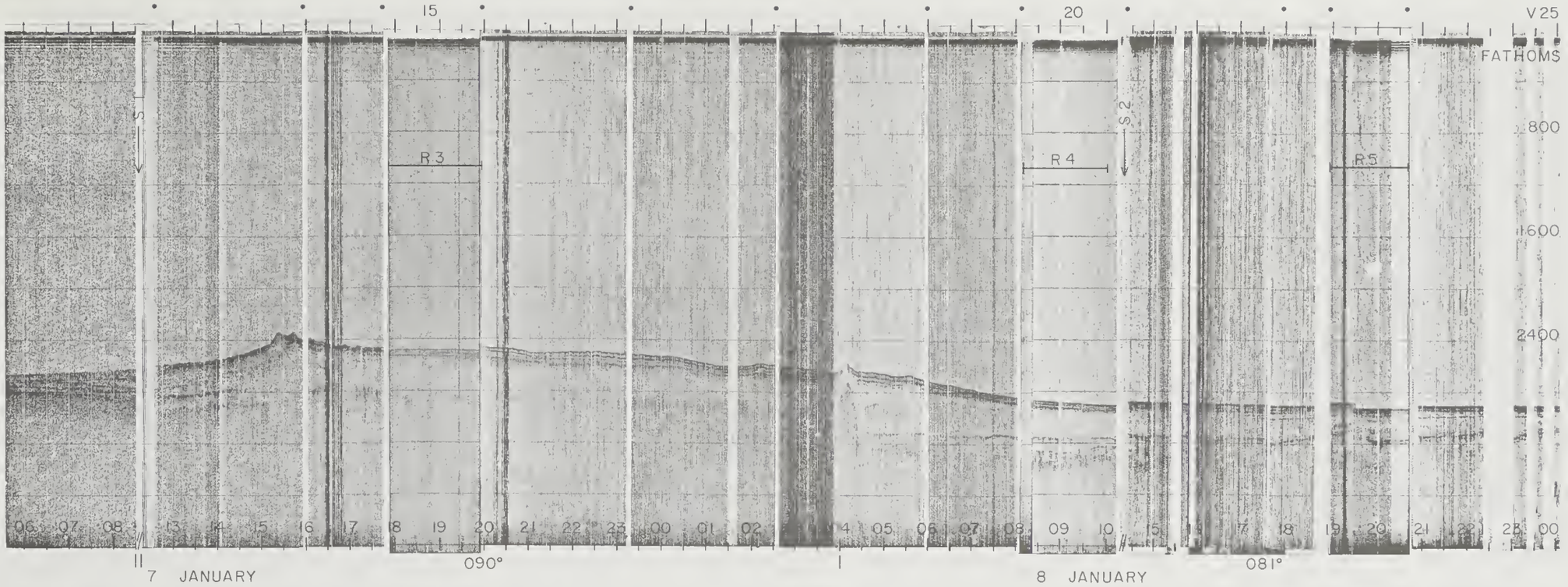

V 24
1655
1660
SECONDS
S 278
S 278
07 08 09 10 12 15 16 18 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 18 19 20 21
11 DECEMBER
307°
12 DECEMBER

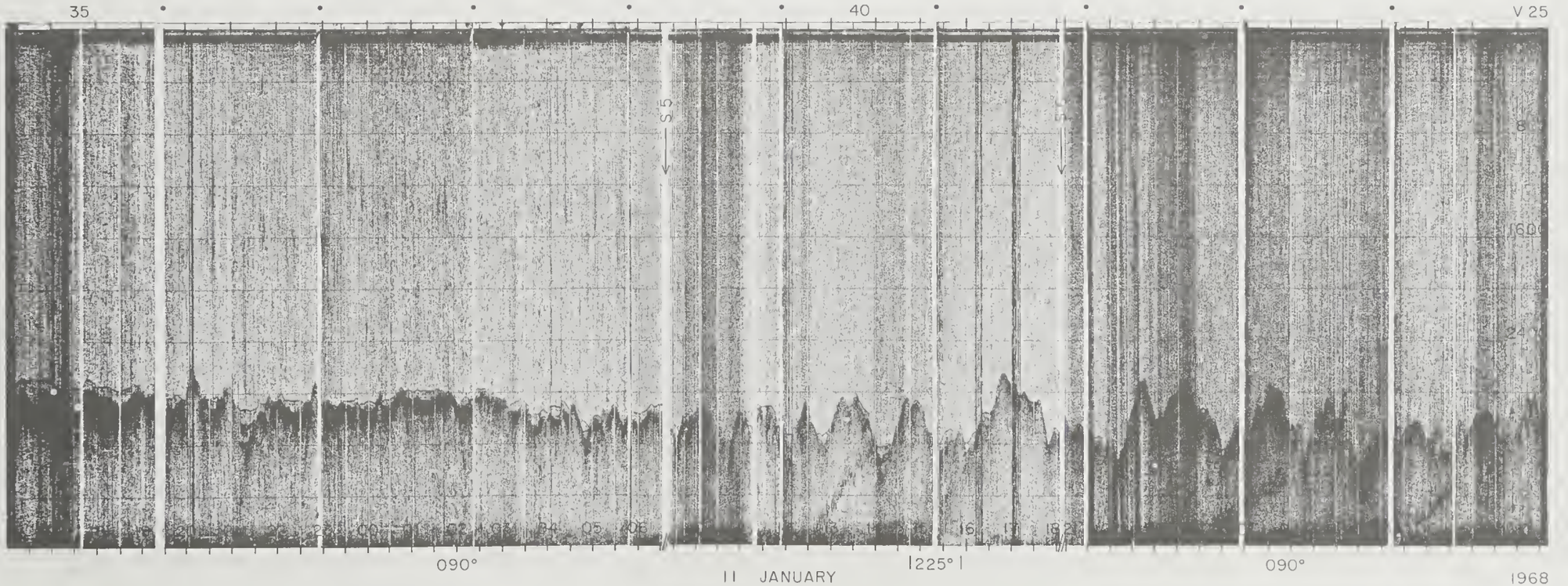

V 24
1675
MIAMI
15 23 00 01 02 03 04
288°
282°
282°
294°
260°
183°
14 DECEMBER
15 DECEMBER
1967

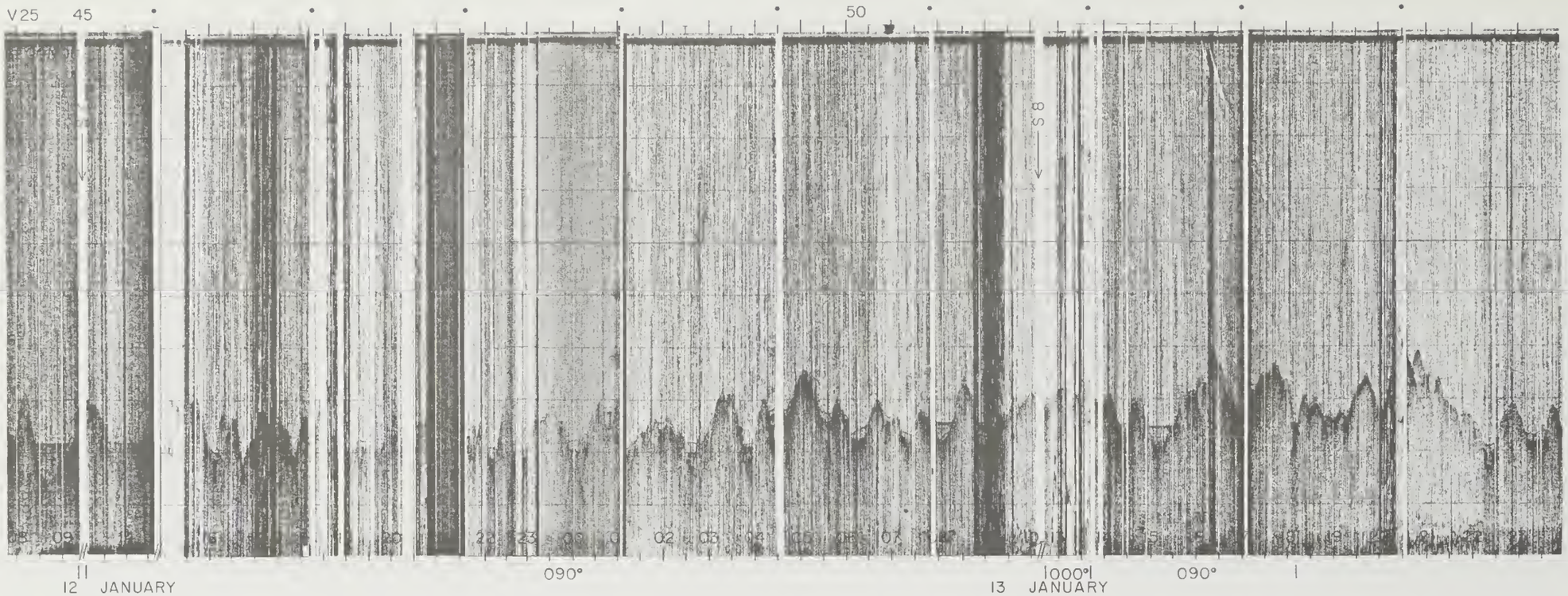

1665
1670
V 24
S 280
S 281
800
2400
3200
Z+4
Z+5
270°
090°
245°
290°
280°
13 DECEMBER
1967

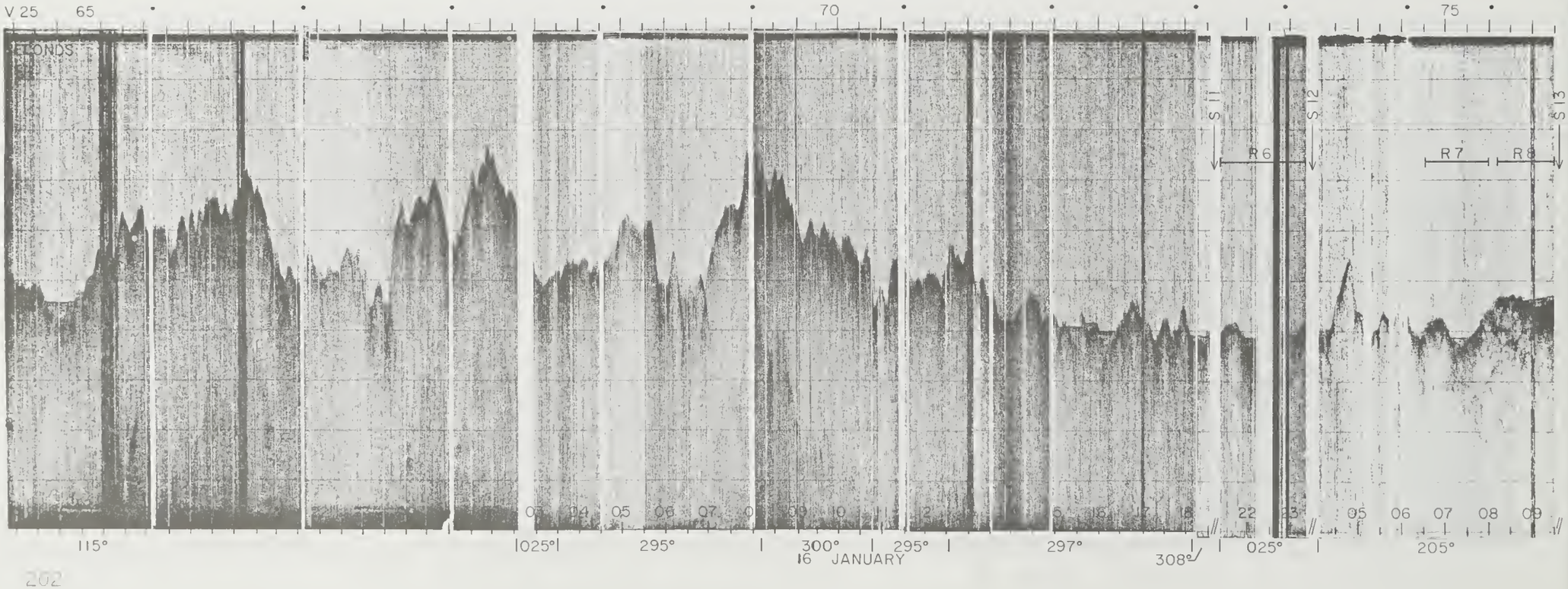

V 25
SECONDS
MIAMI
R1
R2
5 JANUARY
030°
045°
071°
084°
6 JANUARY
077°
090°

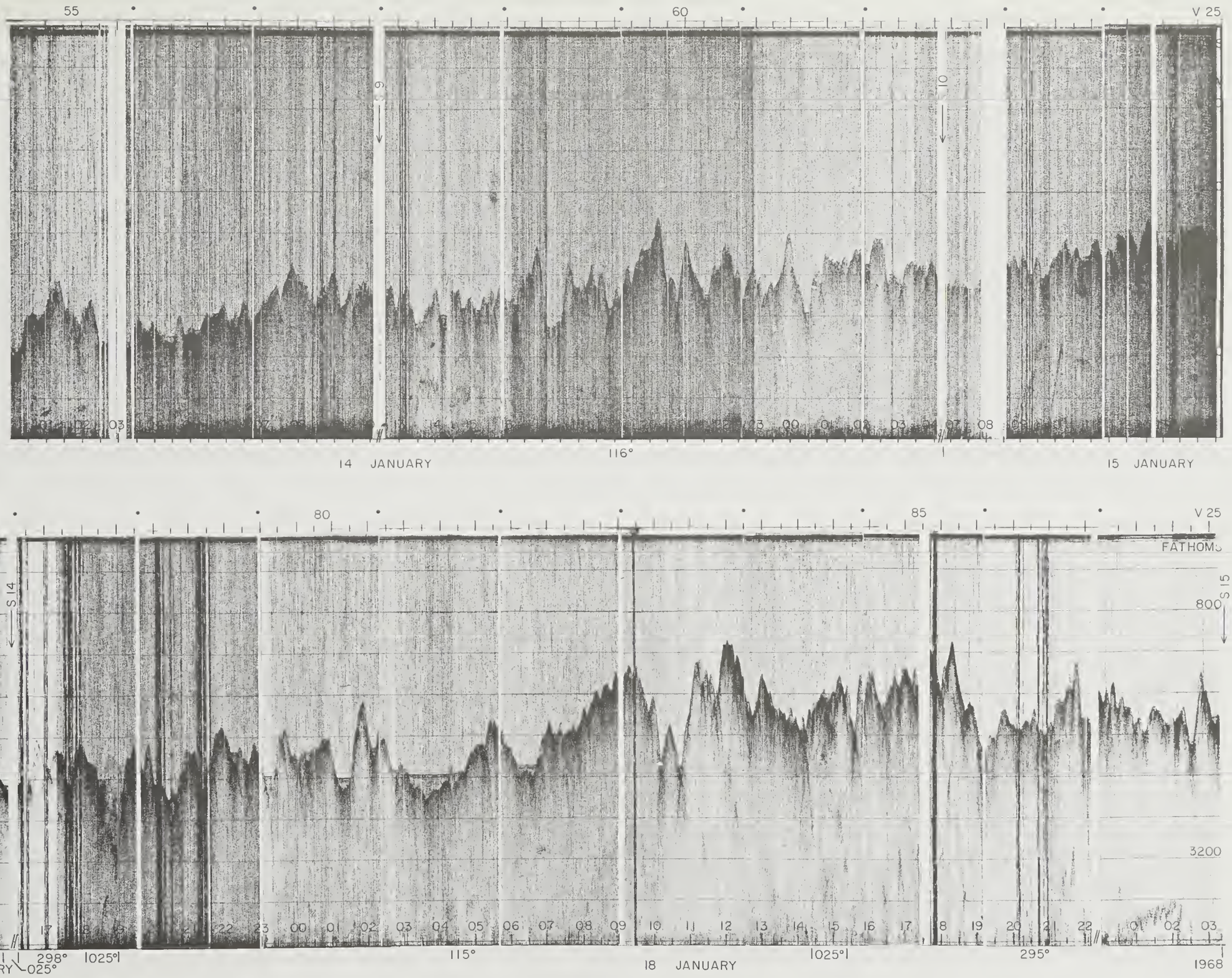

V 25
SECONDS
S3
090°
9 JANUARY
10 JANUARY

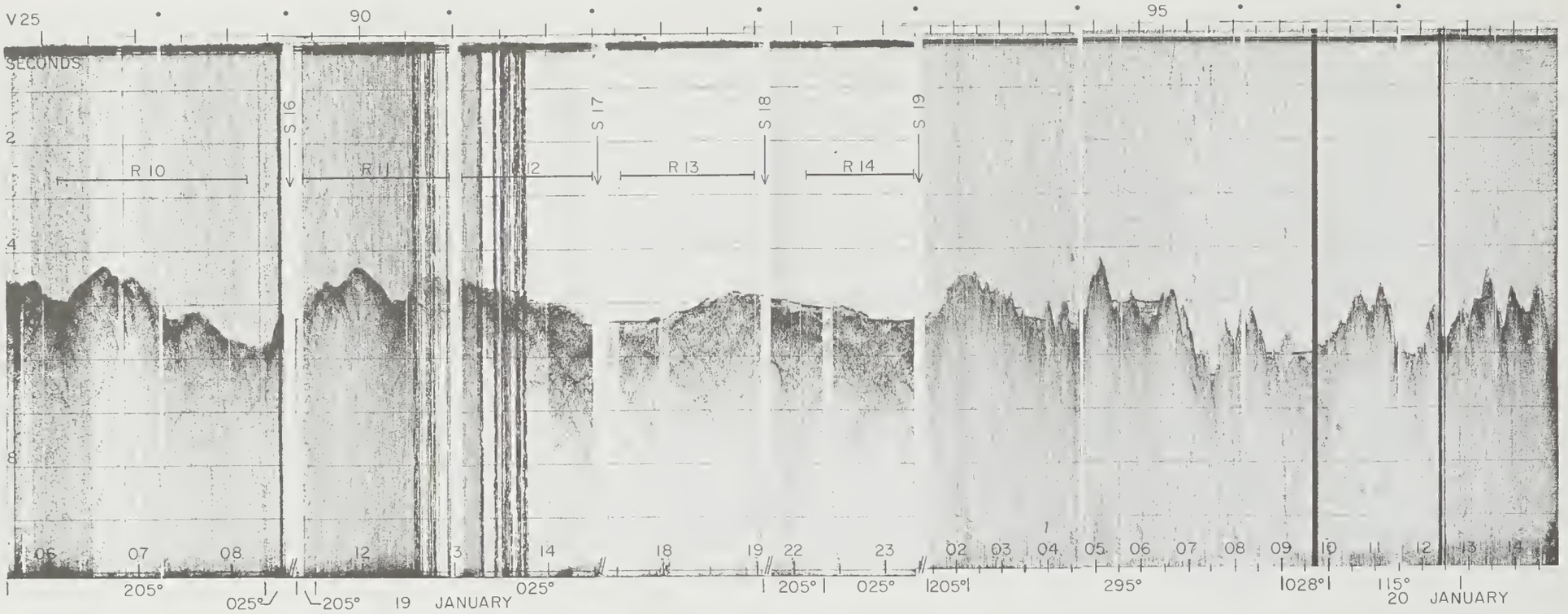

15
20
V 25
FATHOMS
800
1600
2400
S1
S2
R3
R4
R5
06 07 08 13 14 15 16 17 18 19 20 21 22 23 00 01 02 04 05 06 07 08 09 10 15 17 18 19 20 21 22 25 00
090°
081°
7 JANUARY
8 JANUARY

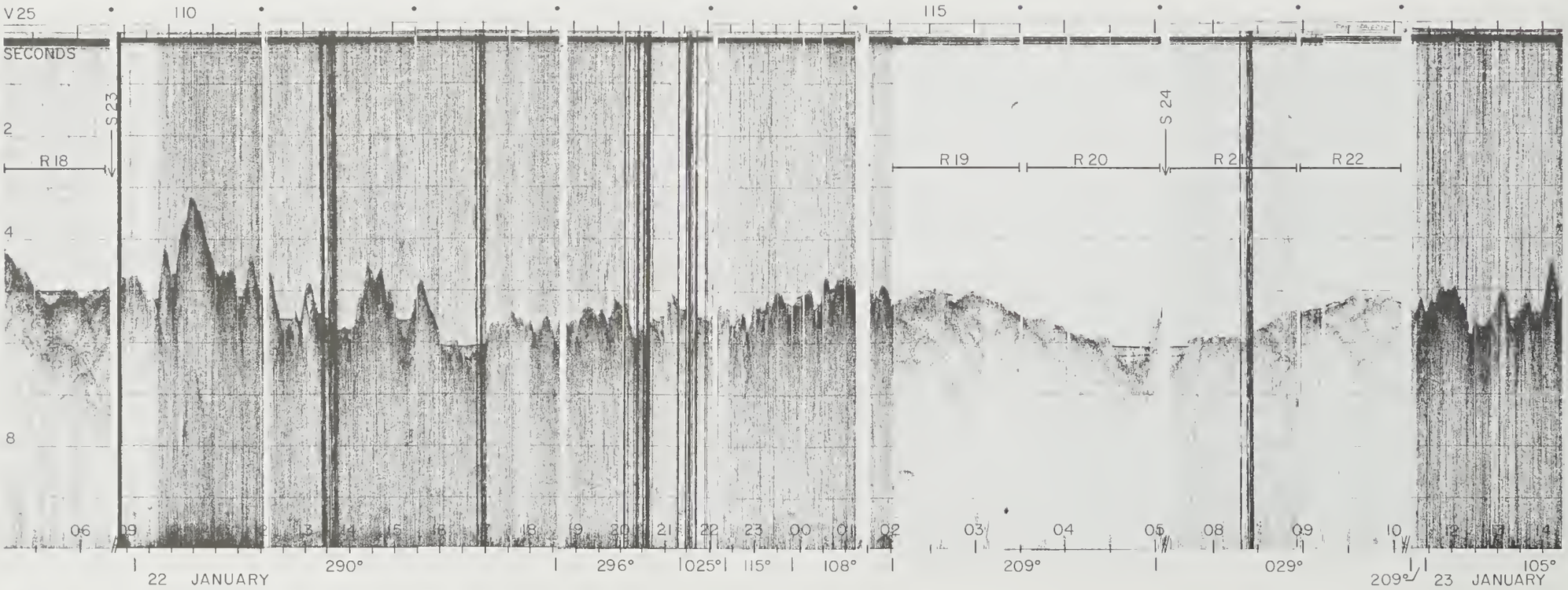

35
40
V 25
S5
S6
8
1600
24
090°
225°
090°
11 JANUARY
1968

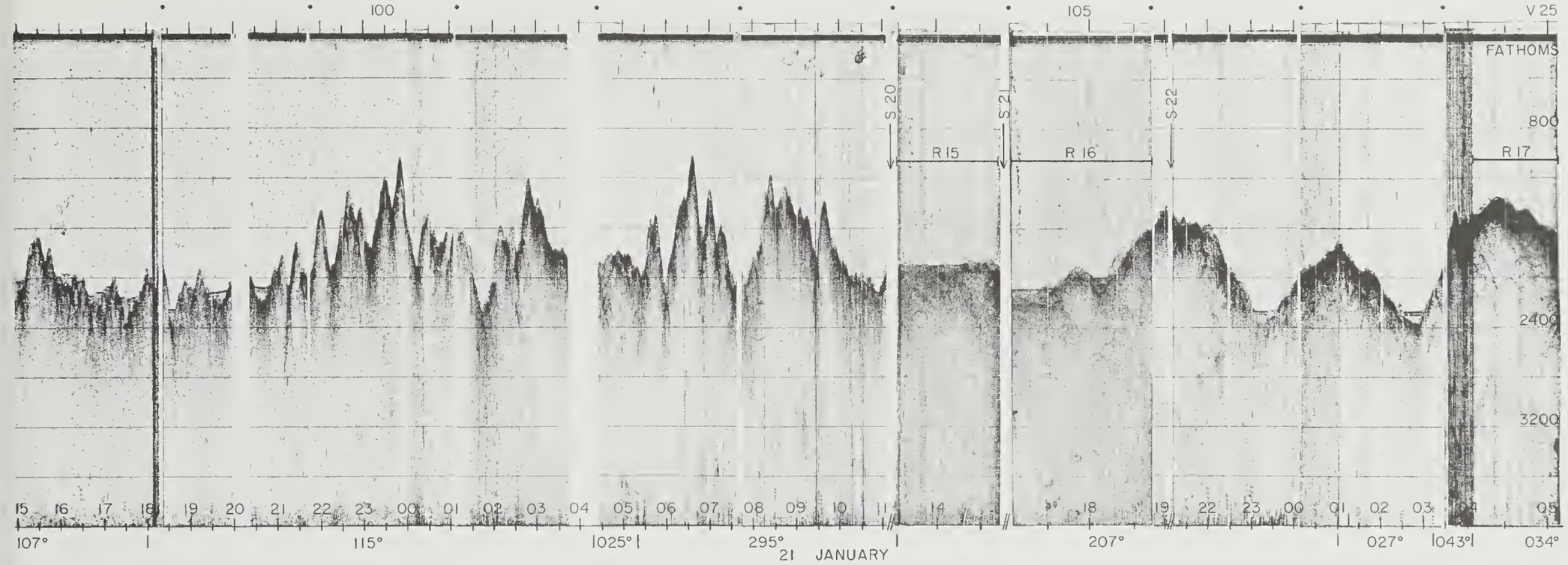

V25 45
50
S8
090°
1000°
090°
12 JANUARY
13 JANUARY

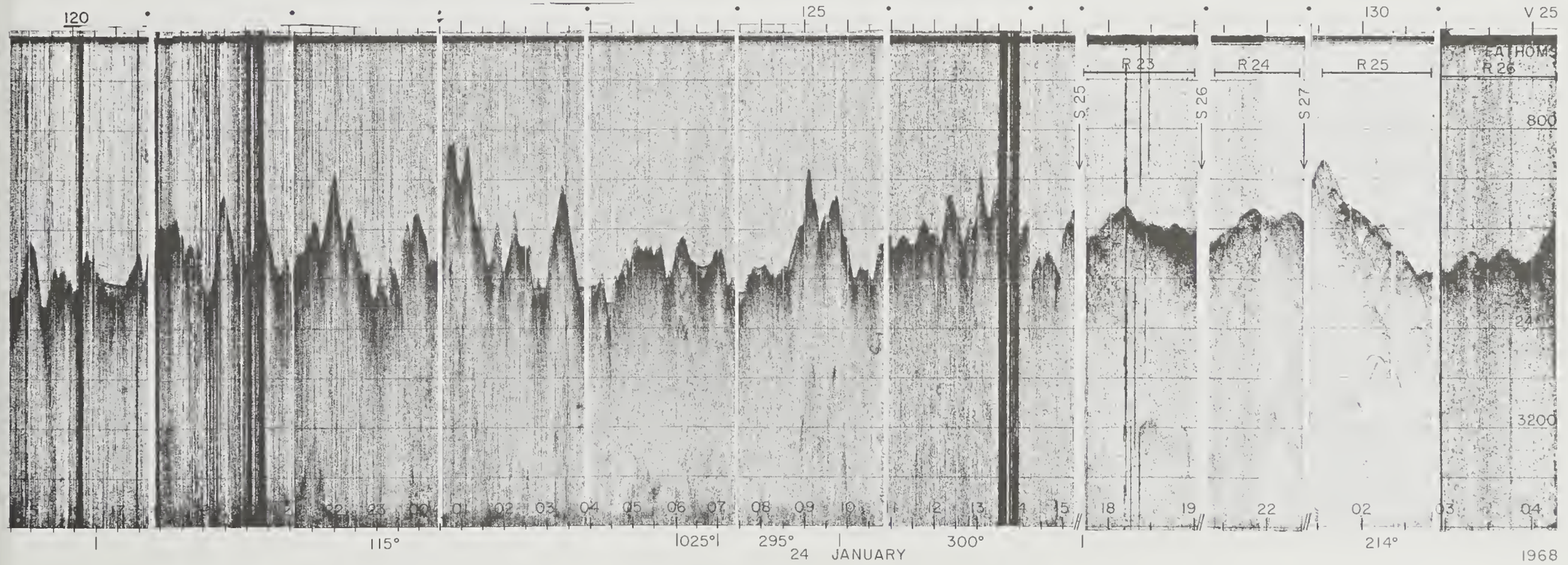

V25 65
70
75
SECONDS
S11
S12
S13
R6
R7
R8
115°
1025°
295°
300°
295°
297°
308°
025°
205°
16 JANUARY

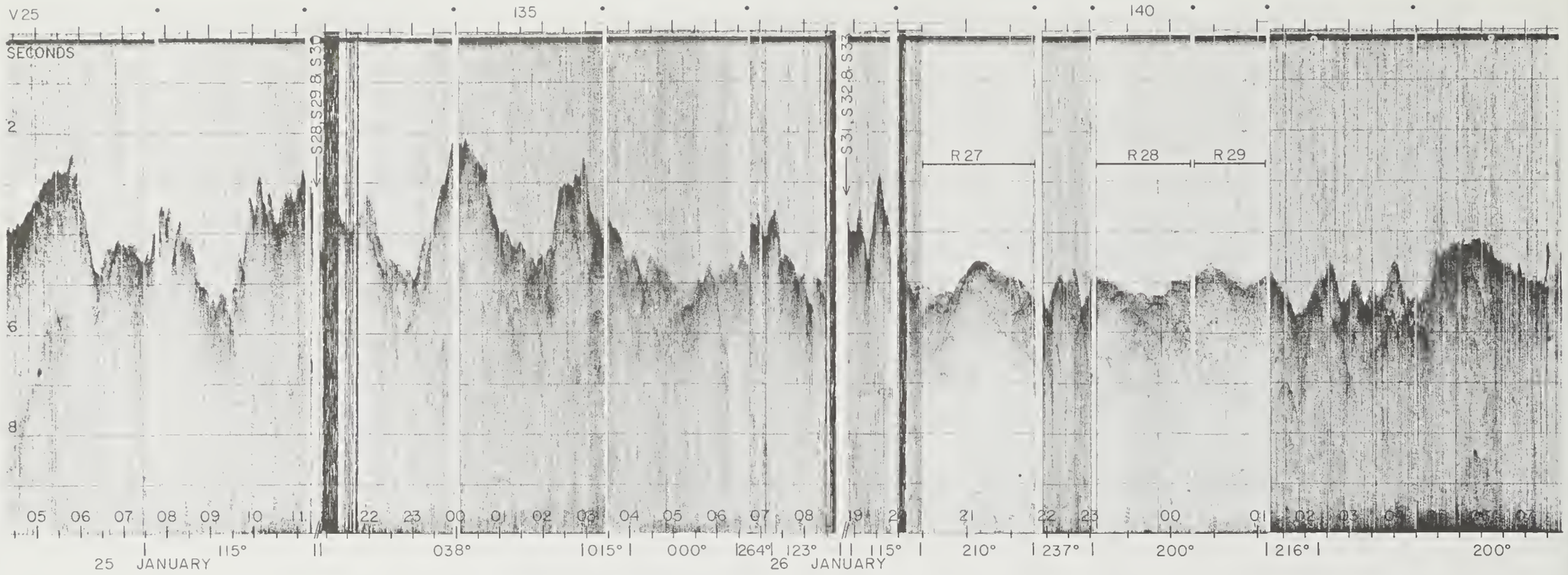

55
60
V 25
S 9
S 10
01 02 03
22 23 00 01 02 03 07 08
116°
14 JANUARY
15 JANUARY
80
85
V 25
FATHOMS
S 14
S 15
800
3200
29
12 13
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 01 02 03
028°
298°
1025
025°
115°
1025
295°
17 JANUARY
18 JANUARY
1968

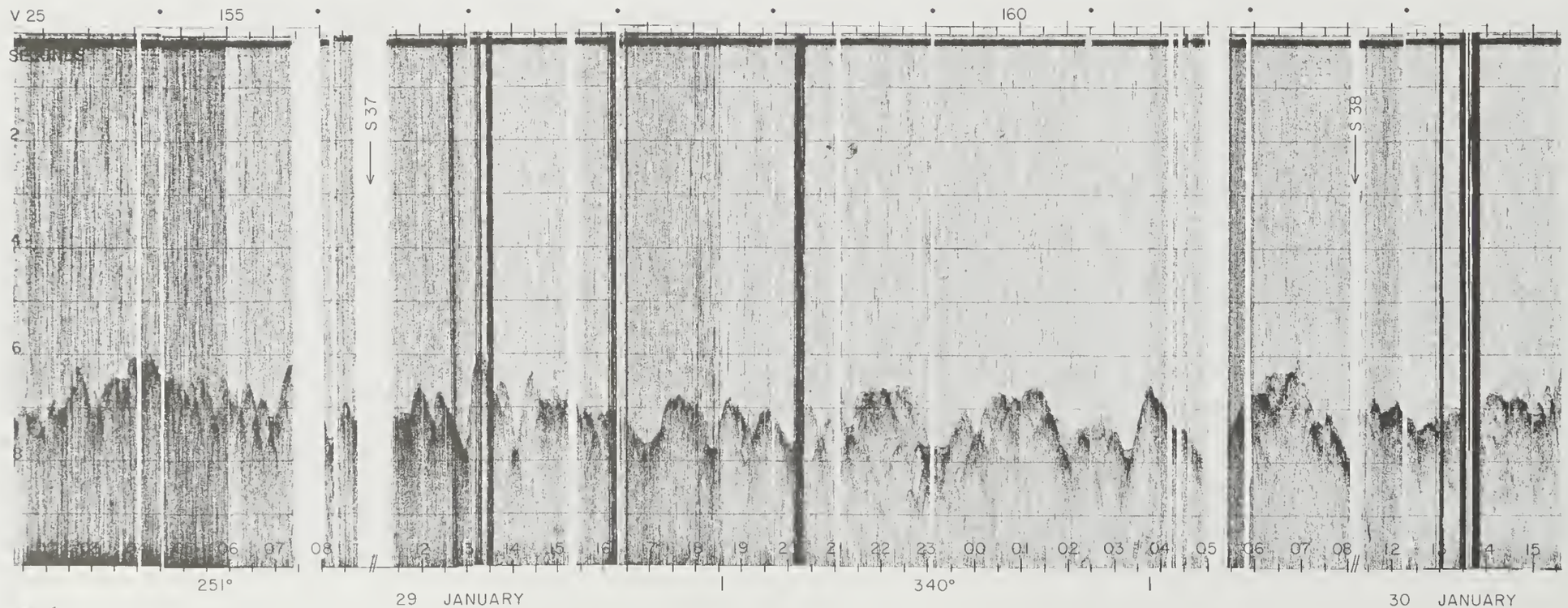

V25
90
95
SECONDS
2
4
8
S 16
S 17
S 18
S 19
R 10
R 11
12
R 13
R 14
05
07
08
12
3
14
18
19
22
23
02
03
04
05
06
07
08
09
10
12
13
14
205°
025°
205°
19 JANUARY
025°
205°
025°
205°
295°
028°
115°
20 JANUARY

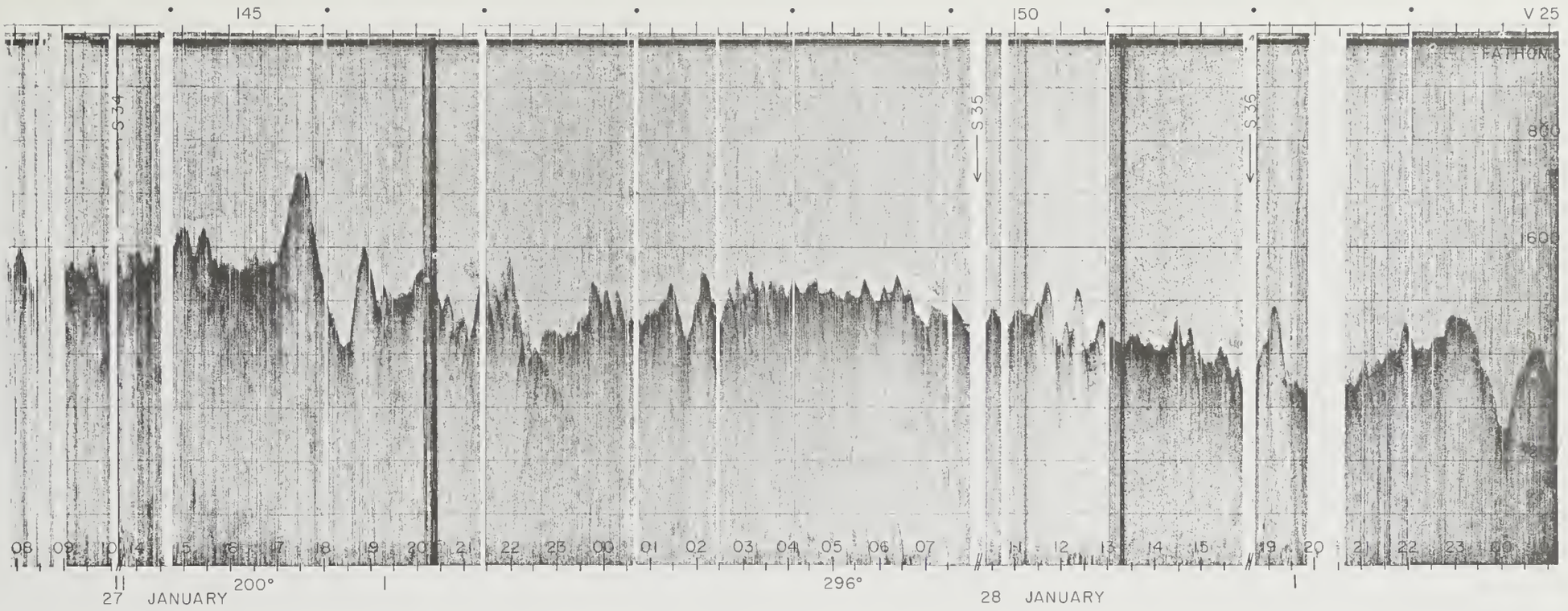

V25
110
115
SECONDS
2
4
8
S 23
S 24
R 18
R 19
R 20
R 21
R 22
06
09
13
14
15
16
17
18
19
20
21
22
23
00
01
02
03
04
05
08
09
10
12
13
14
22 JANUARY
290°
296°
025°
115°
108°
209°
029°
209°
23 JANUARY
105°

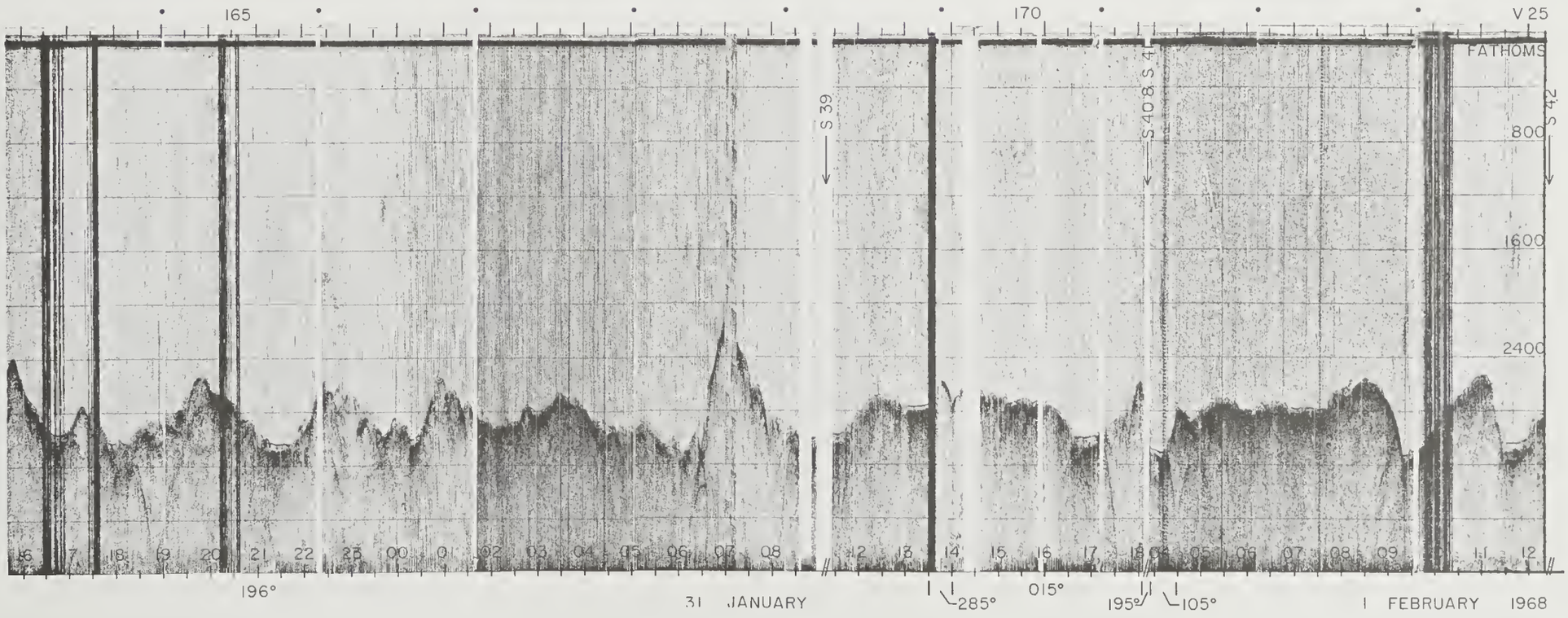

100
105
V 25
FATHOMS
800
2400
3200
S 20
S 21
S 22
R 15
R 16
R 17
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 14 18 19 22 23 00 01 02 03 04 05
107°
115°
1025°
295°
207°
027°
043°
034°
21 JANUARY

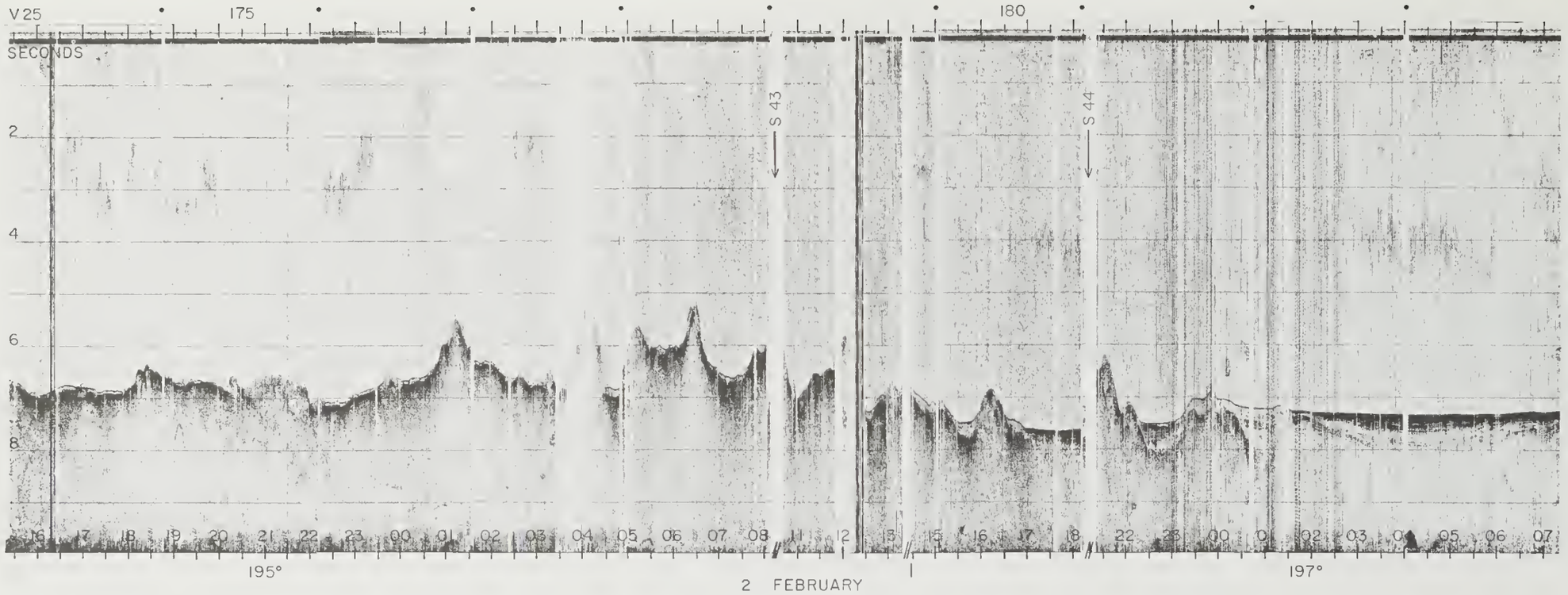

120
125
130
V 25
FATHOMS
800
24
3200
R 23
R 24
R 25
R 26
S 25
S 26
S 27
115°
1025°
295°
300°
214°
24 JANUARY
1968

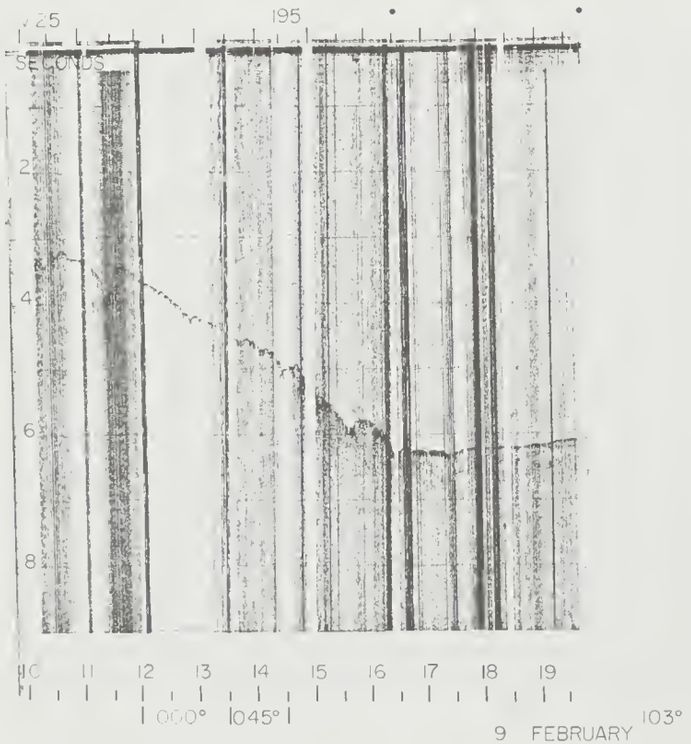

V 25
135
140
SECONDS
2
6
8
S 28, S 29 & S 30
S 31, S 32 & S 33
R 27
R 28
R 29
05 06 07 08 09 10 11 22 23 00 01 02 03 04 05 06 07 08 19 21 22 23 00 01 02 03
115°
038°
1015°
000°
264°
123°
115°
210°
237°
200°
216°
200°
25 JANUARY
26 JANUARY

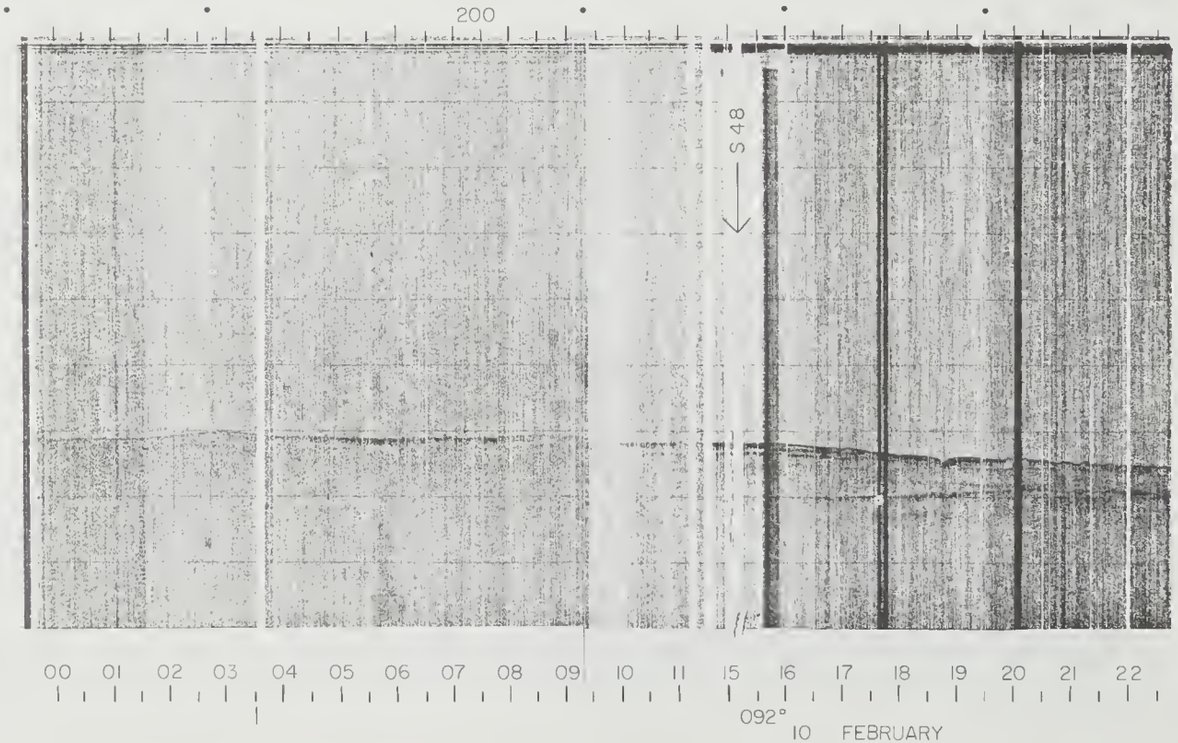

V 25
155
160
SECONDS
2
4
6
8
S 37
S 38
06 07 08 12 13 14 15 16 17 18 19 21 22 23 00 01 02 03 04 05 06 07 08 12 13 14 15
251°
340°
29 JANUARY
30 JANUARY

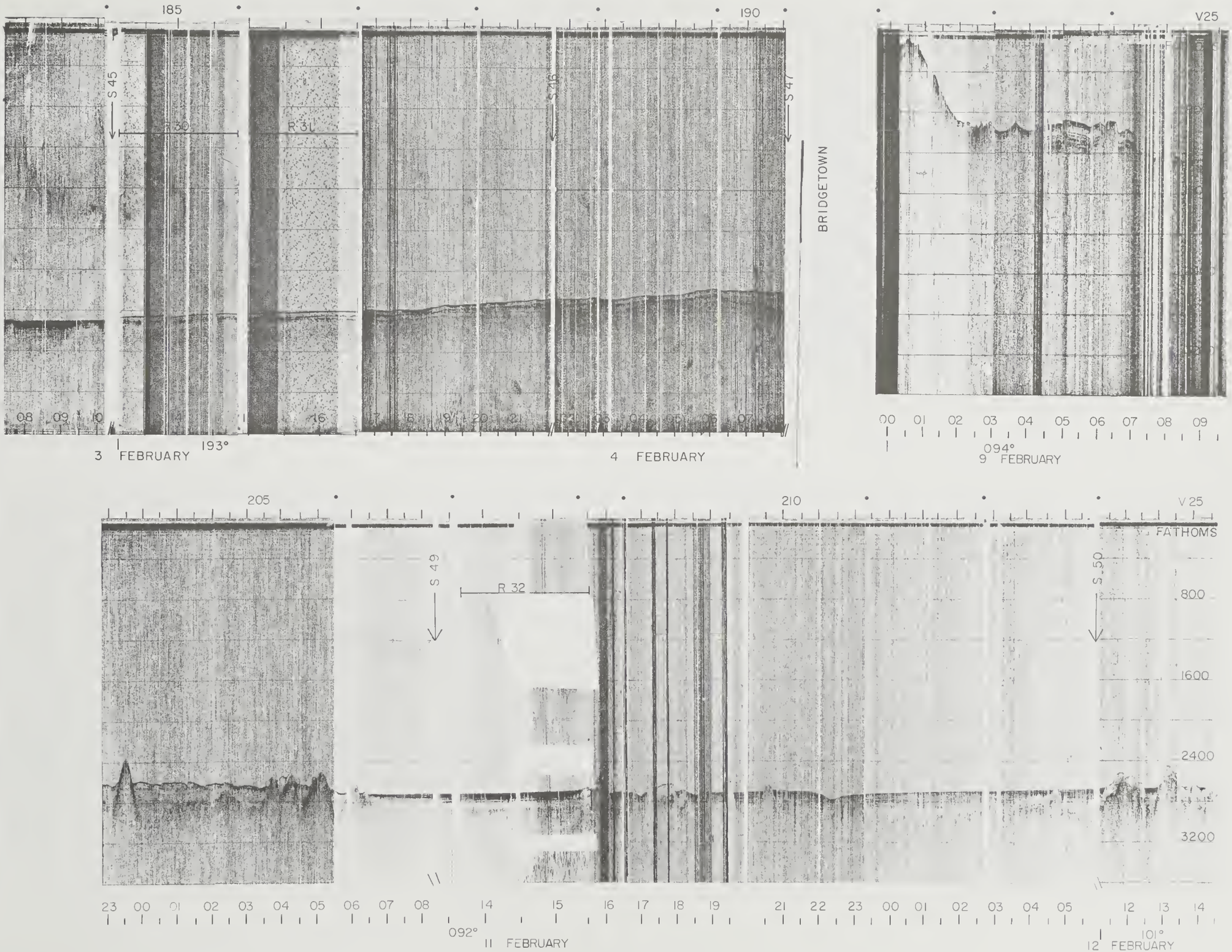

145
150
V 25
FATHOMS
800
1600
S 34
S 35
S 36
27 JANUARY
200°
296°
28 JANUARY

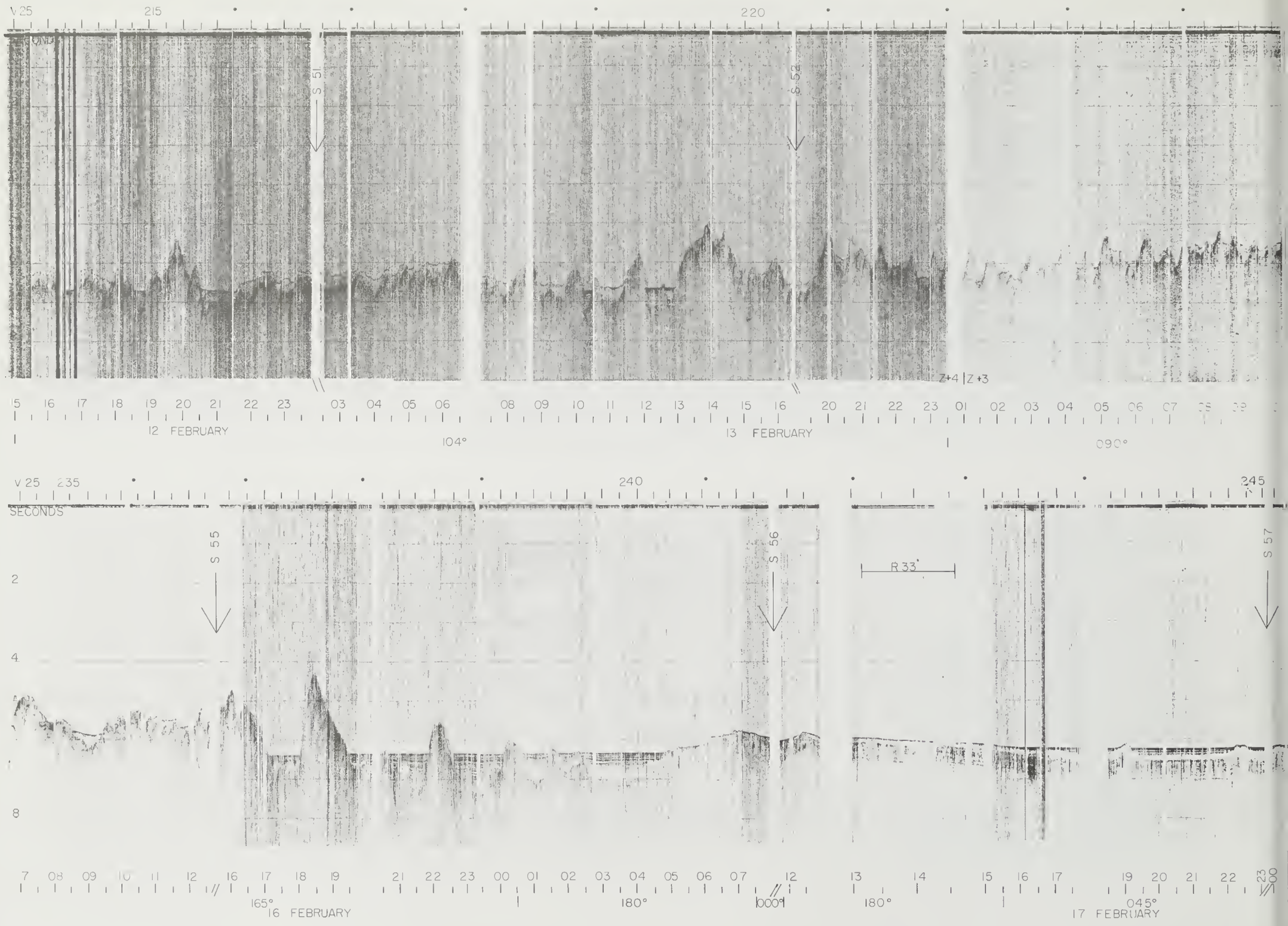

165
170
V 25
FATHOMS
800
1600
2400
S 39
S 40
S 41
S 42
196°
31 JANUARY
285°
015°
195°
105°
1 FEBRUARY 1968

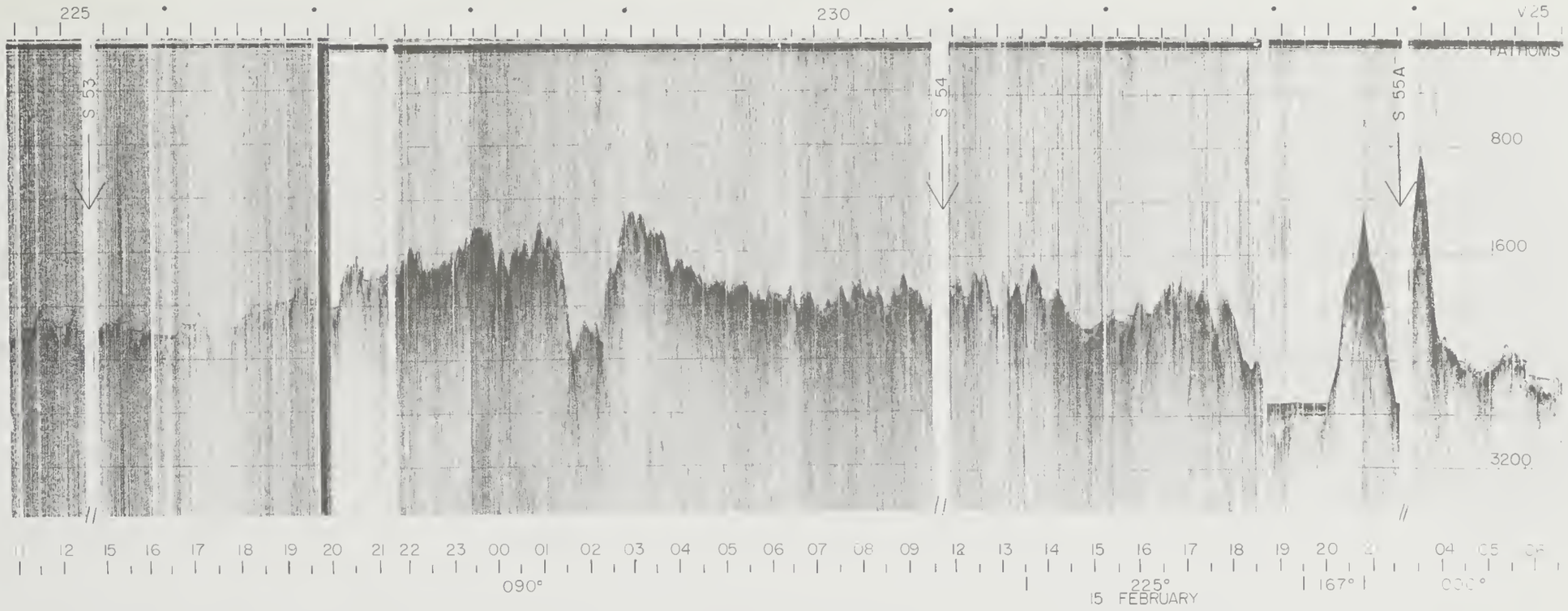

V25
175
180
SECONDS
2
4
6
8
S 43
S 44
16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 11 12 13 15 16 17 18 22 23 00 01 02 03 04 05 06 07
195°
197°
2 FEBRUARY

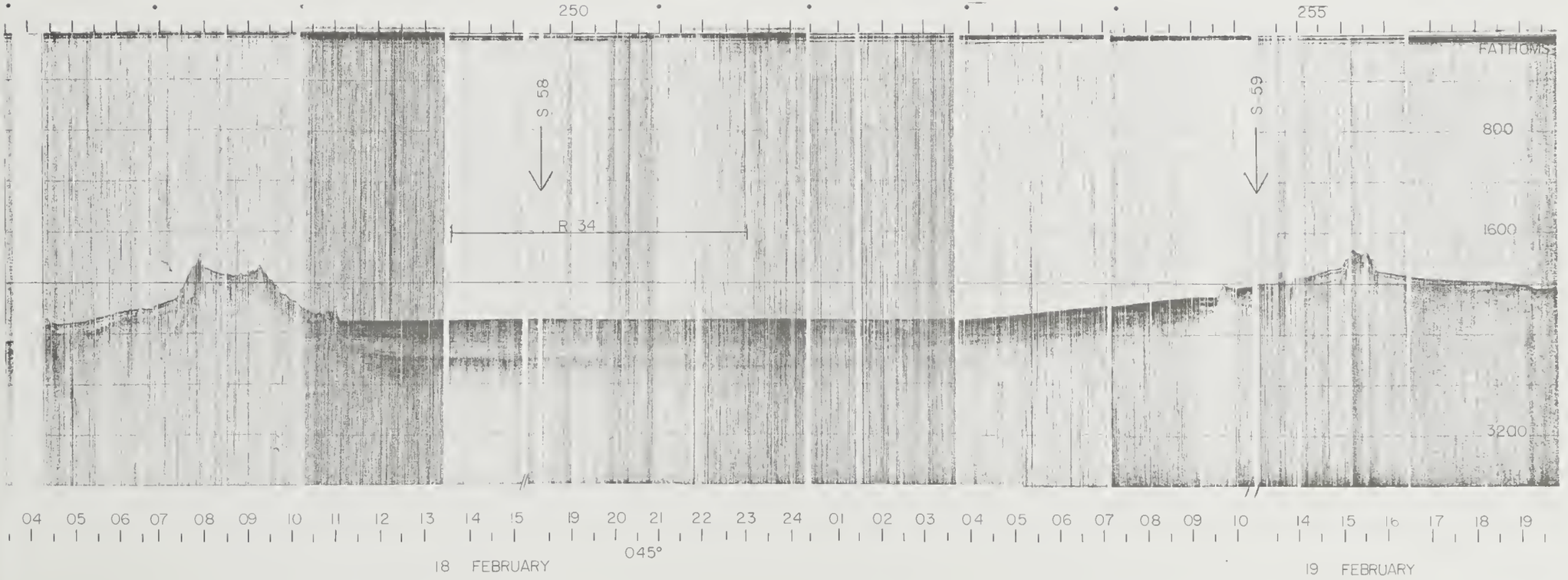

V25
195
SECONDS
2
4
6
8
10 11 12 13 14 15 16 17 18 19
000° 045°
103°
9 FEBRUARY

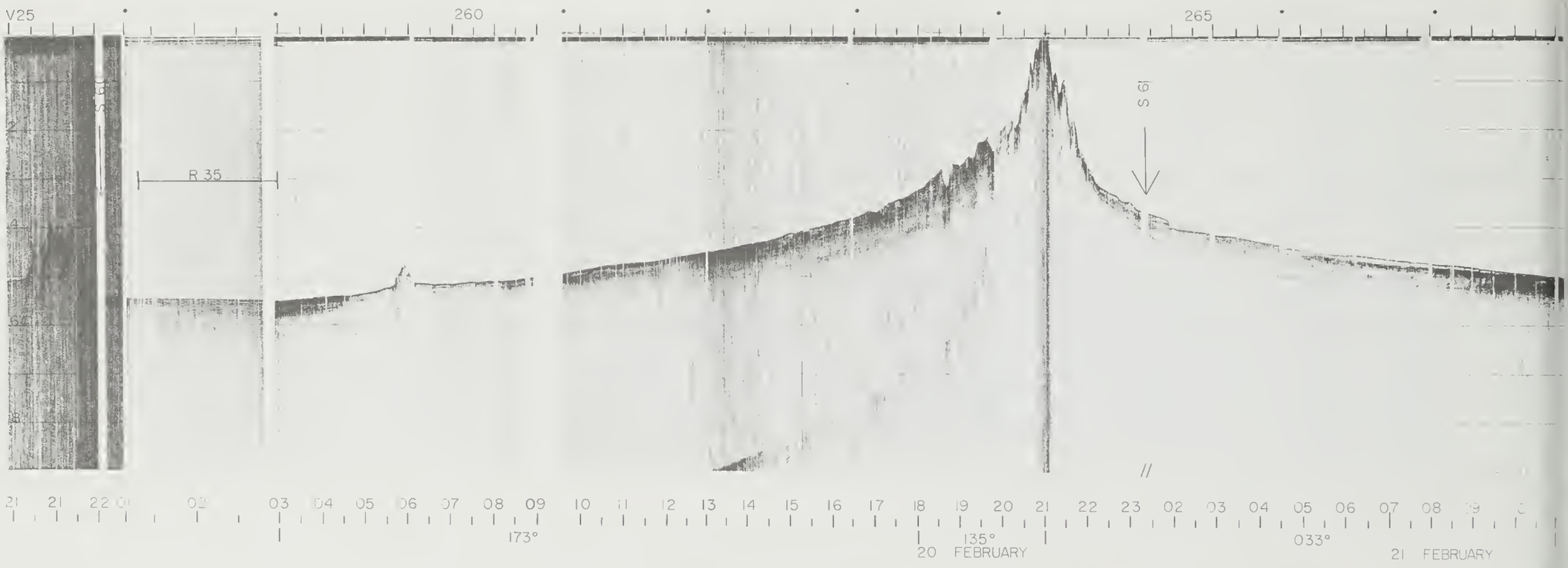

200
S 48
00 01 02 03 04 05 06 07 08 09 10 11 15 16 17 18 19 20 21 22
092°
10 FEBRUARY

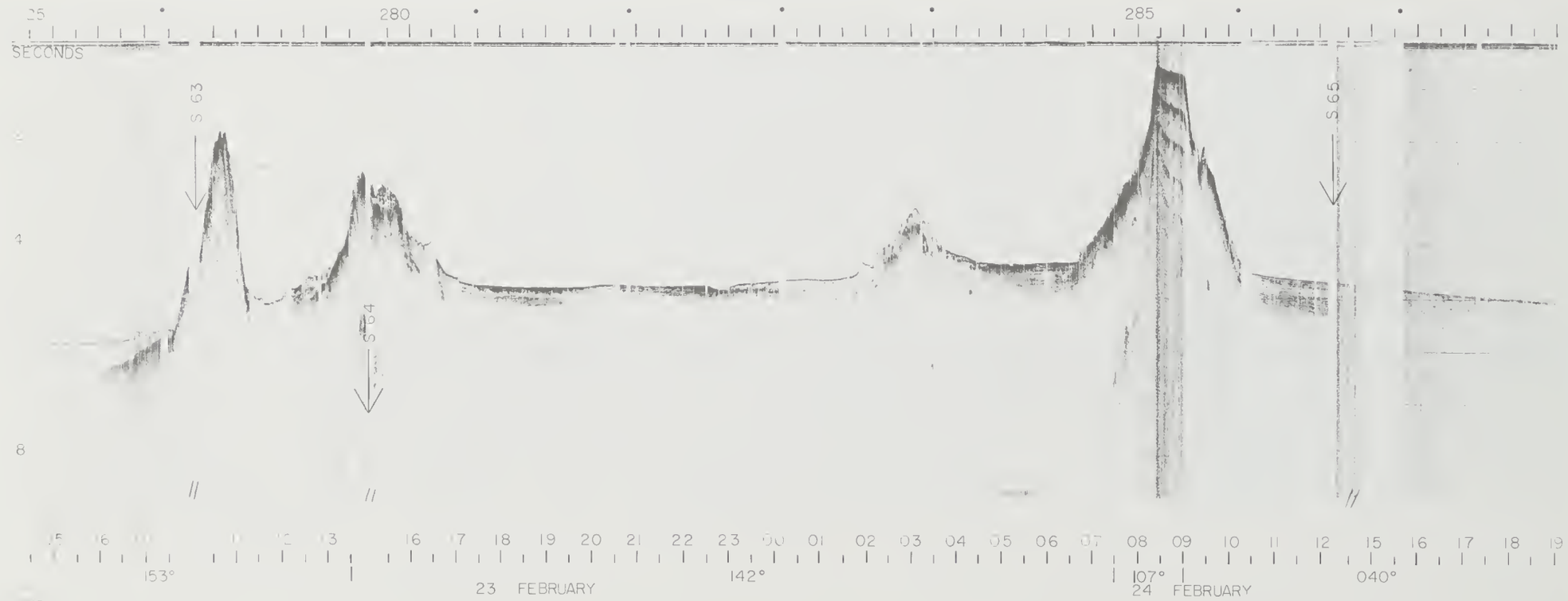

185
190
S 45
R 30
R 31
S 46
S 47
BRIDGETOWN
08 09 10 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07
193°
3 FEBRUARY
4 FEBRUARY
V25
00 01 02 03 04 05 06 07 08 09
094°
9 FEBRUARY
205
210
V 25
FATHOMS
S 49
R 32
S 50
800
1600
2400
3200
23 00 01 02 03 04 05 06 07 08 14 15 16 17 18 19 21 22 23 00 01 02 03 04 05 12 13 14
092°
11 FEBRUARY
101°
12 FEBRUARY

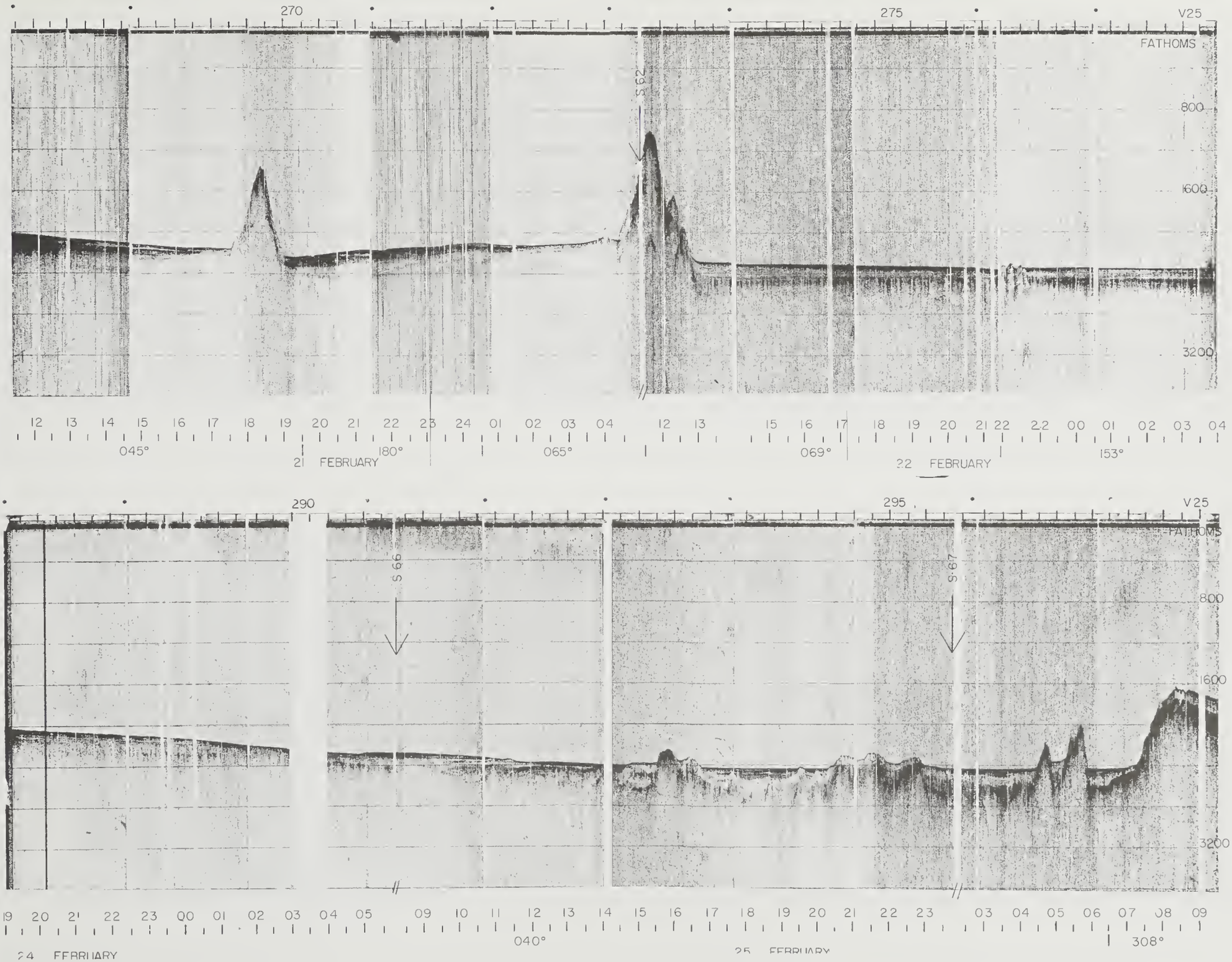

V 25
215
220
S 51
S 52
Z+4 | Z+3
15 16 17 18 19 20 21 22 23 03 04 05 06
12 FEBRUARY
104°
08 09 10 11 12 13 14 15 16 20 21 22 23 01 02 03 04 05 06 07
13 FEBRUARY
090°
V 25
235
240
245
SECONDS
S 55
S 56
S 57
R 33°
2
4
8
7 08 09 10 11 12 16 17 18 19 21 22 23 00 01 02 03 04 05 06 07 12
165°
16 FEBRUARY
180°
180°
13 14 15 16 17 19 20 21 22 23 00
045°
17 FEBRUARY

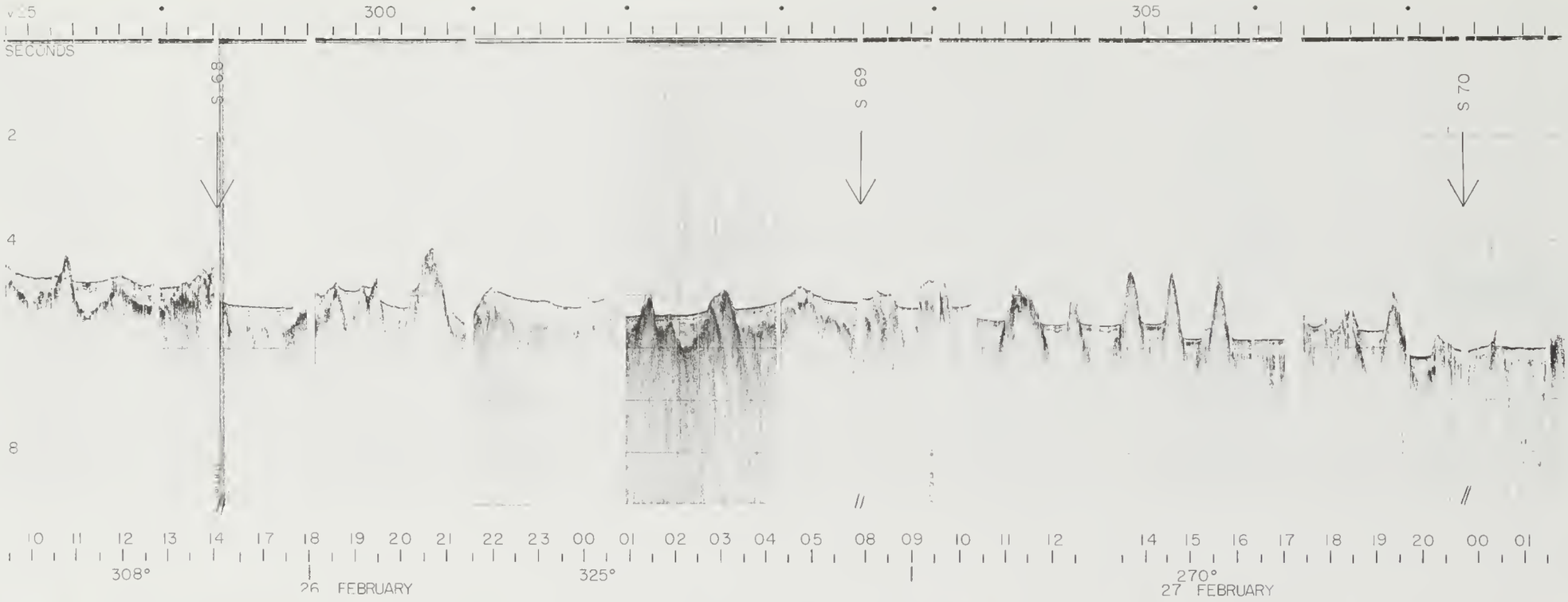

225
230
V25
FATHOMS
S 53
S 54
S 55A
800
1600
3200
090°
225°
167°
15 FEBRUARY

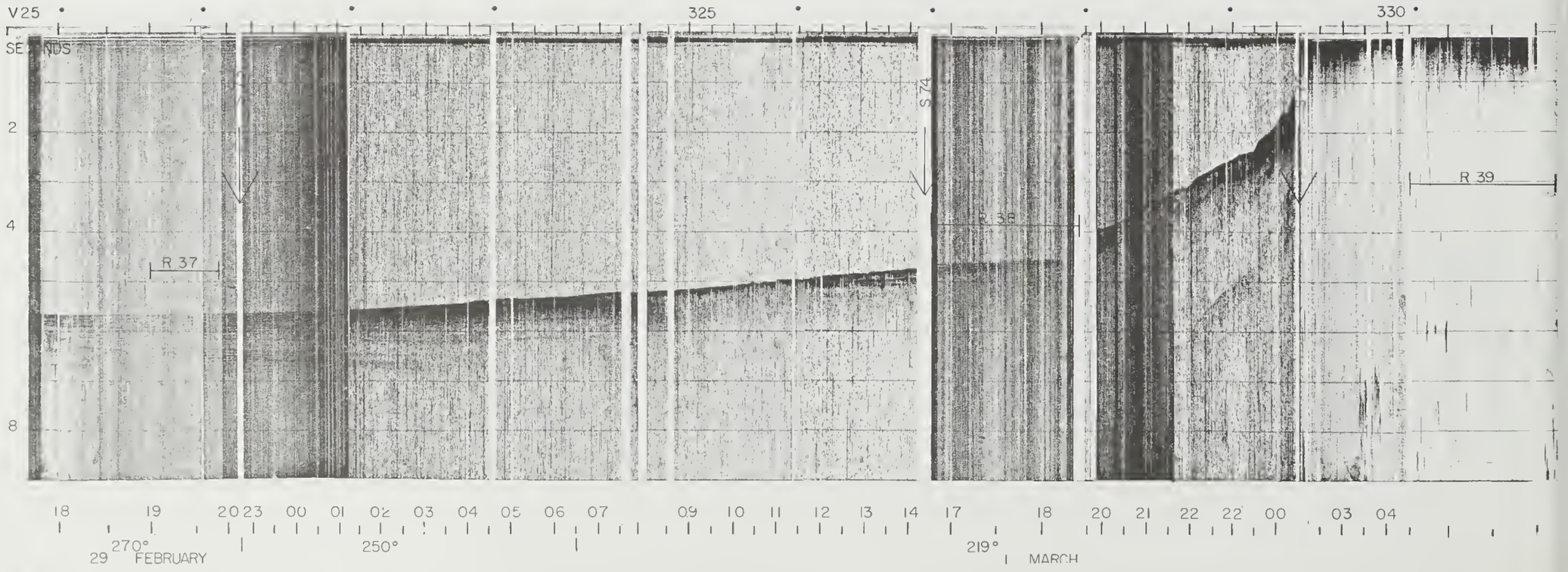

250
255
FATHOMS
S 58
S 59
R 34
800
1600
3200
045°
18 FEBRUARY
19 FEBRUARY

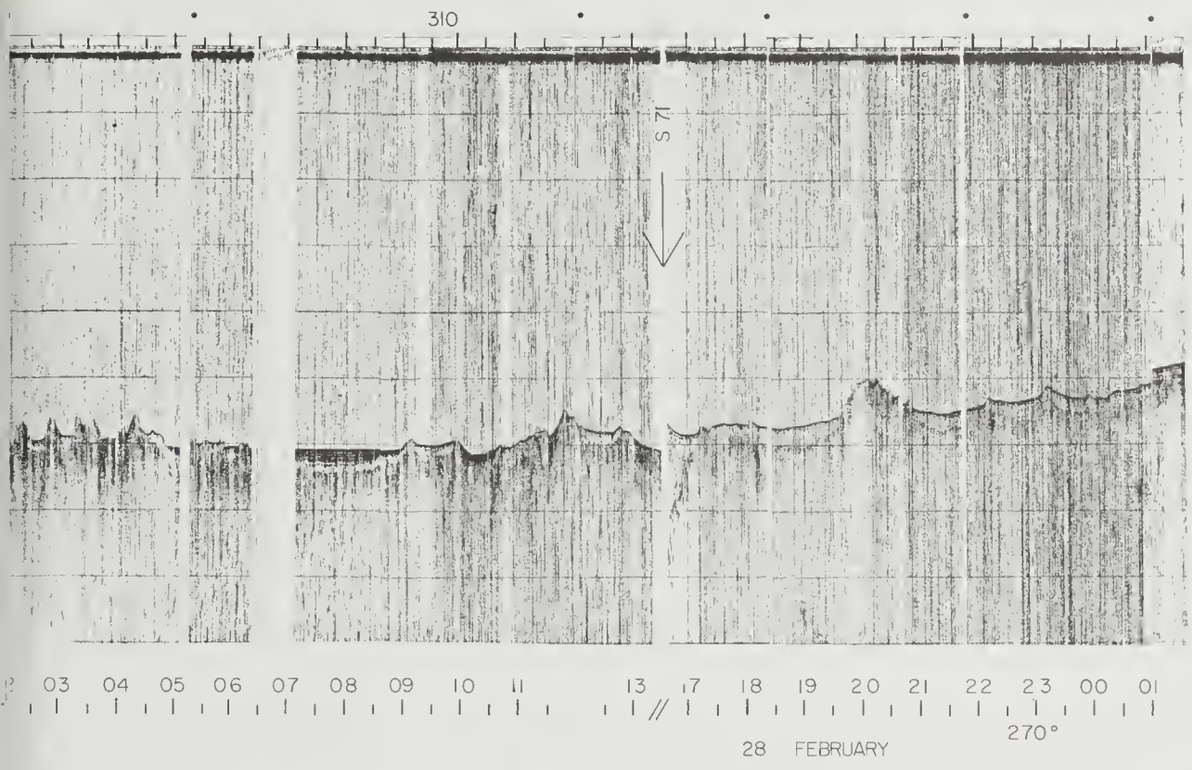

V25
260
265
S 60
R 35
S 61
21 21 22 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 02 03 04 05 06 07 08 09
173°
135°
20 FEBRUARY
033°
21 FEBRUARY

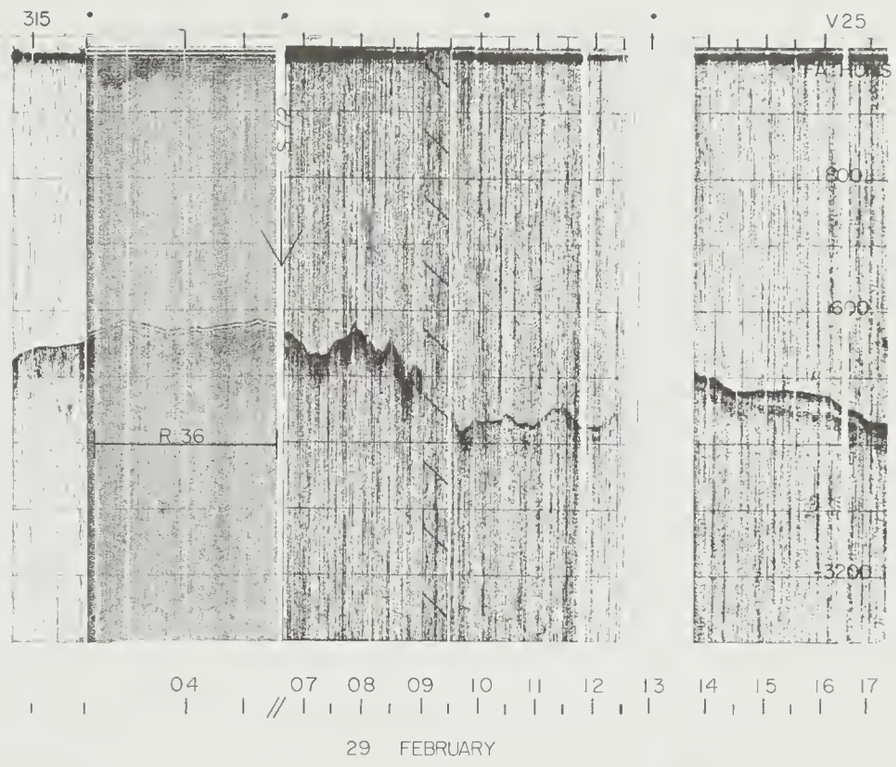

25
280
285
SECONDS
S 63
S 64
S 65
4
8
15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 15 16 17 18 19
153°
23 FEBRUARY
142°
107°
24 FEBRUARY
040°

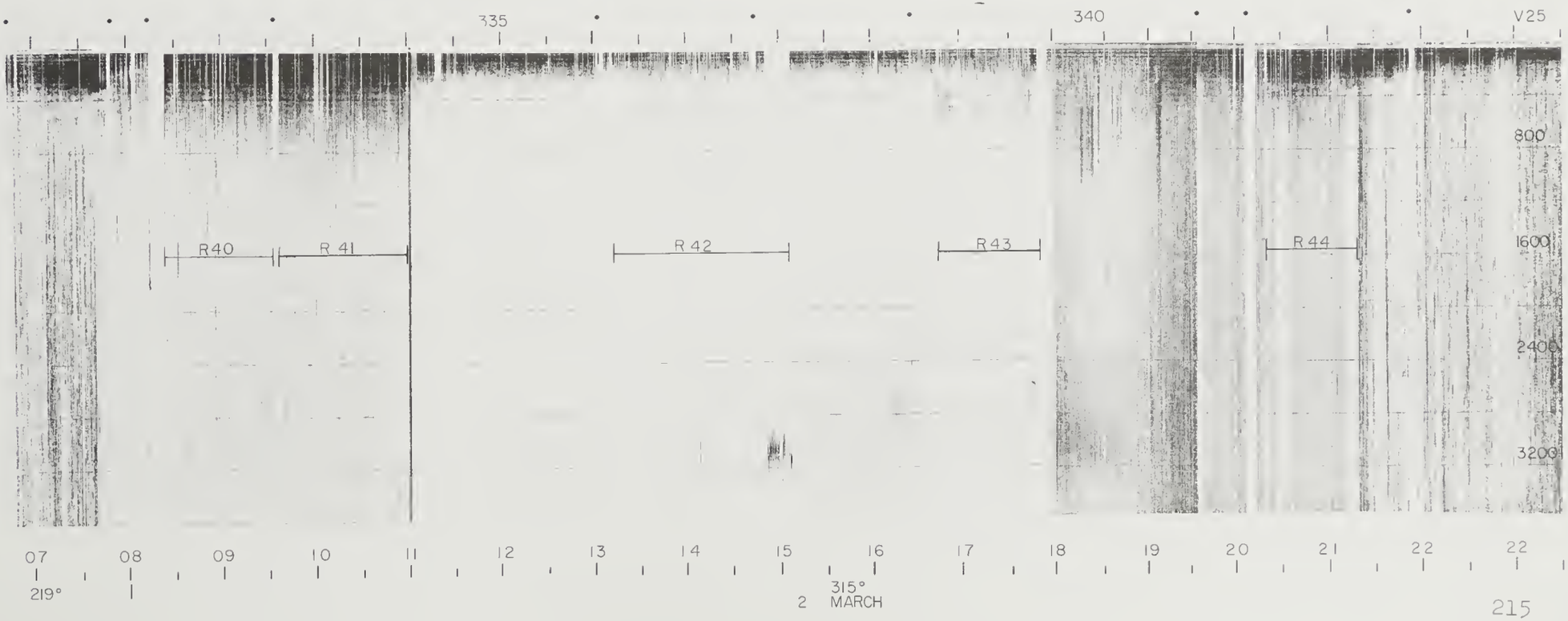

270
275
V25
FATHOMS
800
1600
3200
S 62
12 13 14 15 16 17 18 19 20 21 22 23 24 01 02 03 04 12 13
045°
180°
065°
21 FEBRUARY
15 16 17 18 19 20 21 22 22 00 01 02 03 04
069°
153°
22 FEBRUARY
290
295
V25
FATHOMS
800
1600
3200
S 66
S 67
19 20 21 22 23 00 01 02 03 04 05 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 03 04 05 06 07 08 09
040°
308°
24 FEBRUARY
25 FEBRUARY

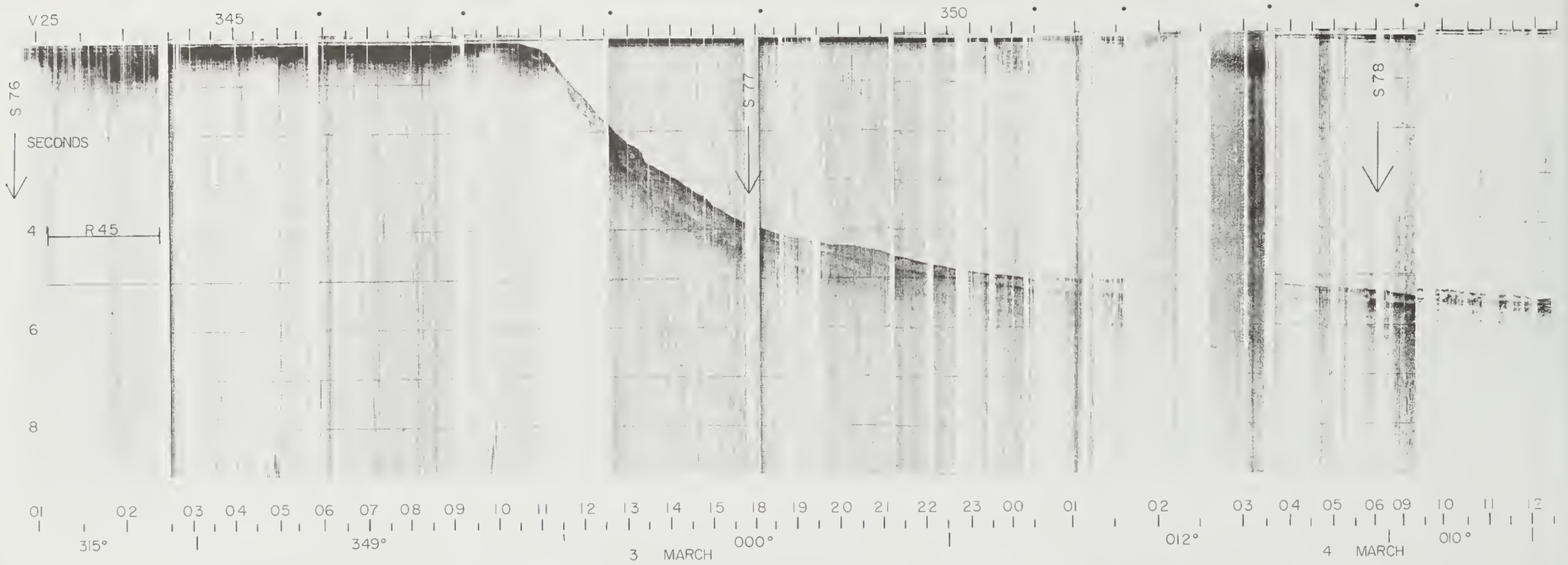

V25
300
305
SECONDS
2
4
8
S 68
S 69
S 70
10 11 12 13 14 17 18 19 20 21 22 23 00 01 02 03 04 05 08 09 10 11 12 14 15 16 17 18 19 20 00 01
308°
26 FEBRUARY
325°
270°
27 FEBRUARY

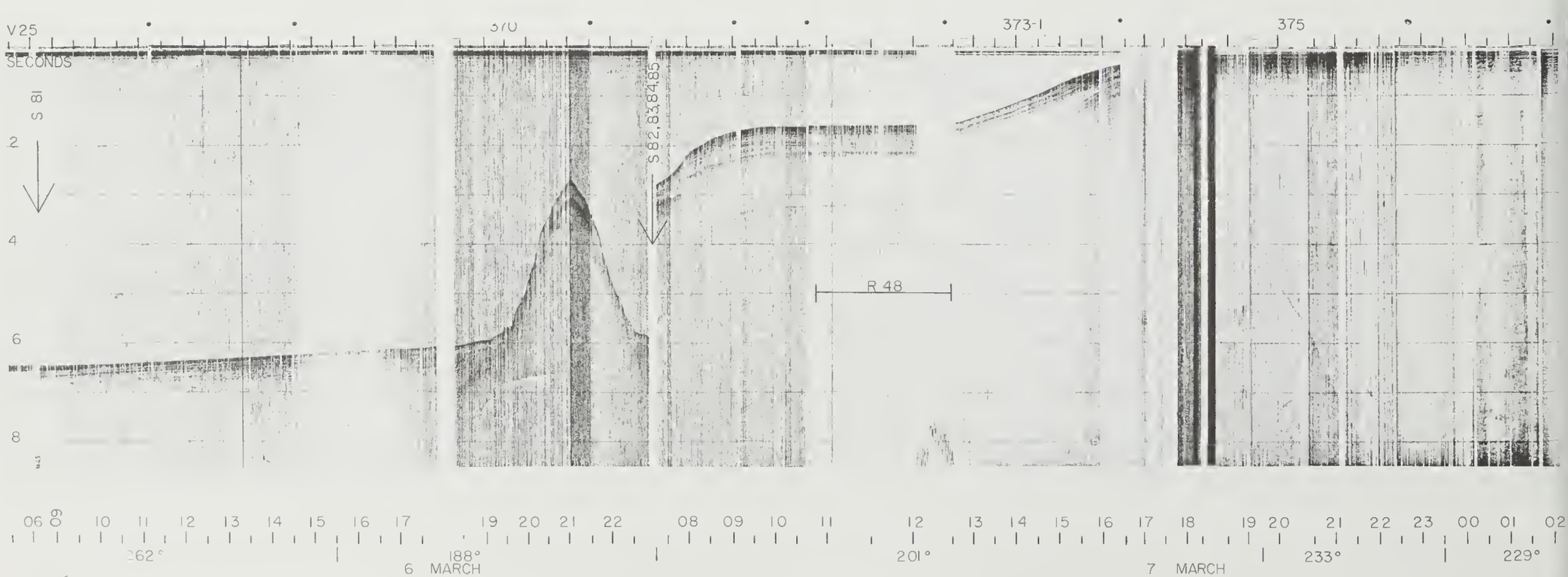

V25
325
330
SECONDS
2
4
8
S 74
R 37
R 38
R 39
18 19 20 23 00 01 02 03 04 05 06 07 09 10 11 12 13 14 17 18 20 21 22 22 00 03 04
270°
29 FEBRUARY
250°
219°
MARCH

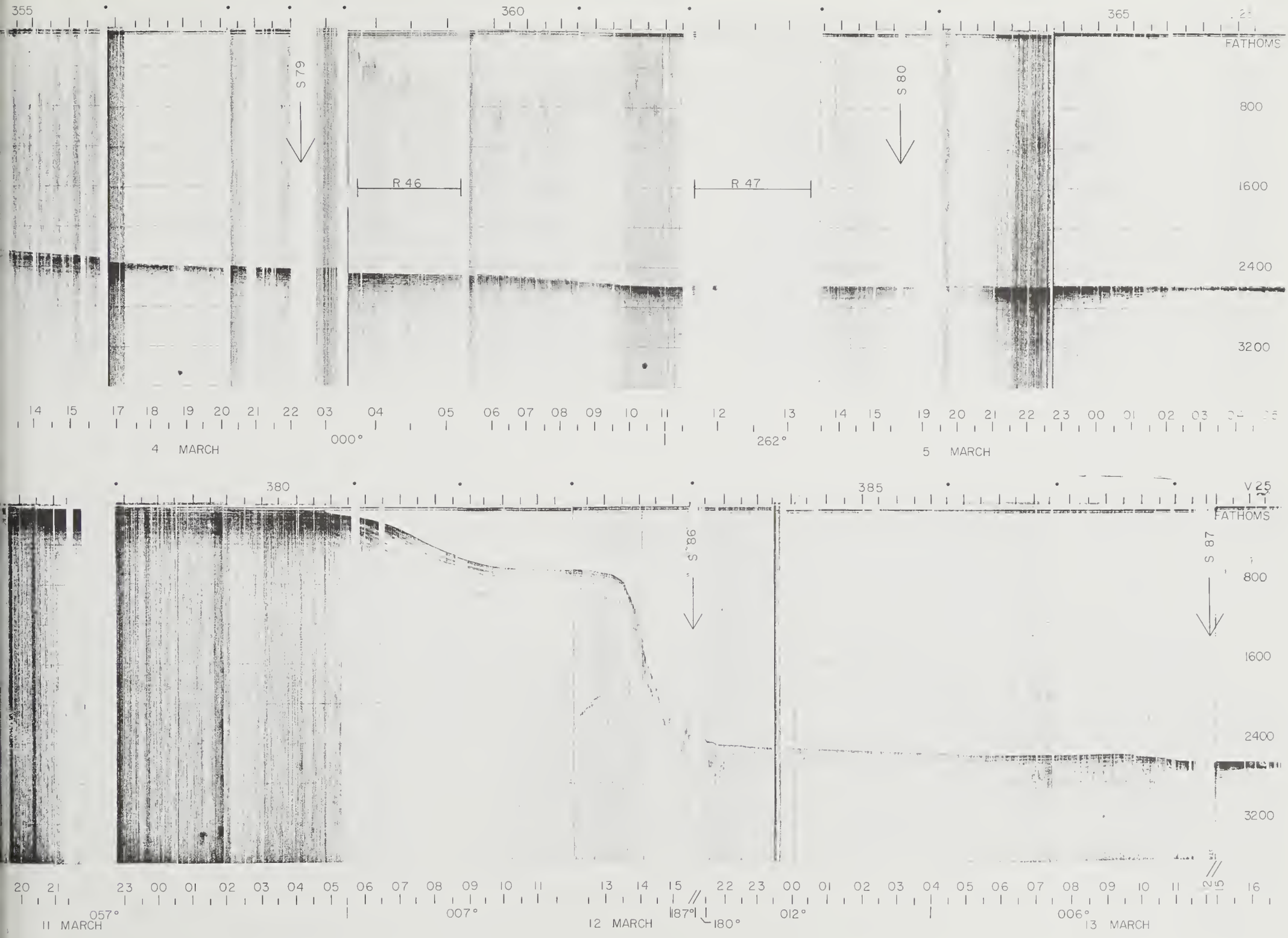

310
S 71
03 04 05 06 07 08 09 10 11 13 17 18 19 20 21 22 23 00 01
270°
28 FEBRUARY

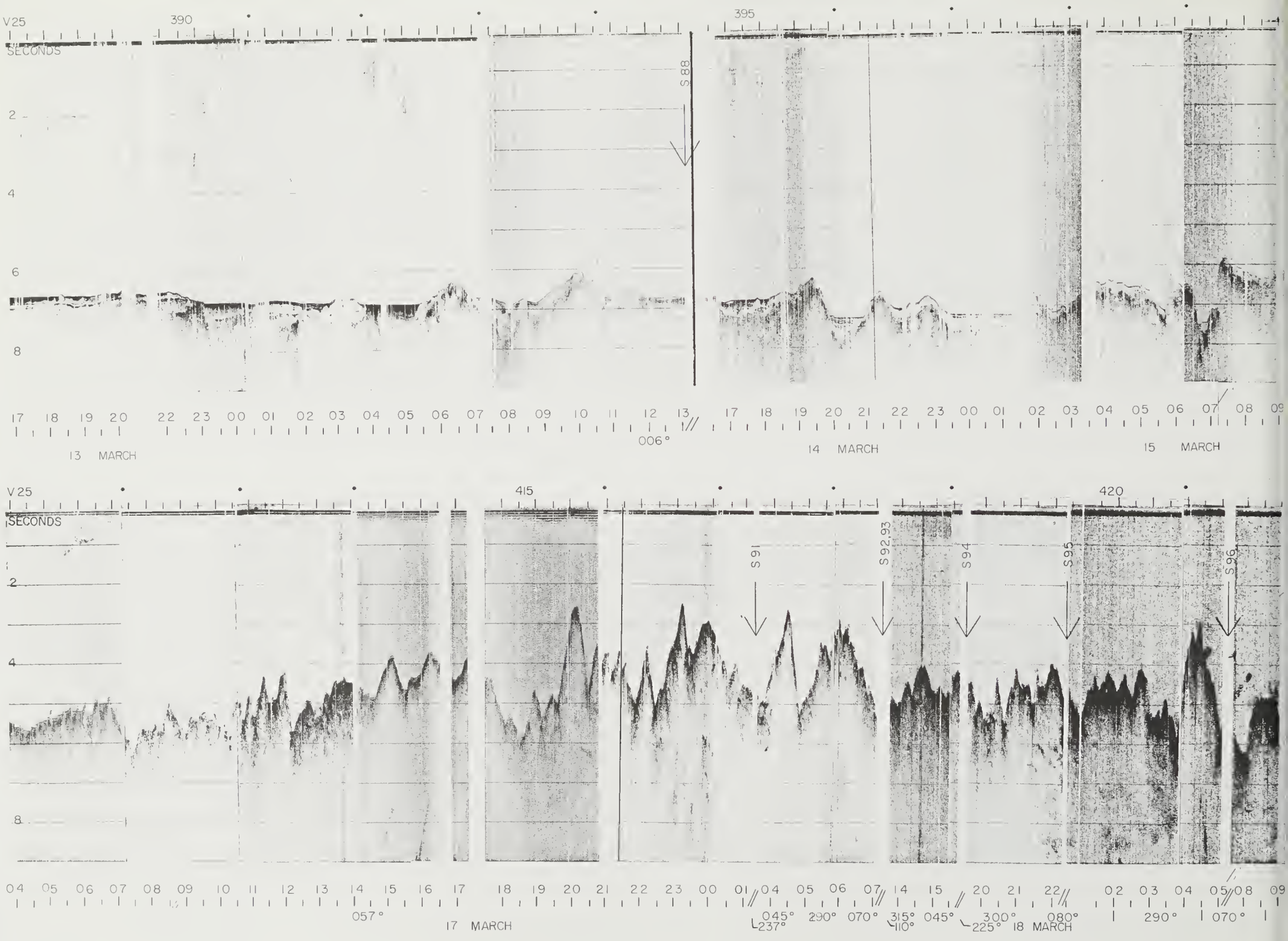

315
V25
FATHOMS
800
1600
3200
S 72
R 36
04 07 08 09 10 11 12 13 14 15 16 17
29 FEBRUARY

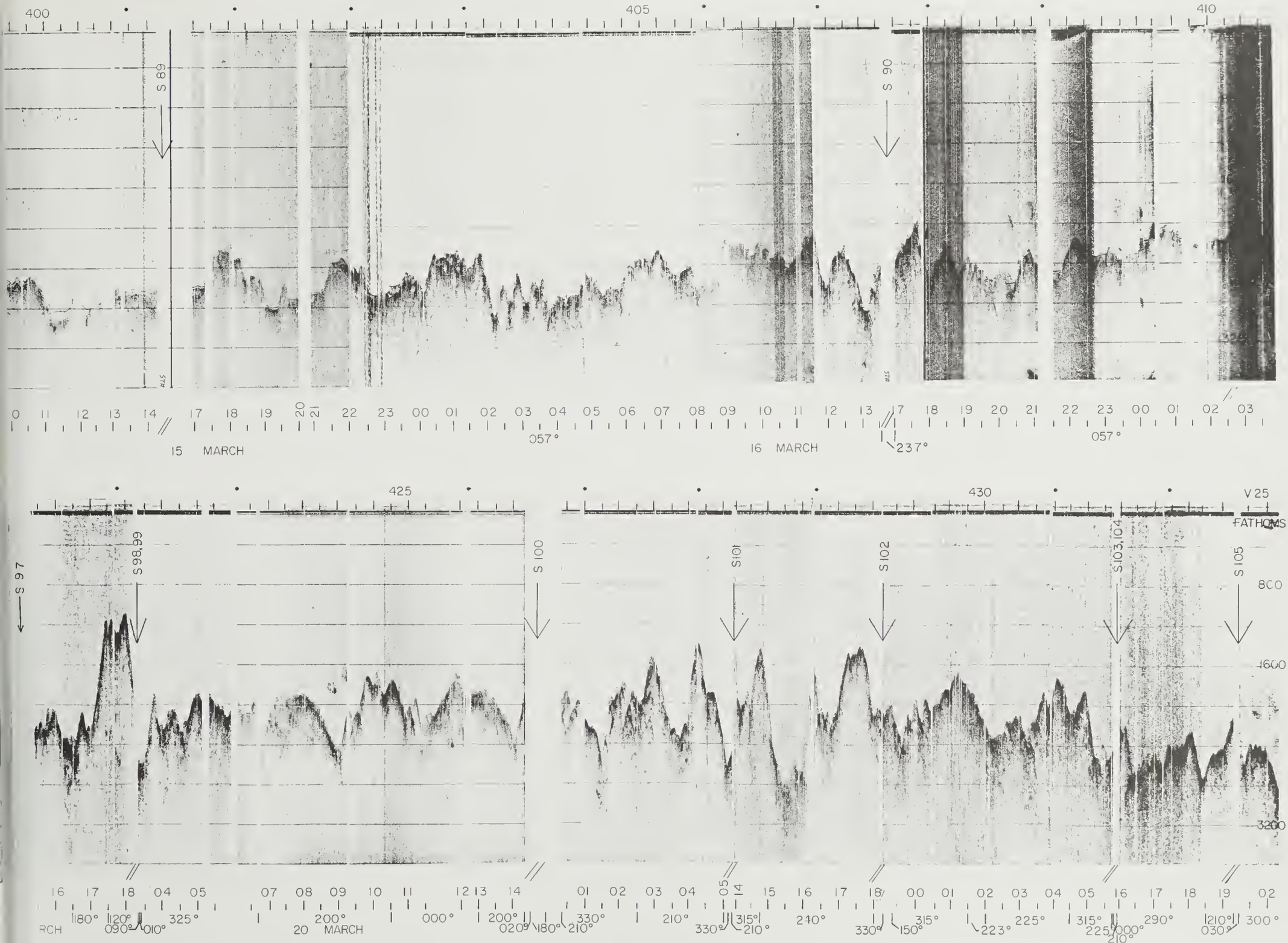

335
340
V25
800
1600
2400
3200
R40
R 41
R 42
R 43
R 44
07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 22
219°
315°
2 MARCH

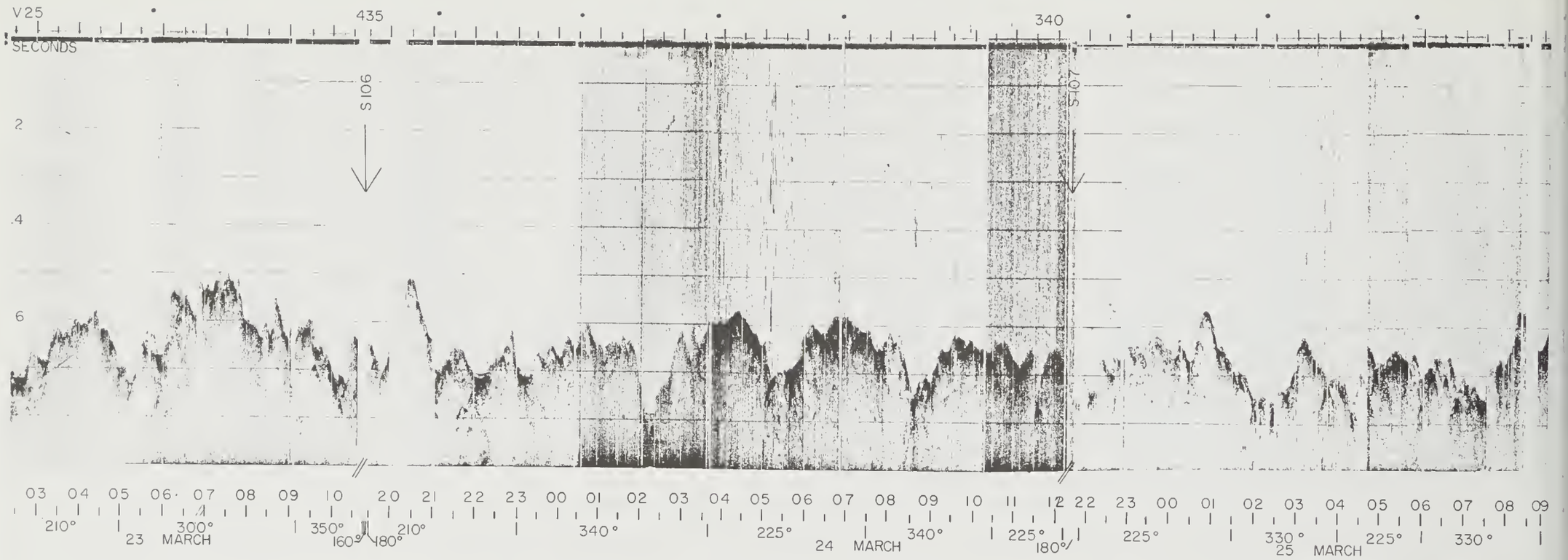

V25
345
350
S 76
SECONDS
S 77
S 78
R45
4
6
8
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 18 19 20 21 22 23 00 01 02 03 04 05 06 09 10 11 12
315°
349°
000°
012°
010°
3 MARCH
4 MARCH

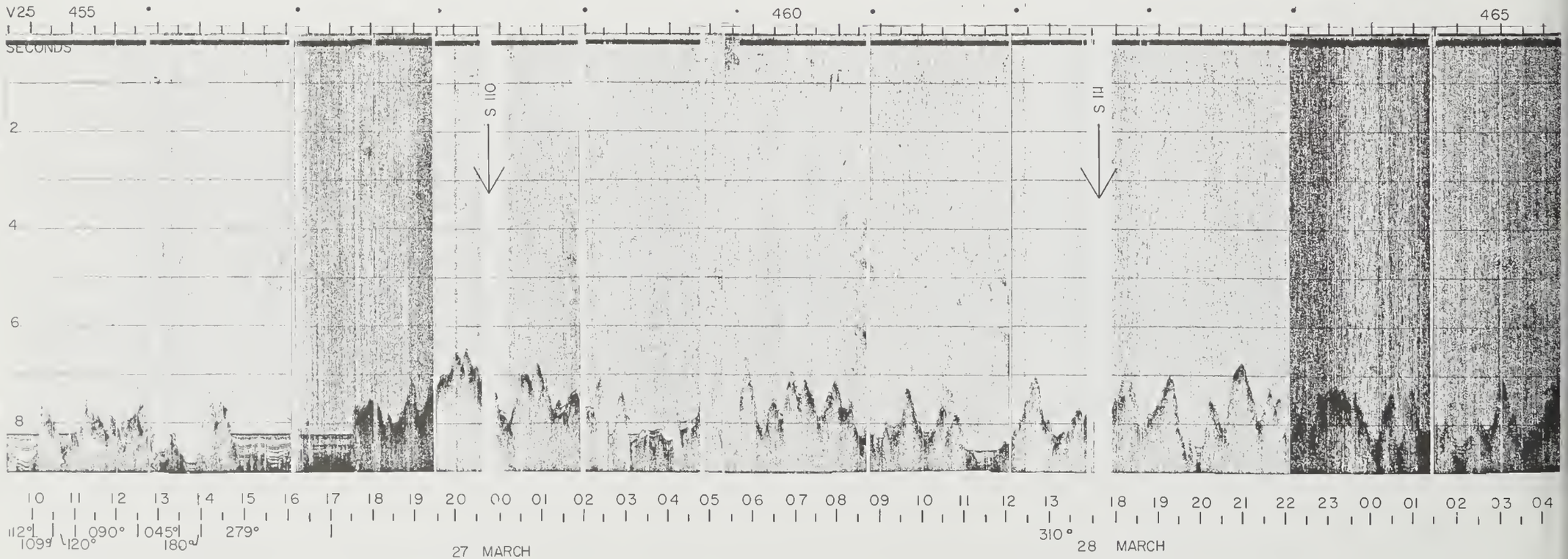

V25
370
373-1
375
SECONDS
S 81
S 82,83,84,85
R 48
2
4
6
8
06 08 10 11 12 13 14 15 16 17 19 20 21 22 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02
262°
188°
201°
233°
229°
6 MARCH
7 MARCH

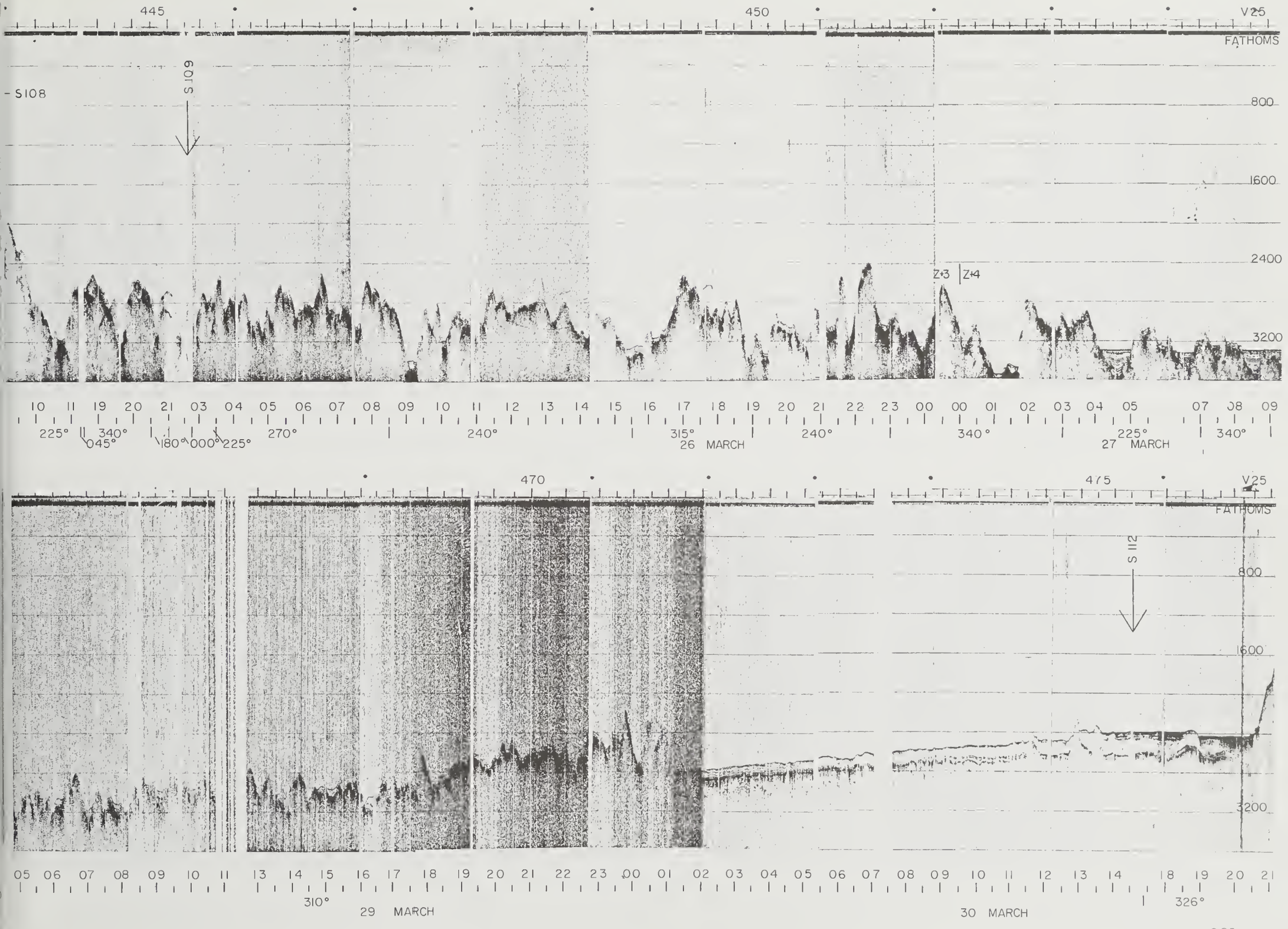

355
360
365
FATHOMS
800
1600
2400
3200
S 79
S 80
R 46
R 47
14 15 17 18 19 20 21 22 03 04 05 06 07 08 09 10 11 12 13 14 15 19 20 21 22 23 00 01 02 03
000°
262°
4 MARCH
5 MARCH
380
385
V 25
FATHOMS
S 86
S 87
800
1600
2400
3200
20 21 23 00 01 02 03 04 05 06 07 08 09 10 11 13 14 15 22 23 00 01 02 03 04 05 06 07 08 09 10 11 15 16
057°
007°
187°
180°
012°
006°
11 MARCH
12 MARCH
13 MARCH

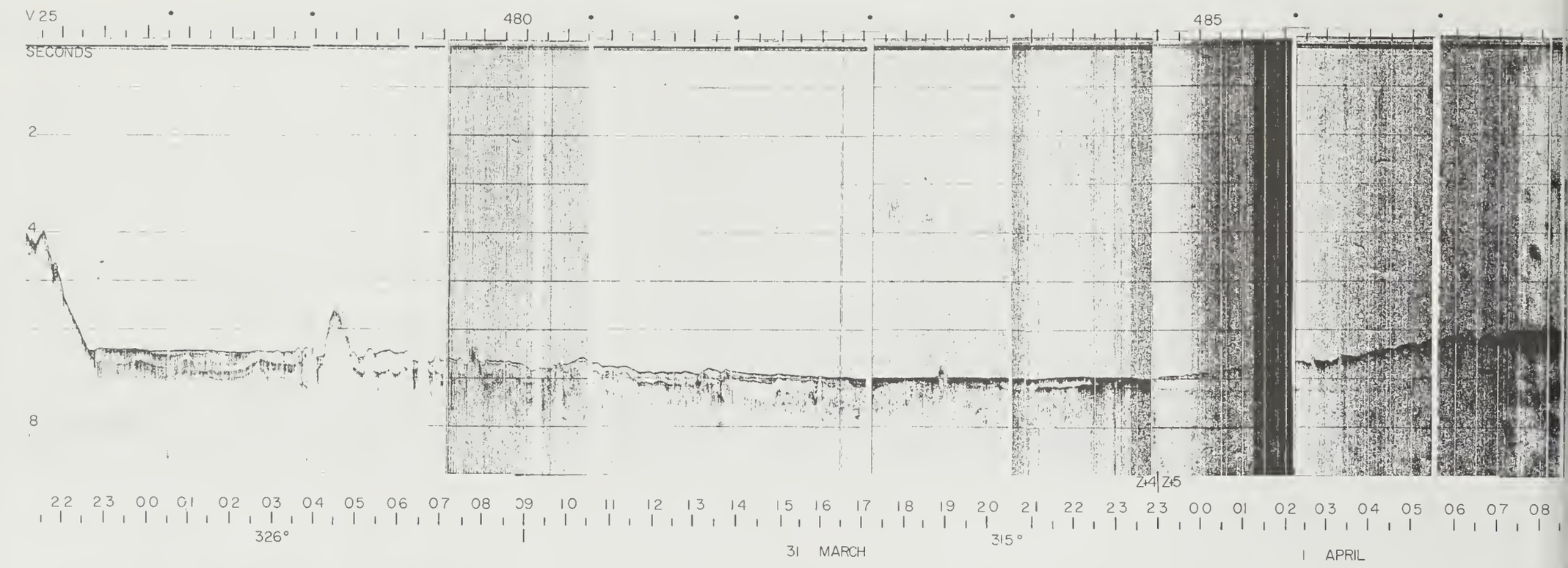

V25
390
395
SECONDS
2
4
6
8
S88
17 18 19 20 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13
006°
13 MARCH
17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09
14 MARCH
15 MARCH
V25
415
420
SECONDS
2
4
8
S91
S92,93
S94
S95
S96
04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 04 05 06 07 14 15 20 21 22 02 03 04 05 08 09
057°
17 MARCH
045° 290° 070° 315° 045° 300° 080°
237° 110° 225°
18 MARCH
290°
070°

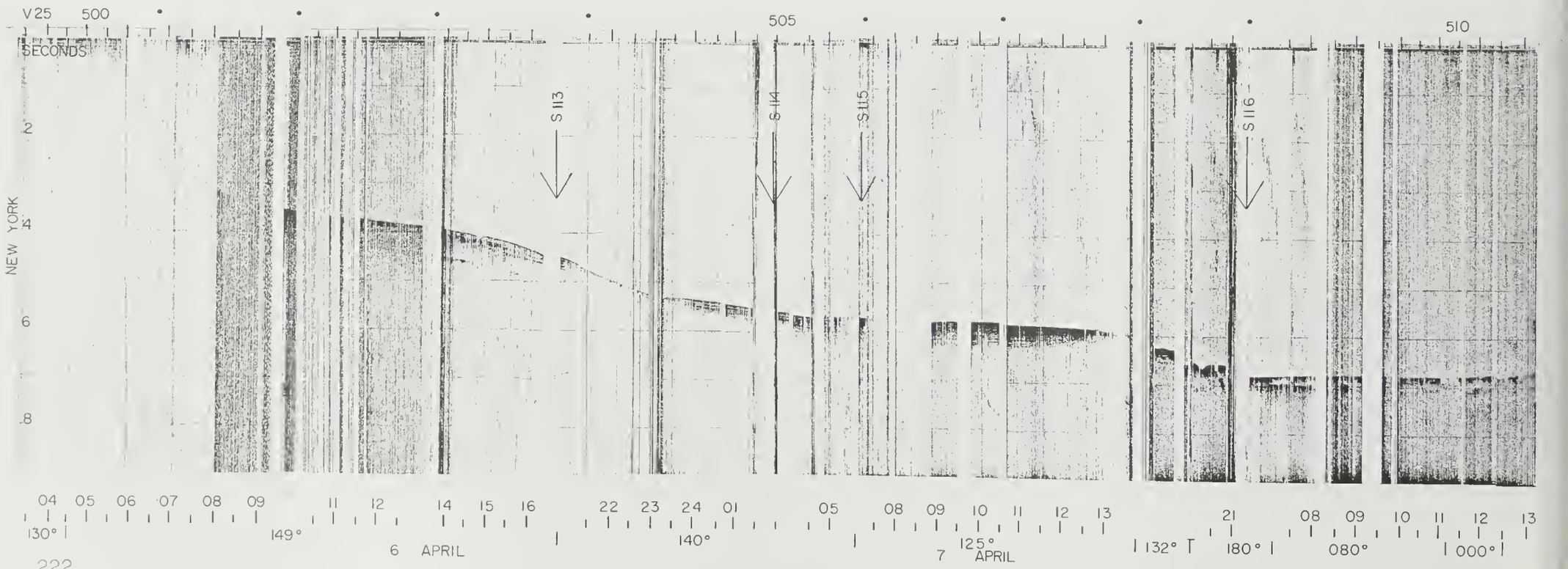

400
405
410
S 89
S 90
0 11 12 13 14 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 17 18 19 20 21 22 23 00 01 02 03
057°
15 MARCH
16 MARCH
237°
057°
425
430
V 25
FATHOMS
S 97
S 98,99
S 100
S 101
S 102
S 103,104
S 105
800
1600
3200
16 17 18 04 05 07 08 09 10 11 12 13 14 01 02 03 04 05 14 15 16 17 18 00 01 02 03 04 05 16 17 18 19 02
180° 120° 090° 010° 325°
20 MARCH
200° 000° 200° 020° 180° 210° 330° 210° 315° 210° 240° 330° 315° 150° 223° 225° 315° 225° 000° 210° 290° 210° 030° 300°

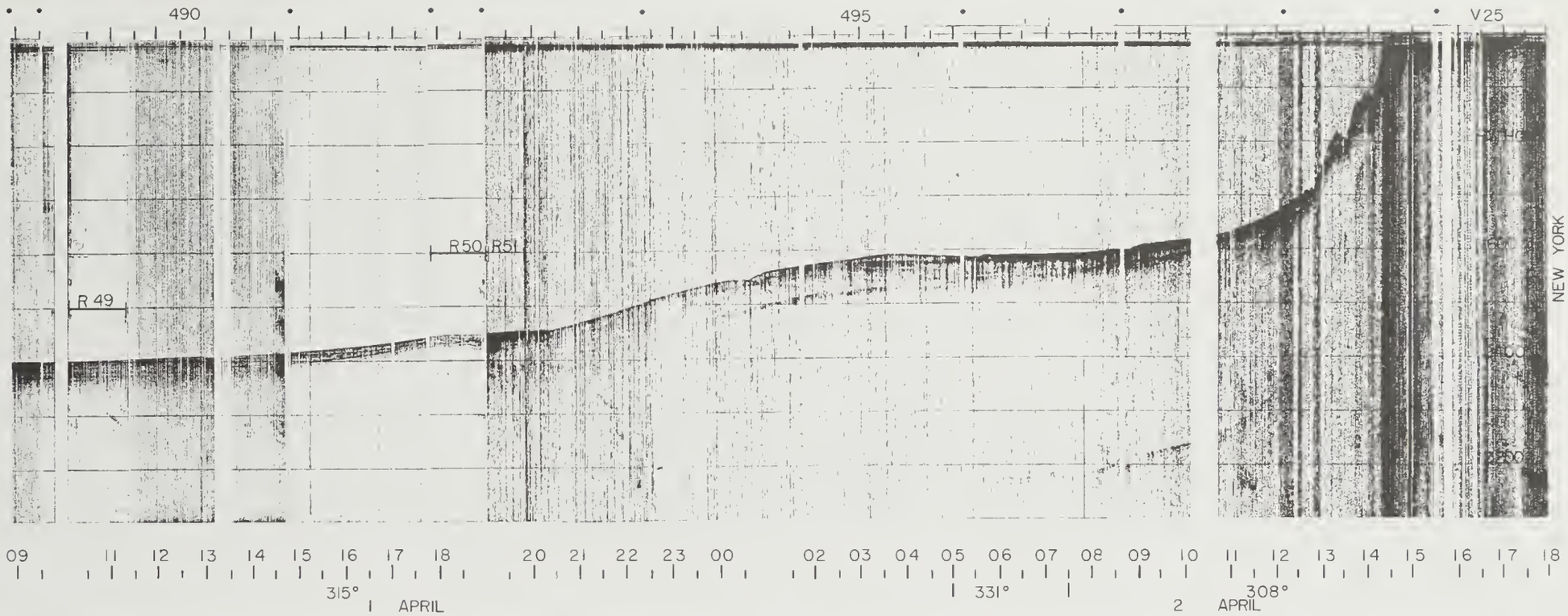

V25
435
340
SECONDS
2
4
6
S 106
S 107
03 04 05 06 07 08 09 10 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 22 23 00 01 02 03 04 05 06 07 08 09
210° 300° 350° 210° 340° 225° 340° 225° 225° 330° 225° 330°
23 MARCH
160° 180°
24 MARCH
180°
25 MARCH

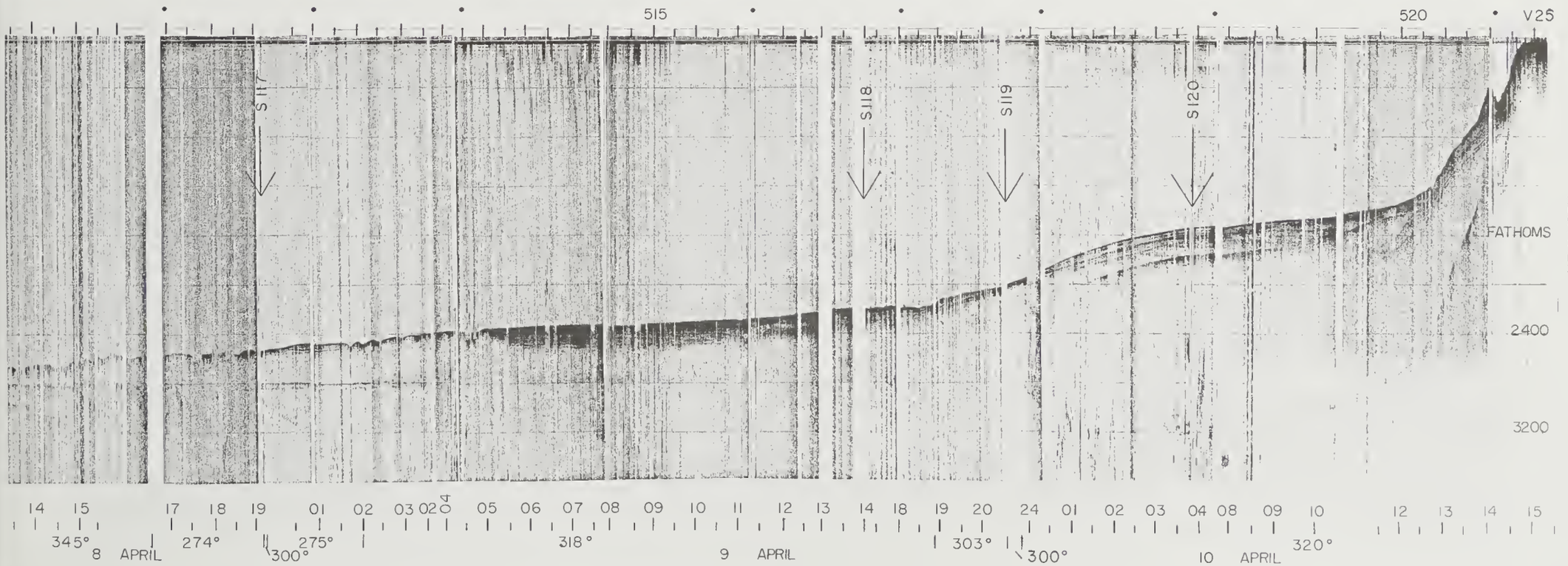

V25
455
460
465
SECONDS
2
4
6
8
S 110
S 111
10 11 12 13 14 15 16 17 18 19 20 00 01 02 03 04 05 06 07 08 09 10 11 12 13 18 19 20 21 22 23 00 01 02 03 04
112° 090° 045° 279° 310°
109° 120° 180°
27 MARCH
28 MARCH

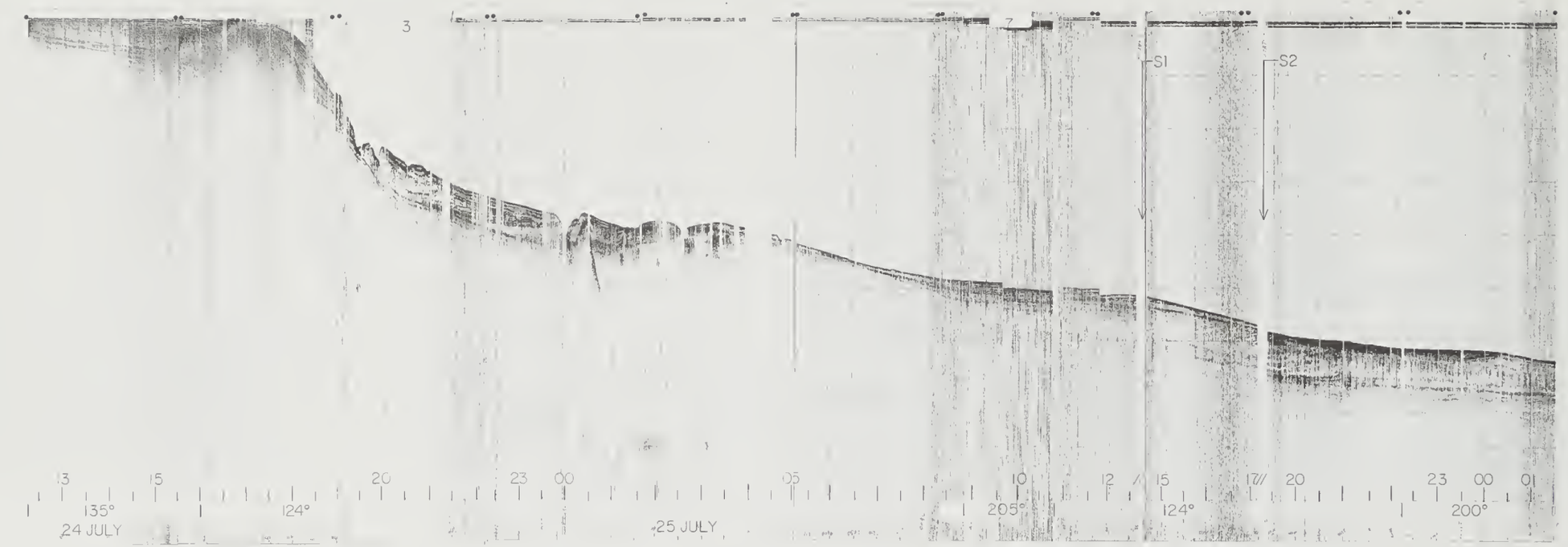

445
450
V25
FATHOMS
S108
S109
800
1600
2400
3200
Z+3
Z+4
10 11 19 20 21 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 00 01 02 03 04 05 07 08 09
225° 340° 045° 180° 000° 225° 270° 240° 315° 240° 340° 225° 340°
26 MARCH
27 MARCH
470
475
V25
FATHOMS
S112
800
1600
3200
05 06 07 08 09 10 11 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 18 19 20 21
310°
326°
29 MARCH
30 MARCH

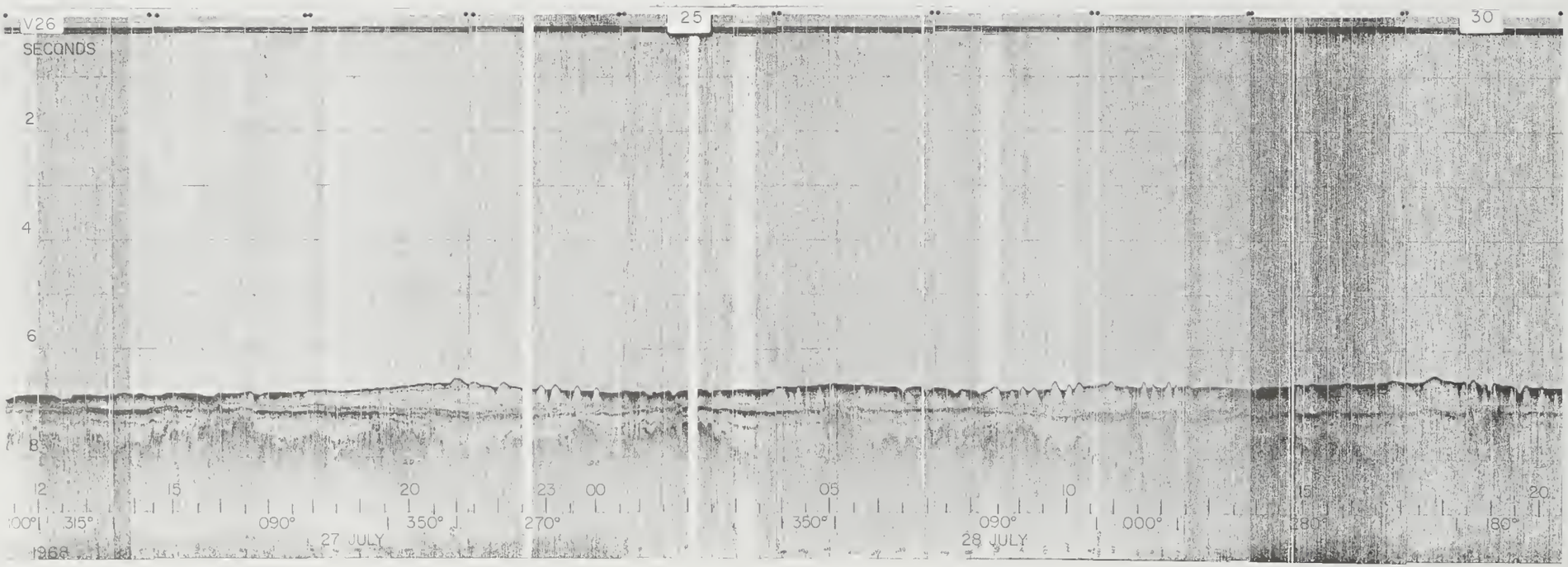

V 25
480
485
SECONDS
2
4
8
Z4
Z5
22 23 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 23 00 01 02 03 04 05 06 07 08
326°
315°
31 MARCH
1 APRIL

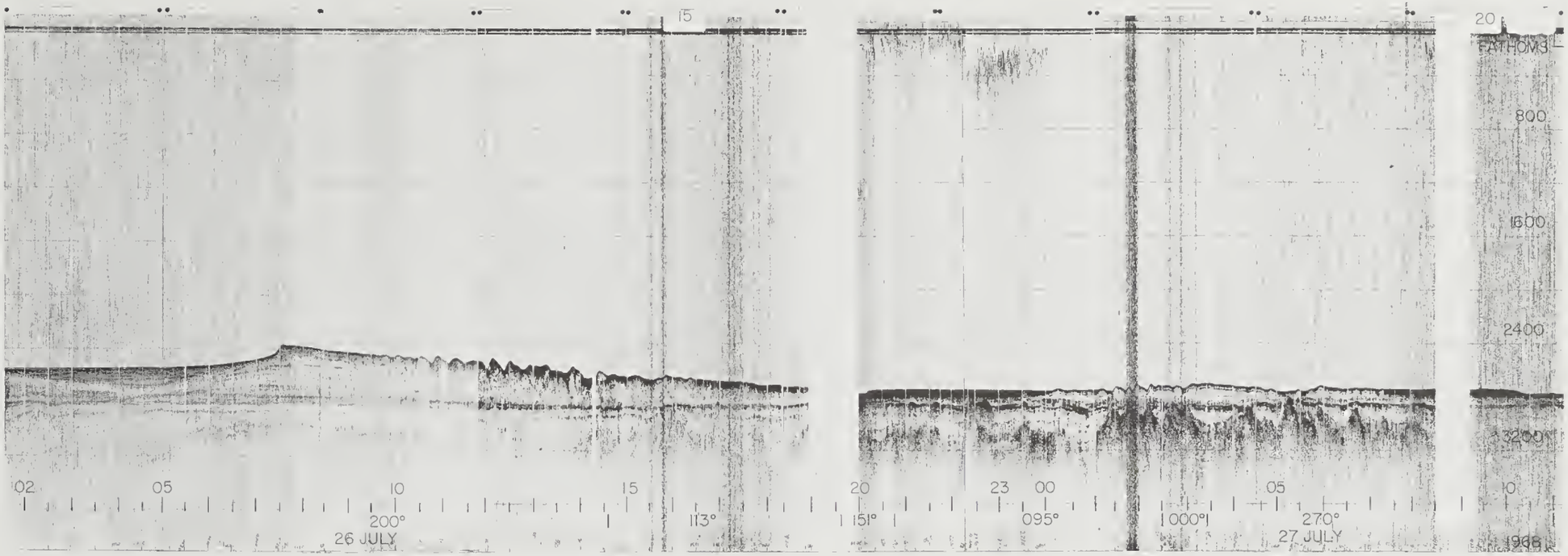

V 25
500
505
510
SECONDS
NEW YORK
2
4
6
8
S 113
S 114
S 115
S 116
04 05 06 07 08 09 11 12 14 15 16 22 23 24 01 05 08 09 10 11 12 13 21 08 09 10 11 12 13
130°
149°
140°
125°
132°
180°
080°
000°
6 APRIL
7 APRIL

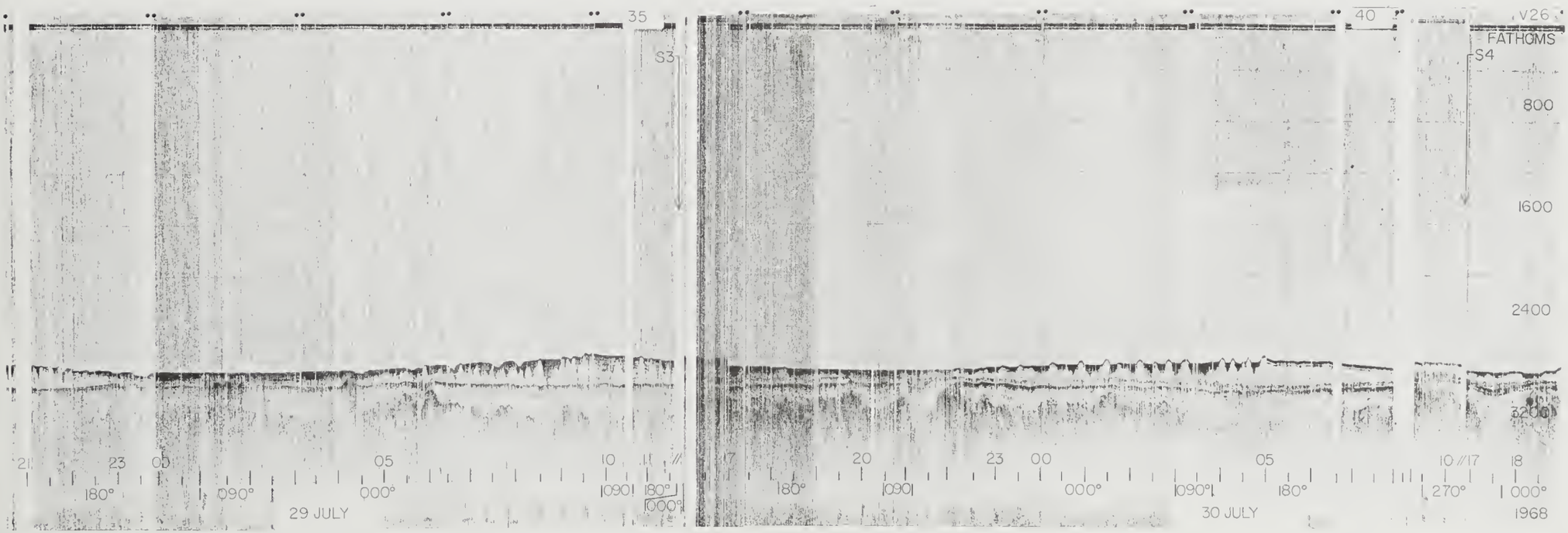

490
495
V25
R 49
R50 R51
NEW YORK
09 11 12 13 14 15 16 17 18 20 21 22 23 00 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
315°
1 APRIL
331°
308°
2 APRIL

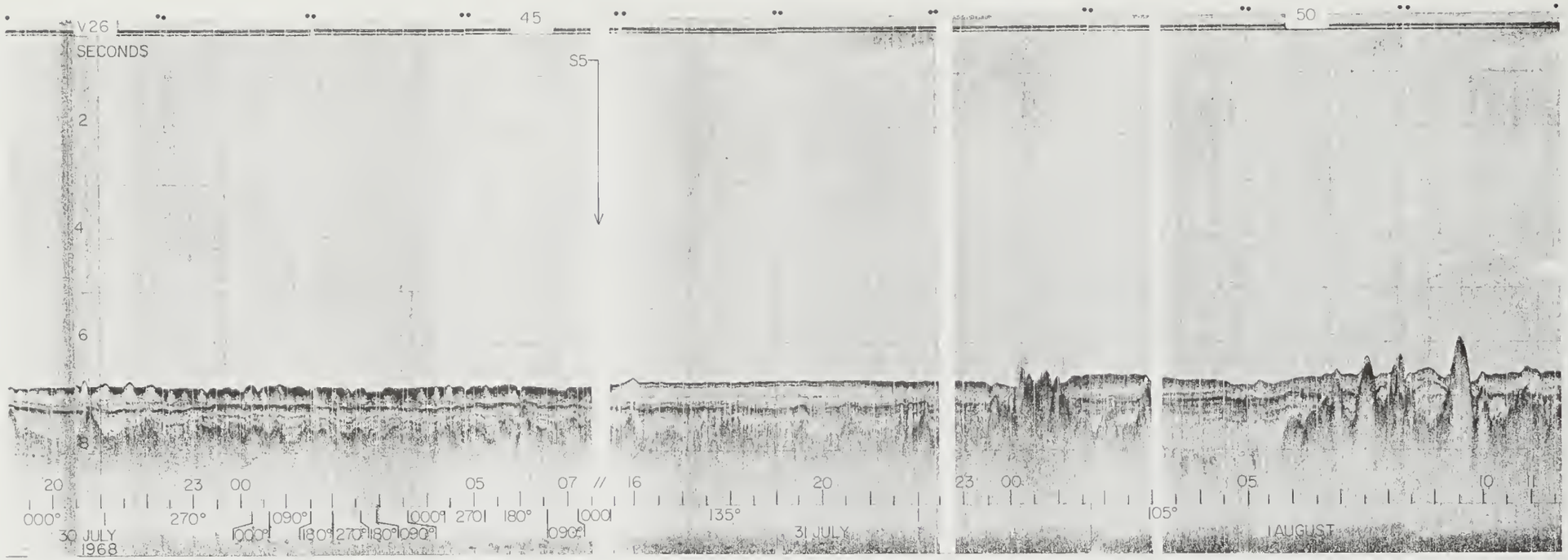

515
520
V25
S117
S118
S119
S120
FATHOMS
2400
3200
NEW YORK
14 15 17 18 19 01 02 03 02 05 06 07 08 09 10 11 12 13 14 18 19 20 24 01 02 03 04 08 09 10 12 13 14 15
345°
8 APRIL
274°
300°
275°
318°
9 APRIL
303°
300°
10 APRIL
320°

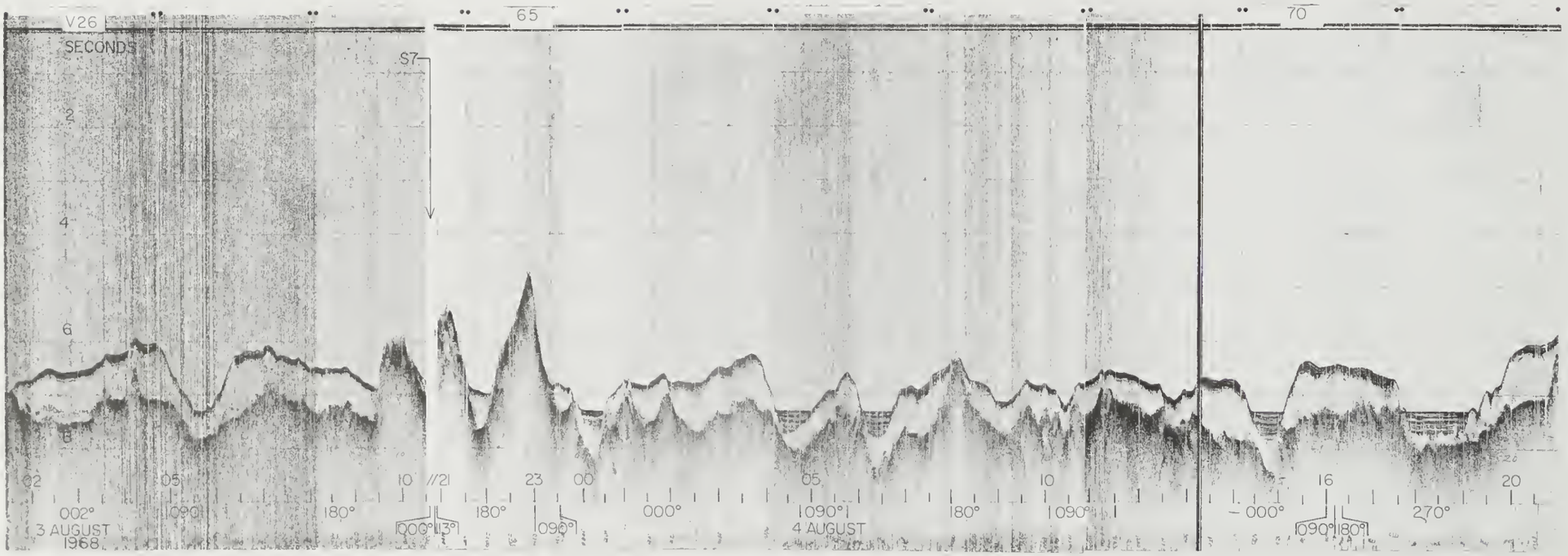

3
7
S1
S2
13
15
20
23
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05
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17
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23
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01
135°
124°
205°
124°
200°
24 JULY
25 JULY

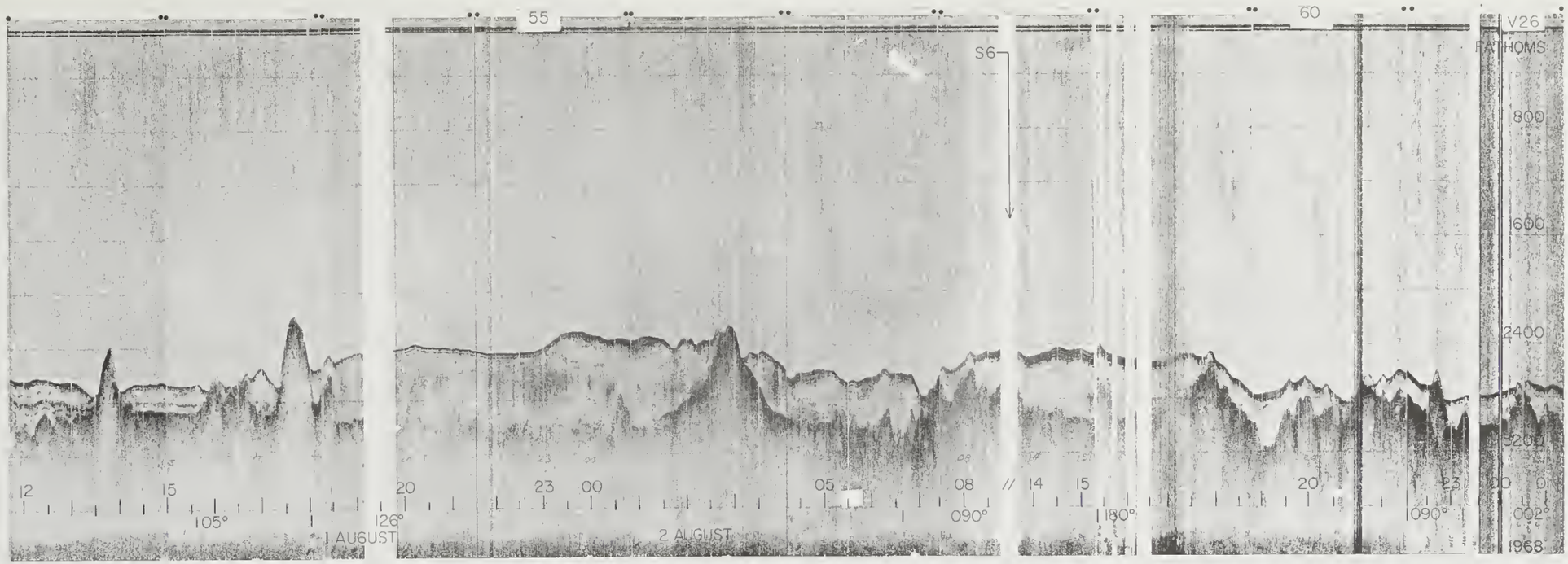

V26
SECONDS
25
30
2
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12
15
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15
20
100°
315°
090°
350°
270°
350°
090°
000°
280°
180°
27 JULY
28 JULY
1968

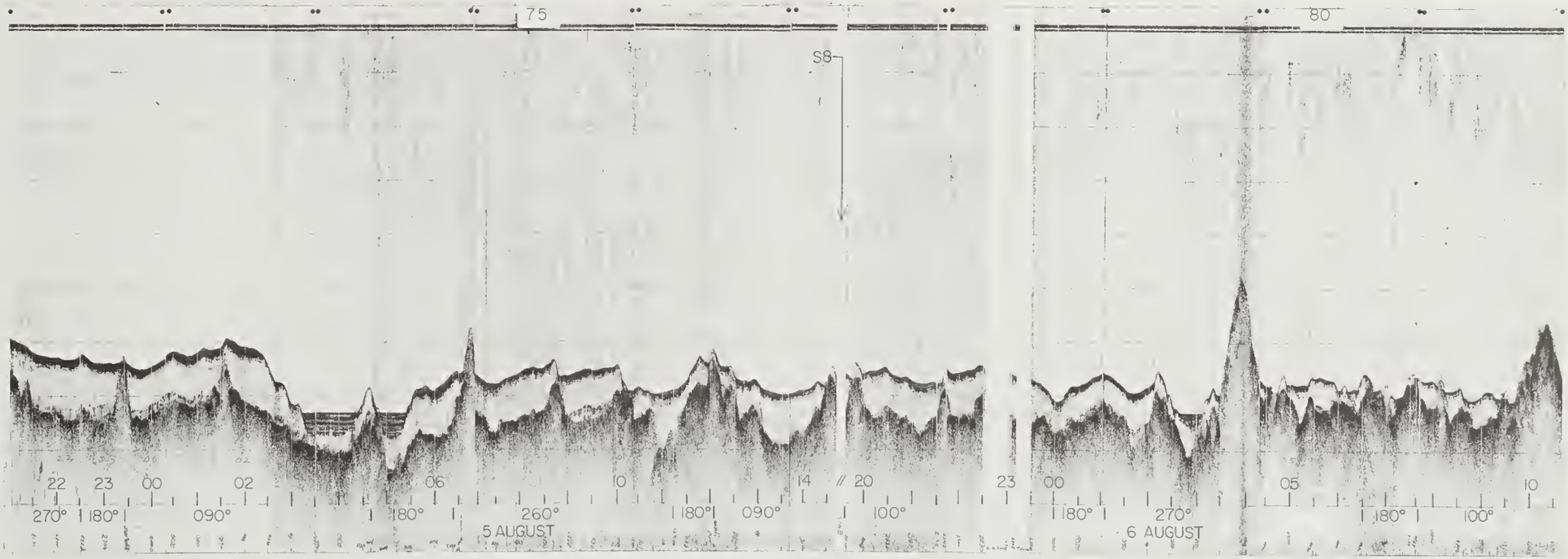

15
20
FATHOMS
800
1600
2400
3200
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200°
113°
151°
095°
000°
270°
26 JULY
27 JULY
1968

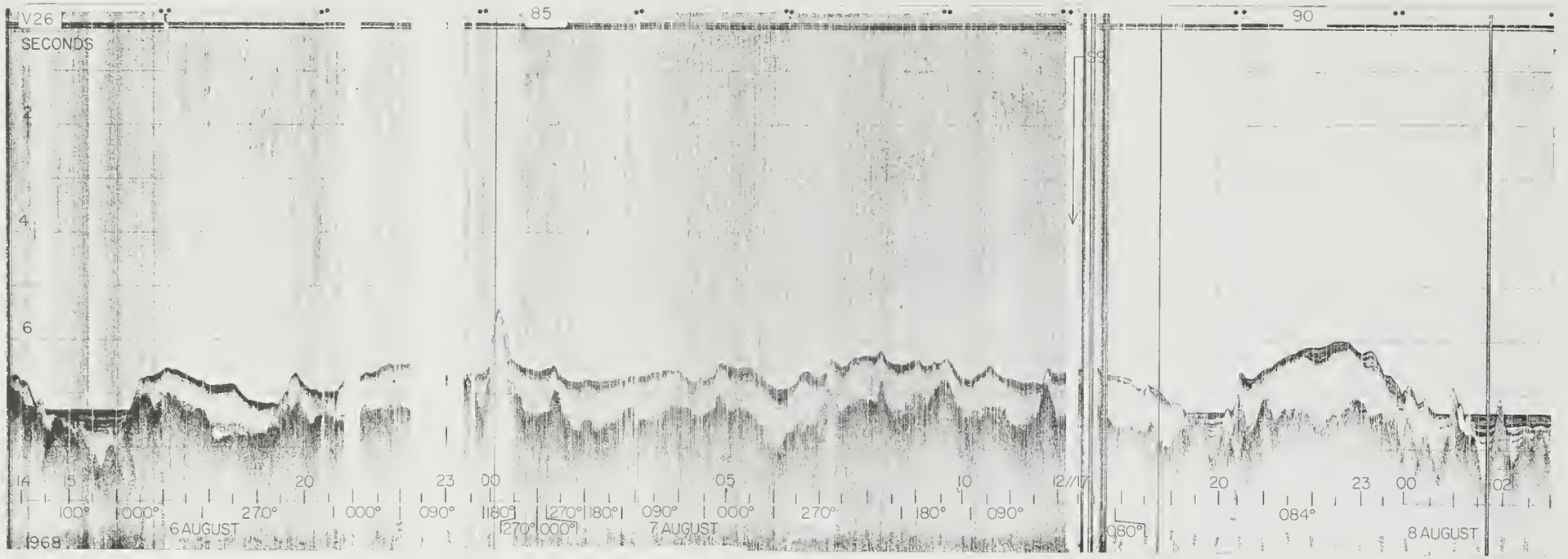

35
S3
40
V26
FATHOMS
S4
800
1600
2400
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270°
000°
29 JULY
30 JULY
1968

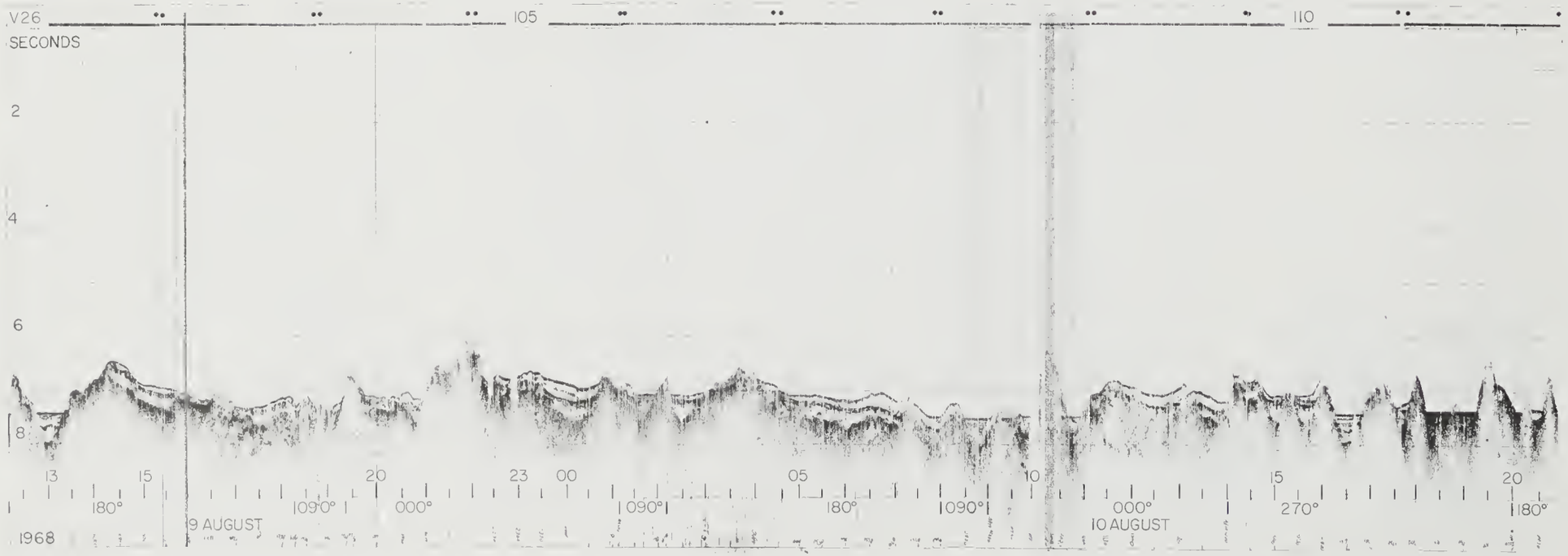

V26
SECONDS
45
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S5
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180°
135°
105°
30 JULY
1968
31 JULY
1 AUGUST

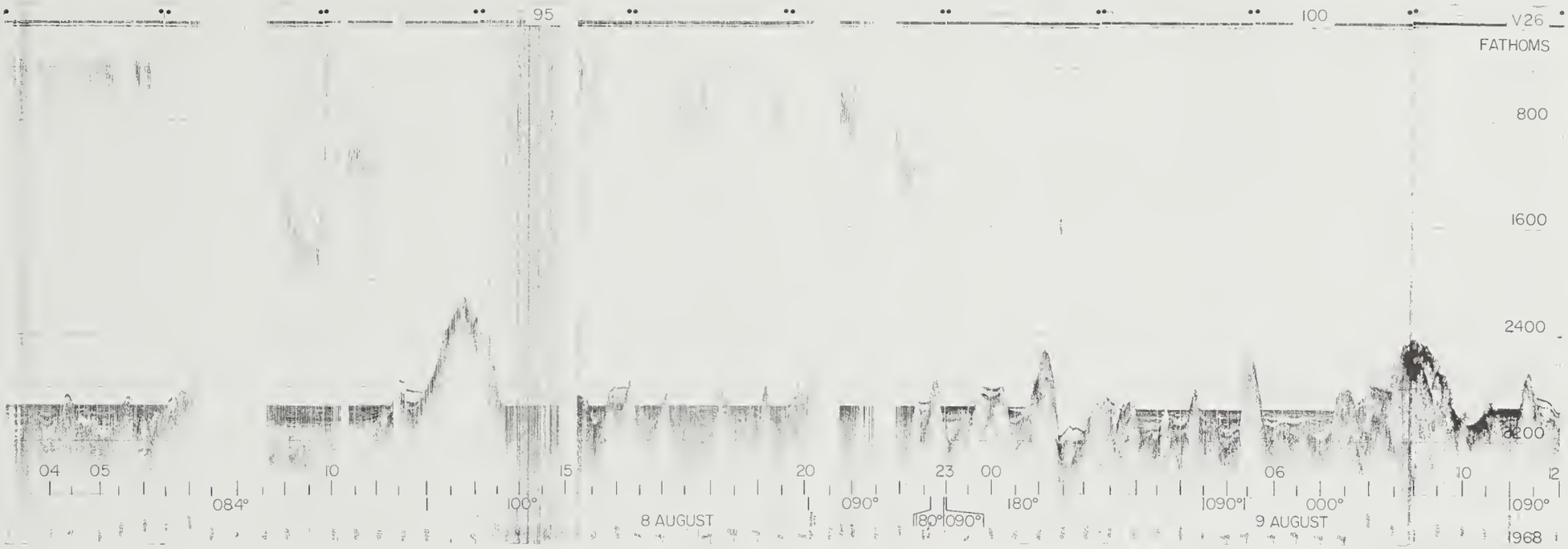

V26
SECONDS
65
70
S7
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000°
270°
3 AUGUST
1968
4 AUGUST

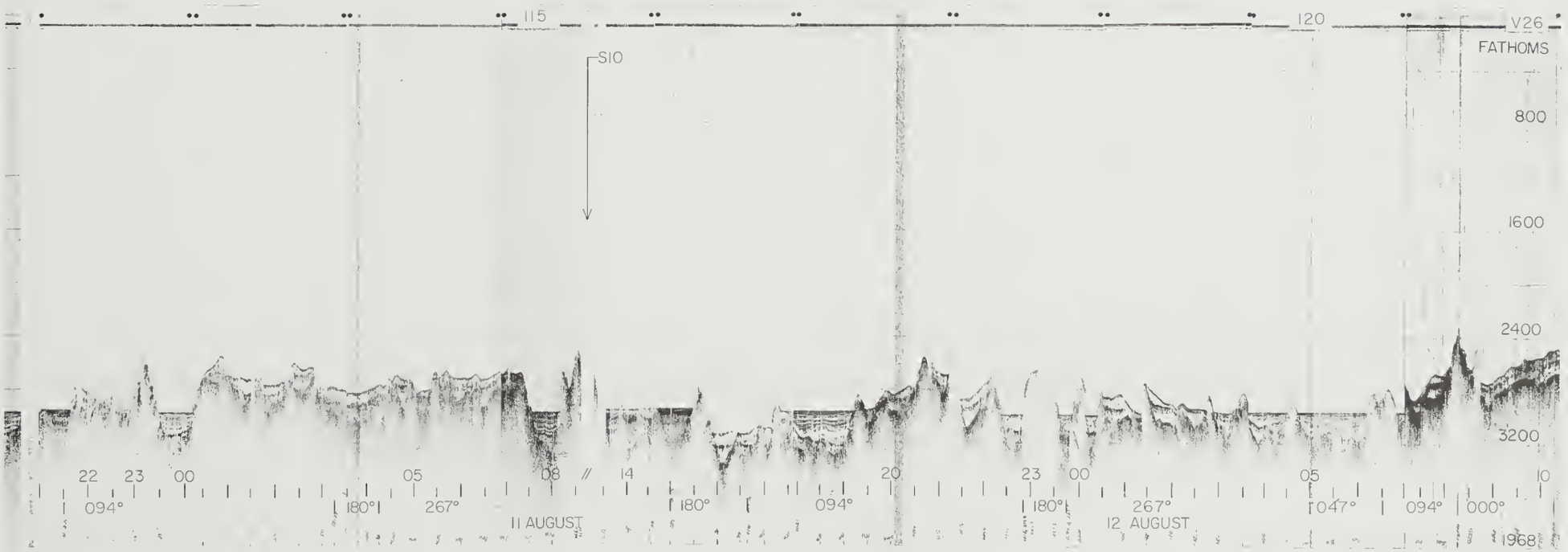

55
S6
60
V26
FATHOMS
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1968
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002°
AUGUST
2 AUGUST

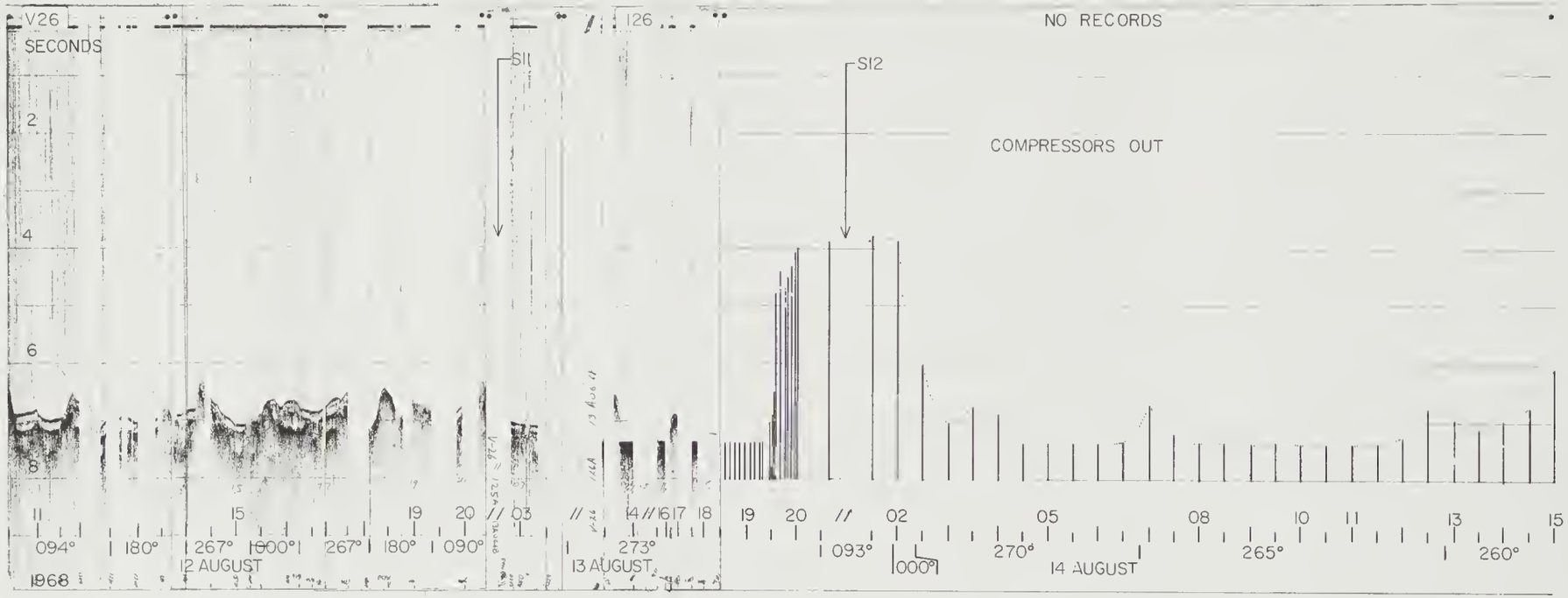

75
S8
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270°
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180°
260°
180°
090°
100°
180°
270°
180°
100°
5 AUGUST
6 AUGUST

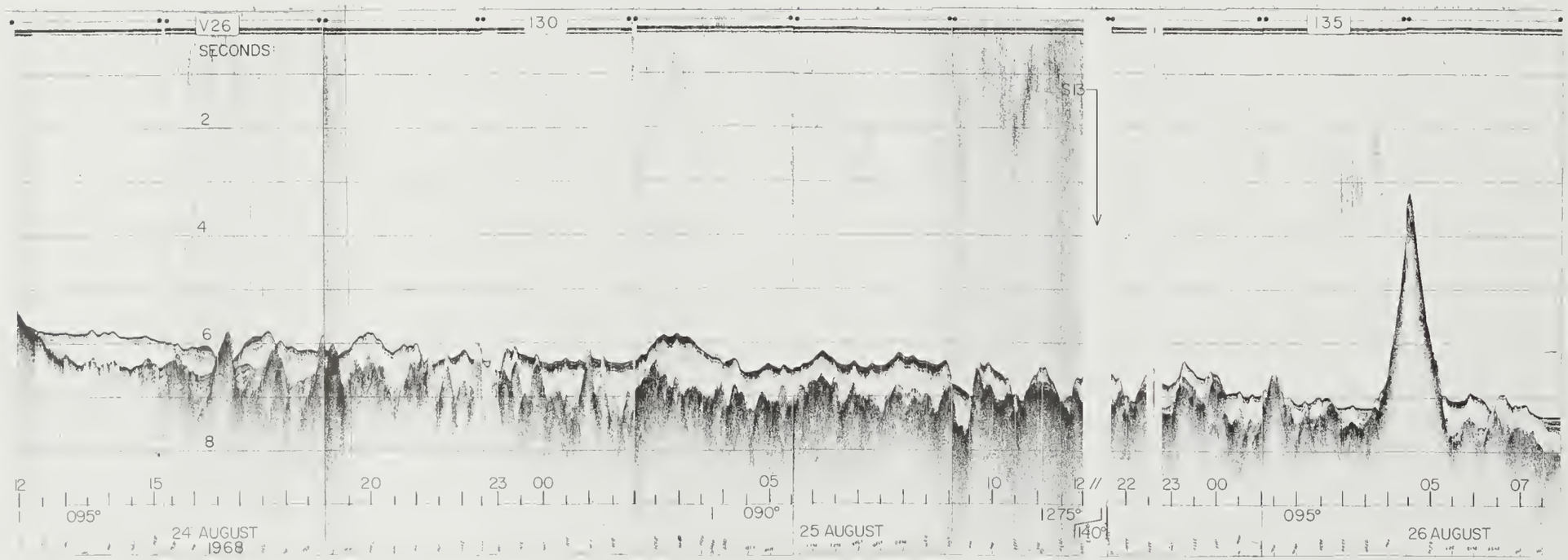

V26
SECONDS
85
90
2
4
6
8
14
15
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23
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12//17
20
23
00
02
100°
000°
270°
000°
090°
180°
270°
000°
270°
180°
090°
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270°
180°
090°
084°
080°
6 AUGUST
7 AUGUST
8 AUGUST
1968


V26
SECONDS
105
110
2
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6
8
13
15
20
23
00
05
10
15
20
180°
090°
000°
090°
180°
090°
000°
270°
180°
9 AUGUST
10 AUGUST
1968


95
100
V26
FATHOMS
800
1600
2400
3200
04 05 10 15 20 23 00 06 10 12
084° 100° 090° 180° 090° 180° 090° 000° 090°
8 AUGUST
9 AUGUST
1968


115
120
V26
FATHOMS
S10
800
1600
2400
3200
22 23 00 05 08 14 20 23 00 05 10
094° 180° 267° 180° 094° 180° 267° 047° 094° 000°
11 AUGUST
12 AUGUST
1968


V26
SECONDS
126
S11
S12
NO RECORDS
COMPRESSORS OUT
2
4
6
8
11 15 19 20 // 03 // 14 // 16 17 18 19 20 // 02 05 08 10 11 13 15
094° 180° 267° 000° 267° 180° 090° 273° 093° 000° 270° 265° 260°
12 AUGUST
13 AUGUST
14 AUGUST
1968


V26
SECONDS
130
135
S13
2
4
6
8
12 15 20 23 00 05 10 12 // 22 23 00 05 07
095° 090° 275° 140° 095°
24 AUGUST
1968
25 AUGUST
26 AUGUST

NO RECORDS

V26

FATHOMS

800

1600

2400

3200

BERMUDA I

16 20 23 00 05 10 15 20 23 00

260° 1270°

14 AUGUST 15 AUGUST 1968

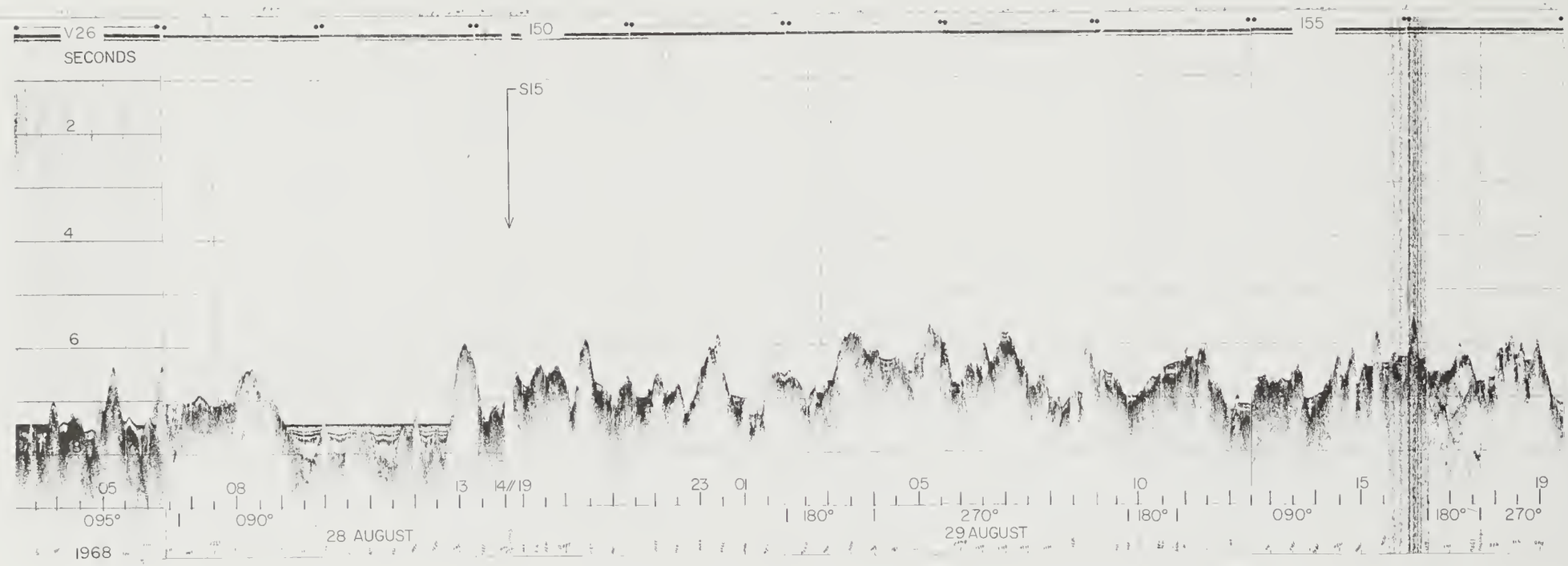
140 145

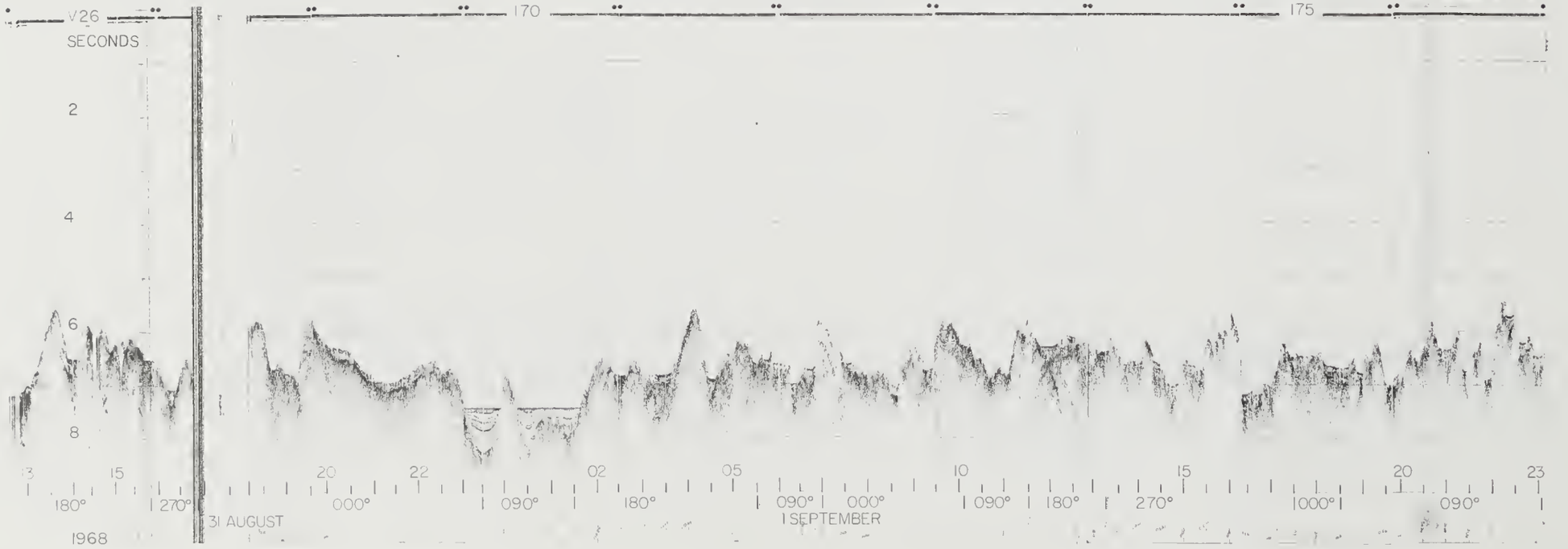
S14

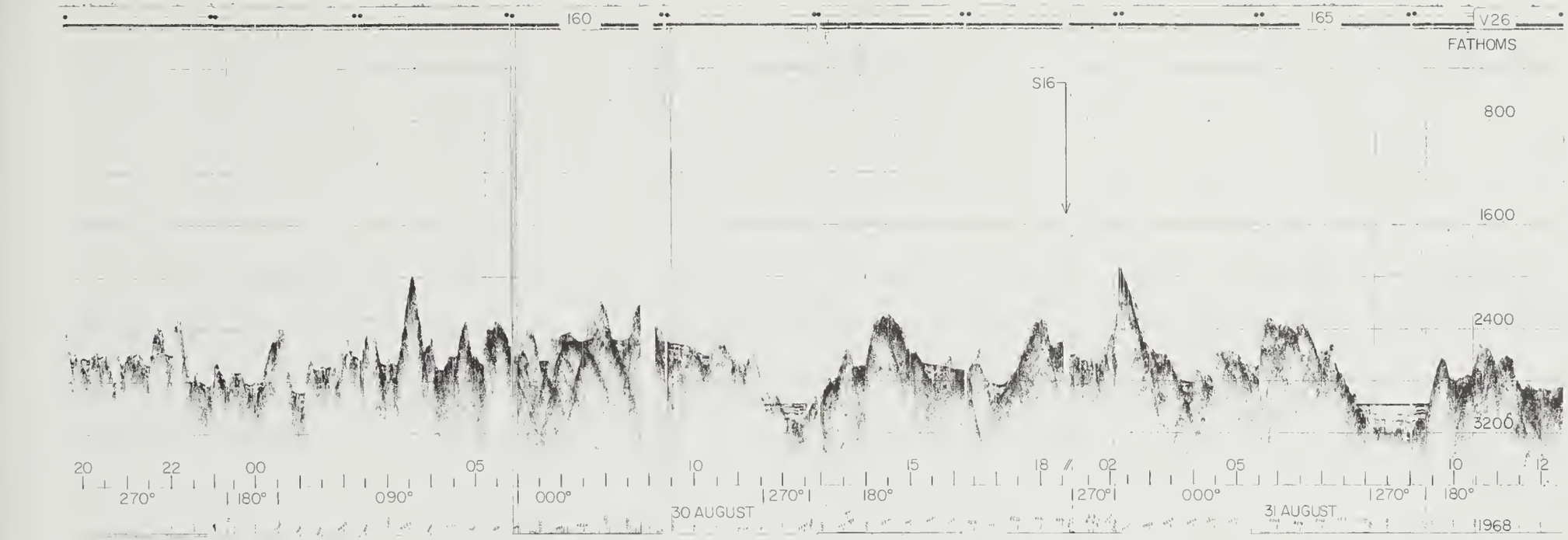
08 10 15 17 03 05 10 15 20 22 00 02

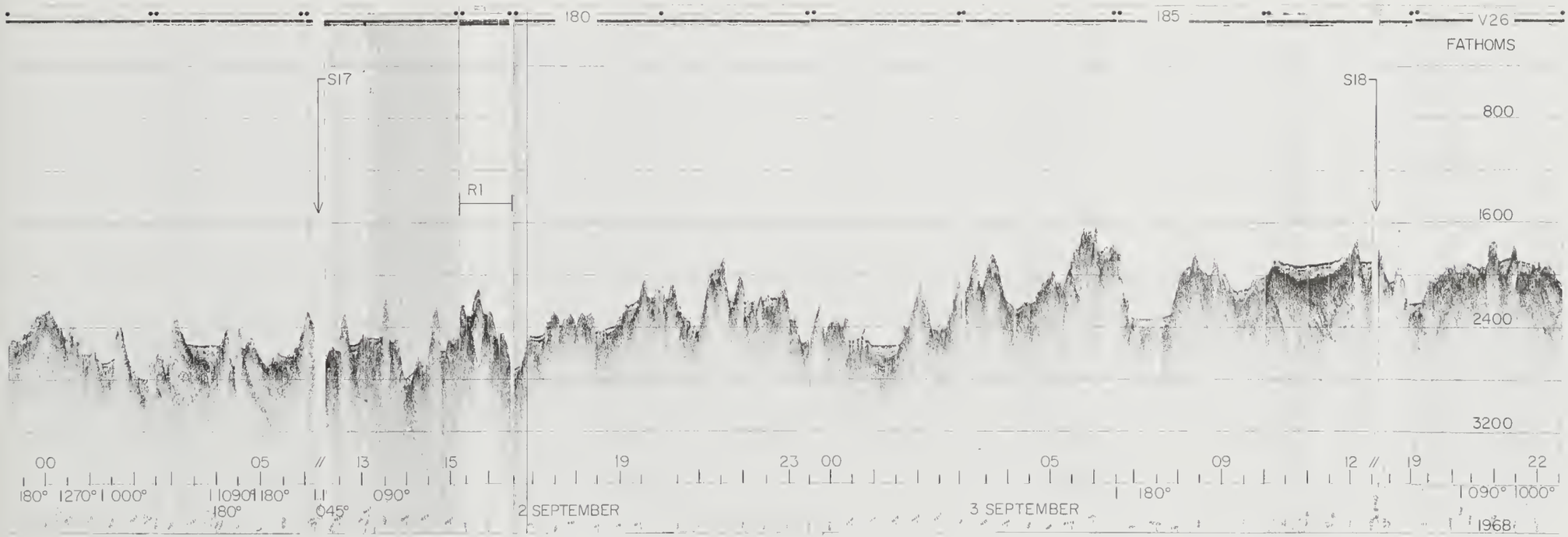
095° 090°

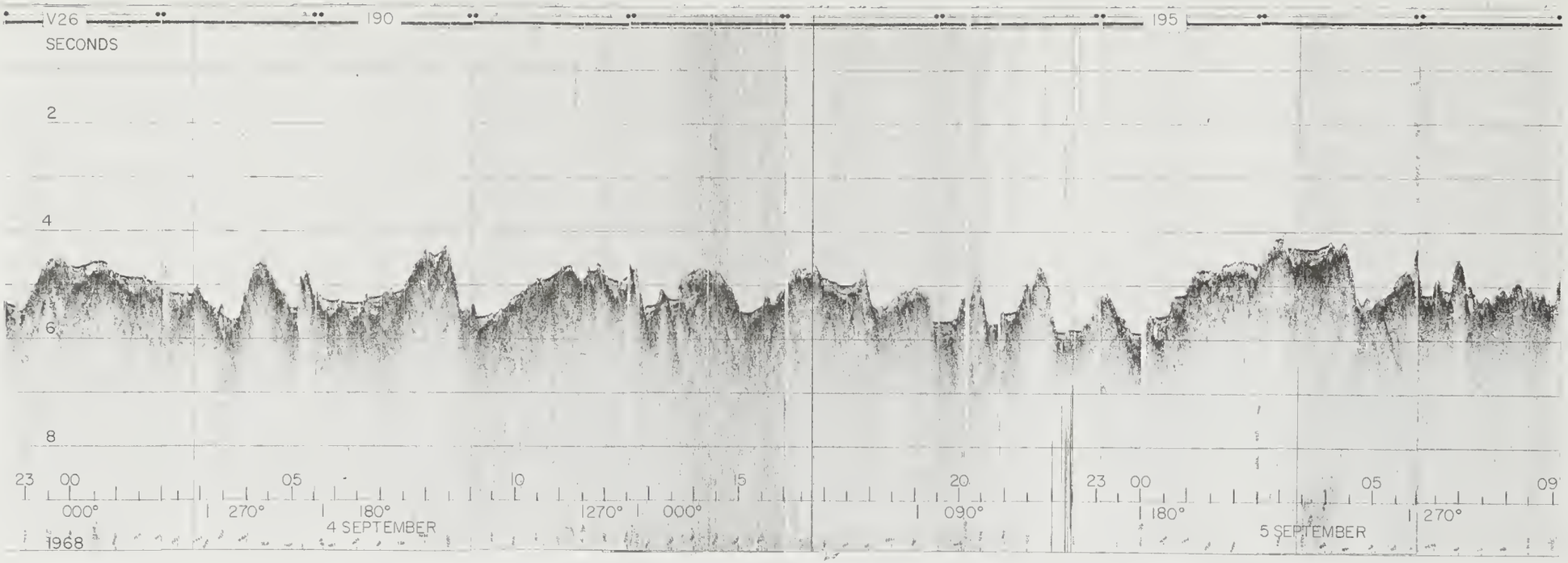
26 AUGUST 27 AUGUST 28 AUG

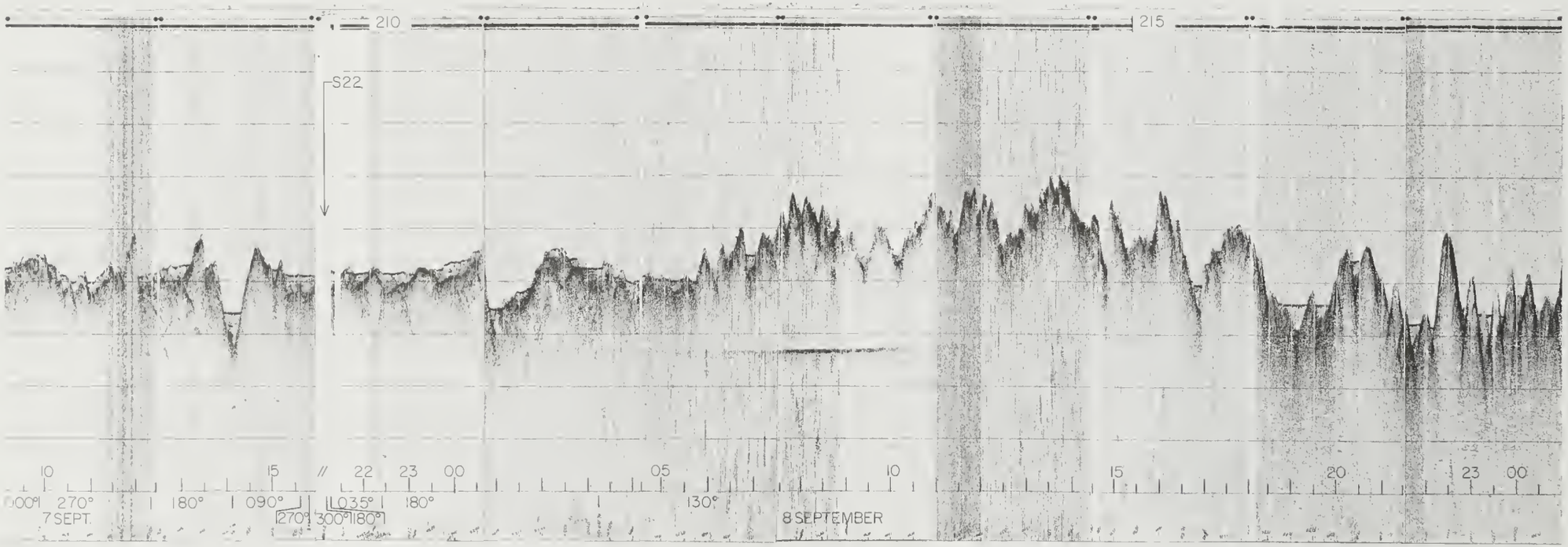

V26
150
155
SECONDS
S15
2
4
6
8
05
08
13
14//19
23
01
05
10
15
19
095°
090°
180°
270°
180°
090°
180°
270°
28 AUGUST
29 AUGUST
1968

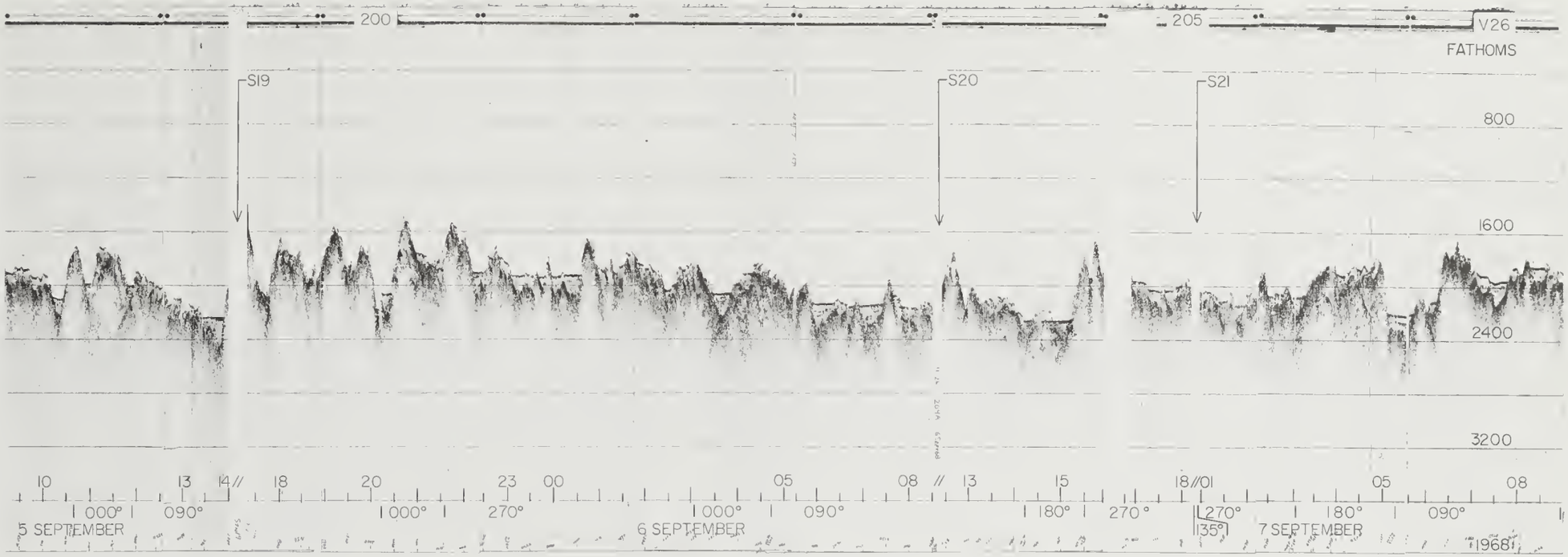

V26
170
175
SECONDS
2
4
6
8
13
15
20
22
02
05
10
15
20
23
180°
270°
000°
090°
180°
090°
000°
090°
180°
270°
000°
090°
31 AUGUST
1 SEPTEMBER
1968

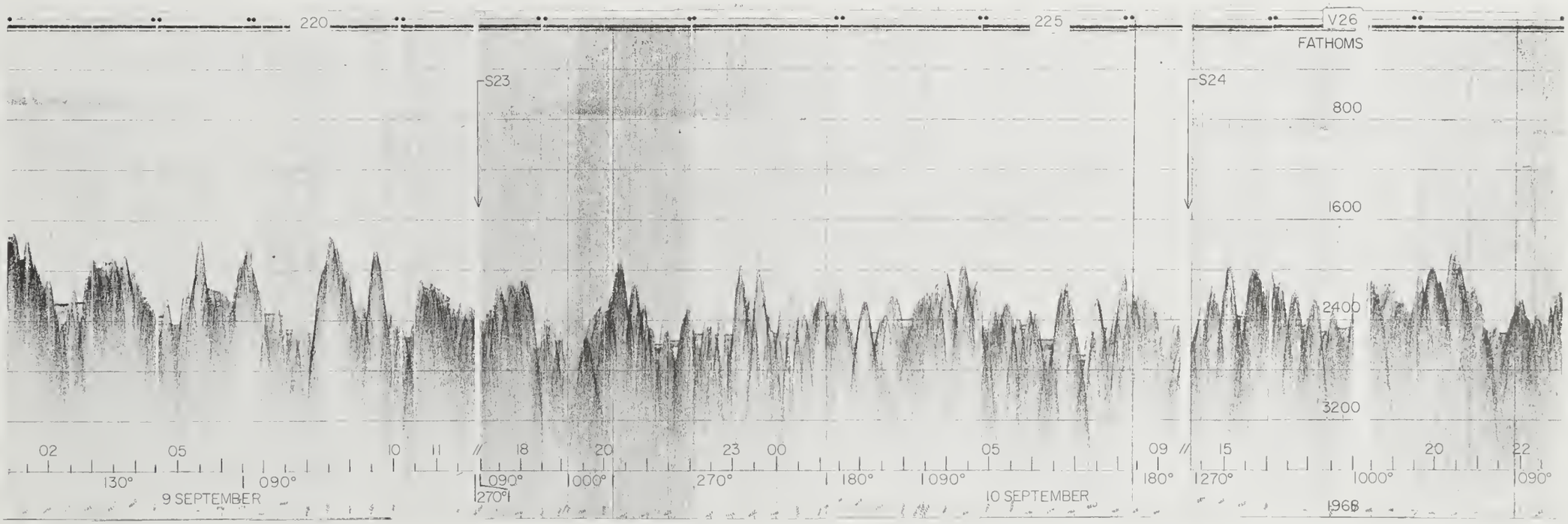

160
165
V26
FATHOMS
S16
800
1600
2400
3200
20
22
00
05
10
15
18
02
05
10
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270°
180°
090°
000°
270°
180°
270°
000°
270°
180°
30 AUGUST
31 AUGUST
1968

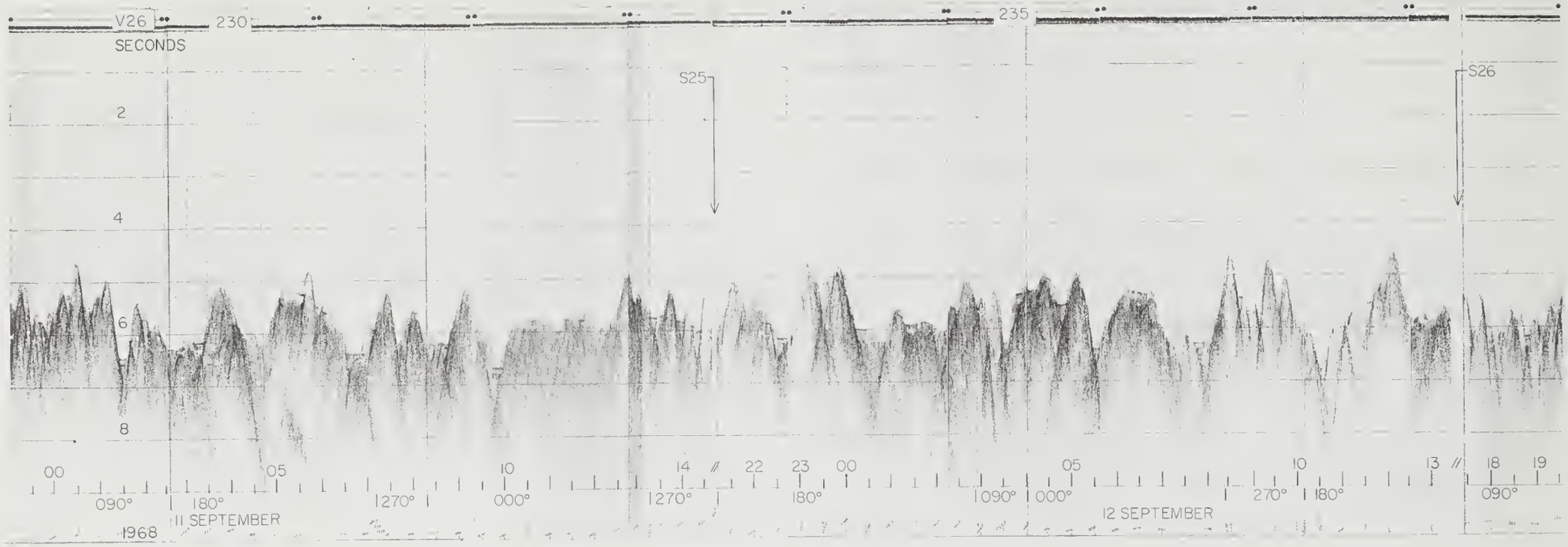

180
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V26
FATHOMS
S17
R1
S18
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1600
2400
3200
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05
13
15
19
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00
05
09
12
19
22
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270°
000°
090°
180°
045°
090°
180°
090°
000°
2 SEPTEMBER
3 SEPTEMBER
1968

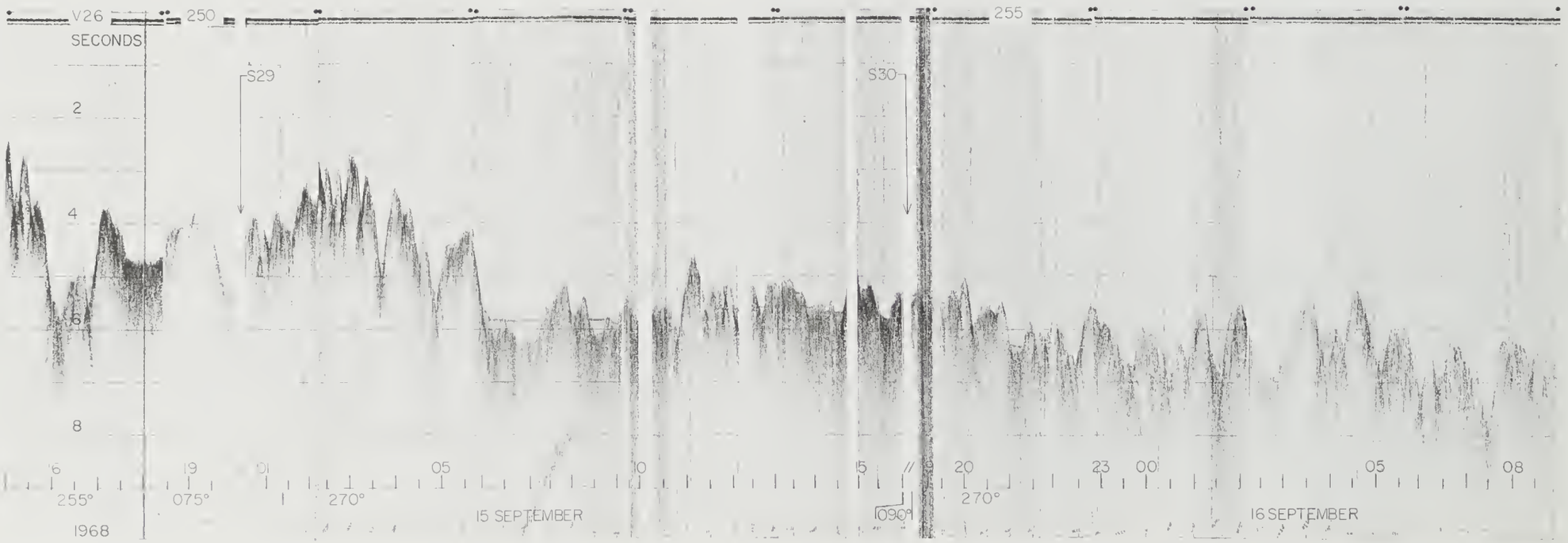

V26
190
195
SECONDS
2
4
6
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23 00 05 10 15 20 23 00 05 09
000° 270° 180° 270° 000° 090° 180° 270°
4 SEPTEMBER
1968
5 SEPTEMBER

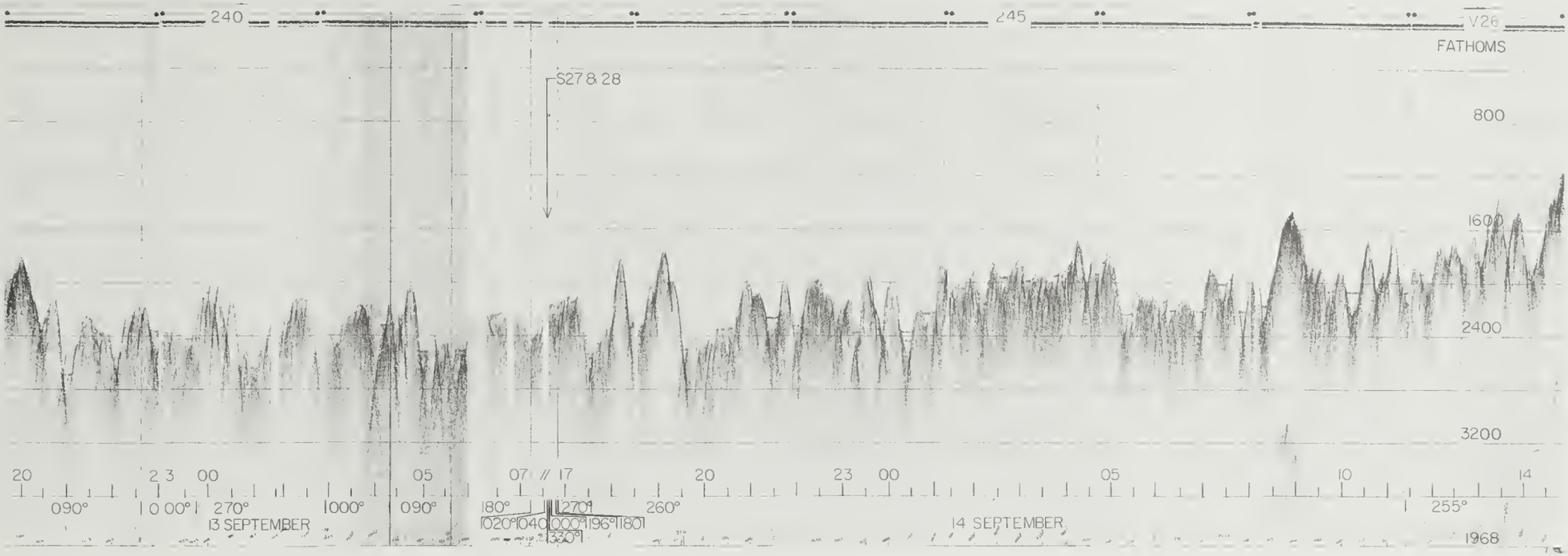

210
215
S22
10 15 22 23 00 05 10 15 20 23 00
000° 270° 180° 090° 270° 300° 180° 035° 180° 130°
7 SEPT.
8 SEPTEMBER

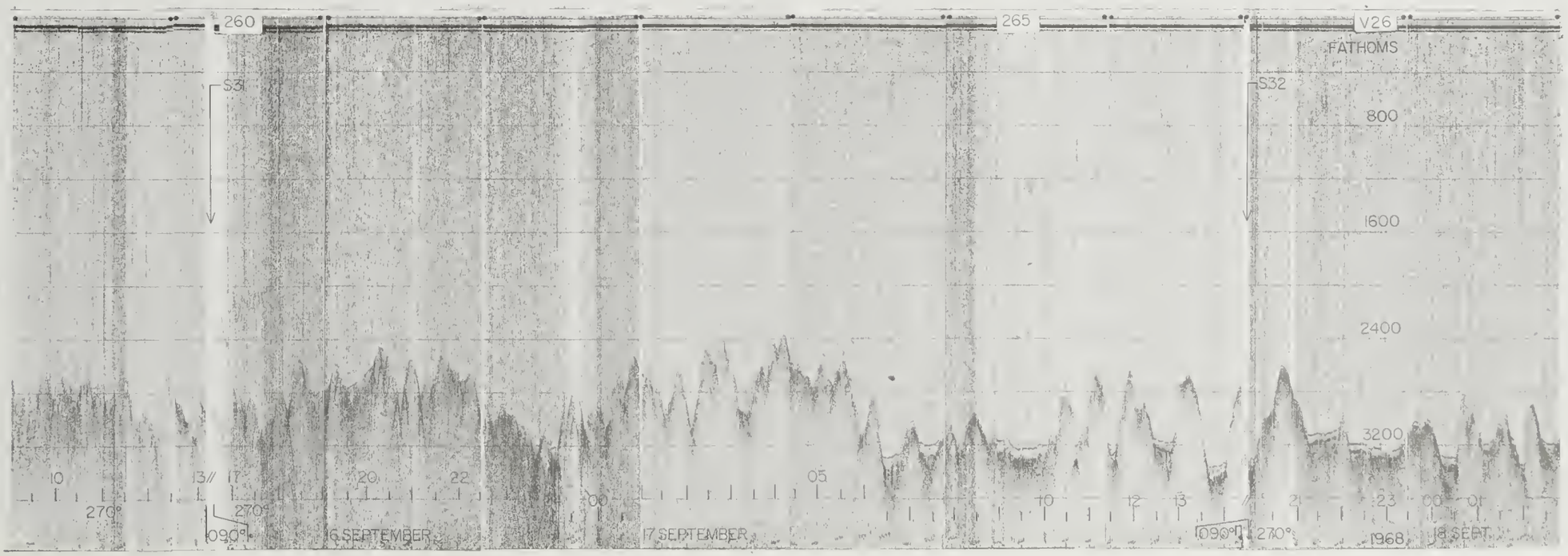

200
205
V26
FATHOMS
S19
S20
S21
800
1600
2400
3200
10
13
14//
18
20
23
00
05
08 // 13
15
18//01
05
08
000°
090°
000°
270°
000°
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180°
270°
270°
135°
180°
090°
5 SEPTEMBER
6 SEPTEMBER
7 SEPTEMBER
1968

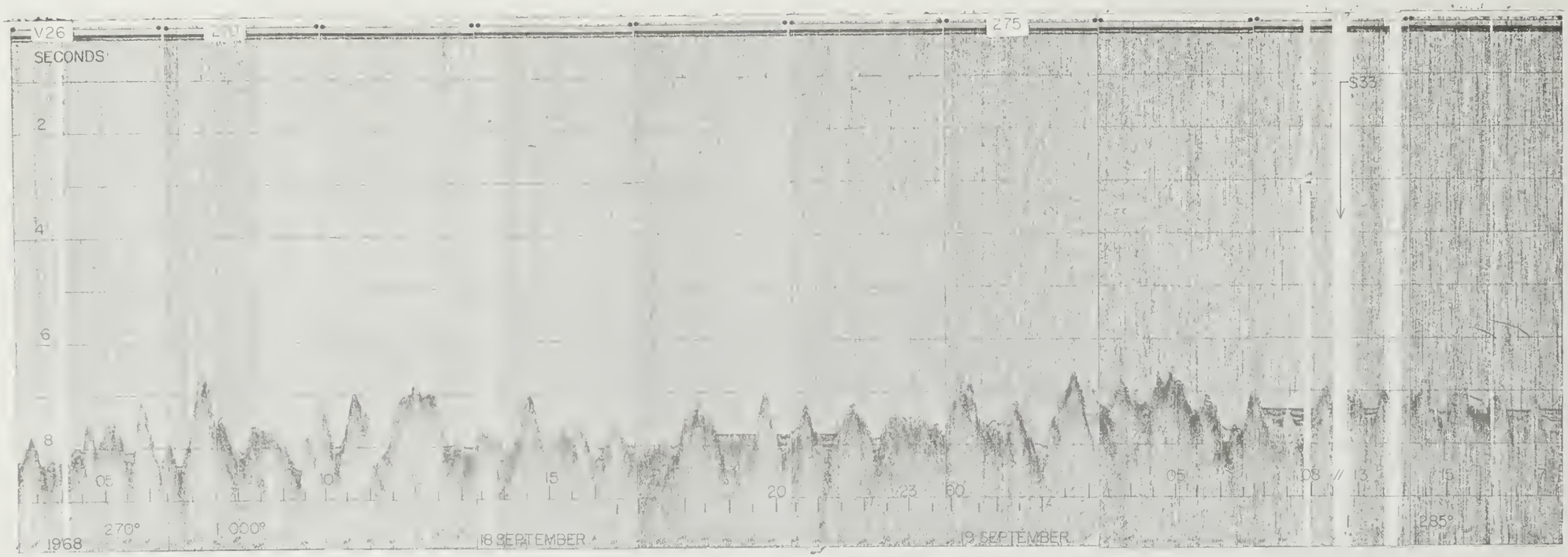

220
225
V26
FATHOMS
S23
S24
800
1600
2400
3200
02
05
10
11
//
18
20
23
00
05
09 //
15
20
22
130°
090°
090°
270°
000°
270°
180°
090°
180°
270°
000°
090°
9 SEPTEMBER
10 SEPTEMBER
1968

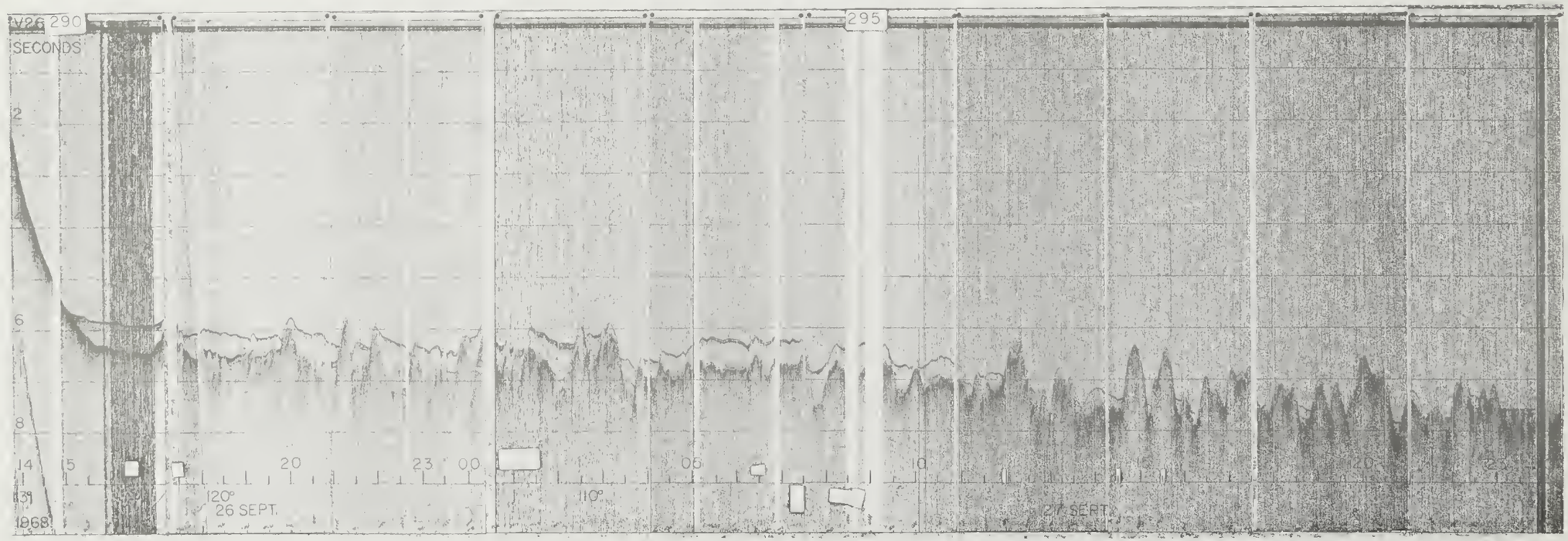

V26
230
235
SECONDS
2
4
6
8
S25
S26
00
05
10
14
22
23
00
05
10
13
18
19
090°
180°
270°
000°
270°
180°
090°
000°
090°
11 SEPTEMBER
1968
12 SEPTEMBER

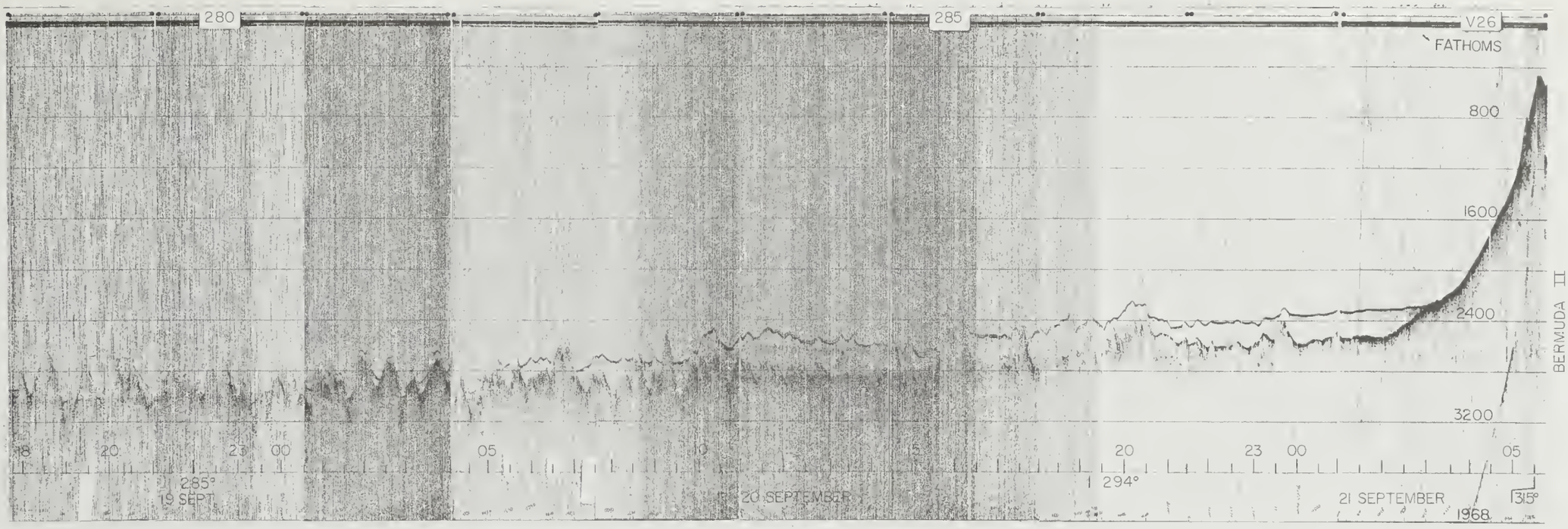

V26
250
255
SECONDS
2
4
6
8
S29
S30
16
19
01
05
10
15
20
23
00
05
08
255°
075°
270°
090°
270°
1968
15 SEPTEMBER
16 SEPTEMBER

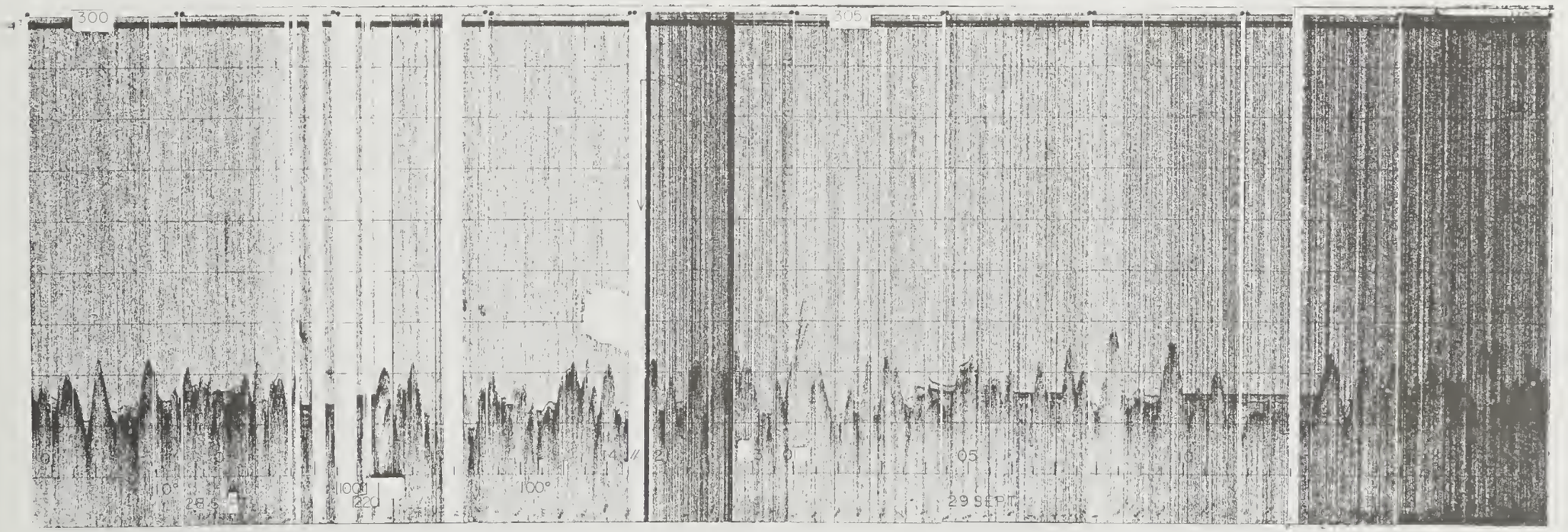

240
245
V26
FATHOMS
S27 & 28
800
1600
2400
3200
20
23 00
05
07 // 17
20
23 00
05
10
14
090°
000°
270°
1000°
090°
180°
270°
260°
255°
13 SEPTEMBER
14 SEPTEMBER
1968

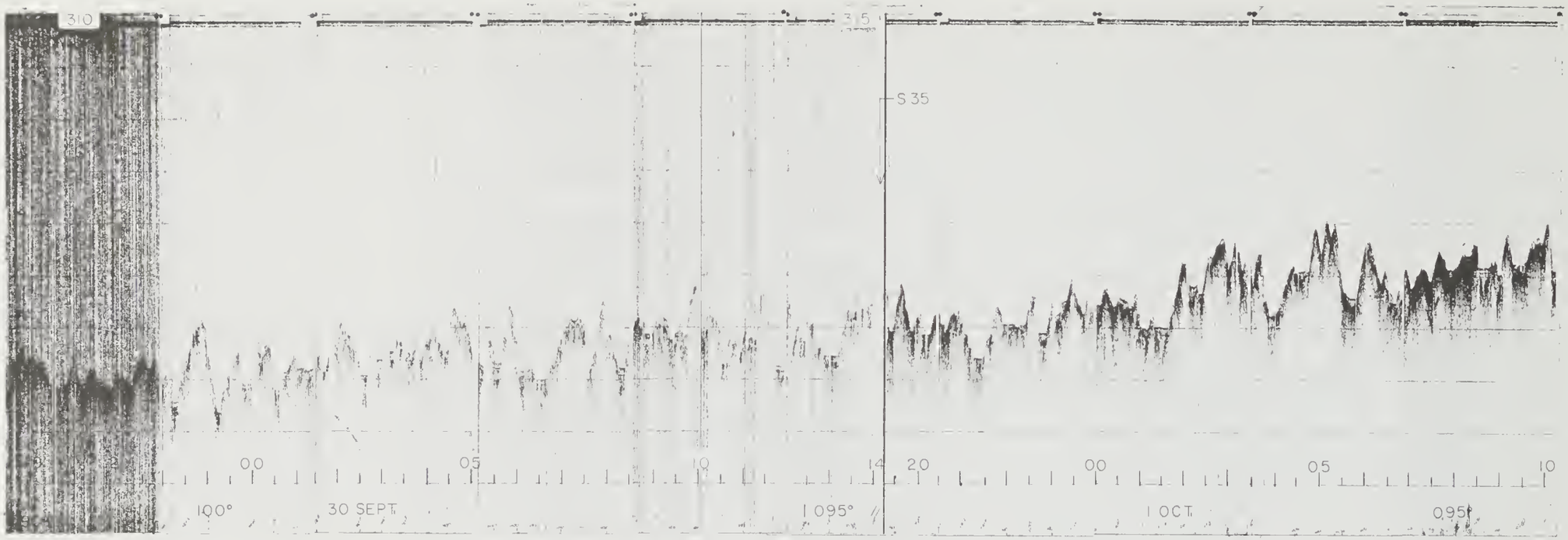

260
265
V26
FATHOMS
S31
S32
800
1600
2400
3200
10
13 // 17
20
22
05
10
12
13
21
23
00
01
270°
090°
270°
090°
270°
16 SEPTEMBER
17 SEPTEMBER
1968
18 SEPT

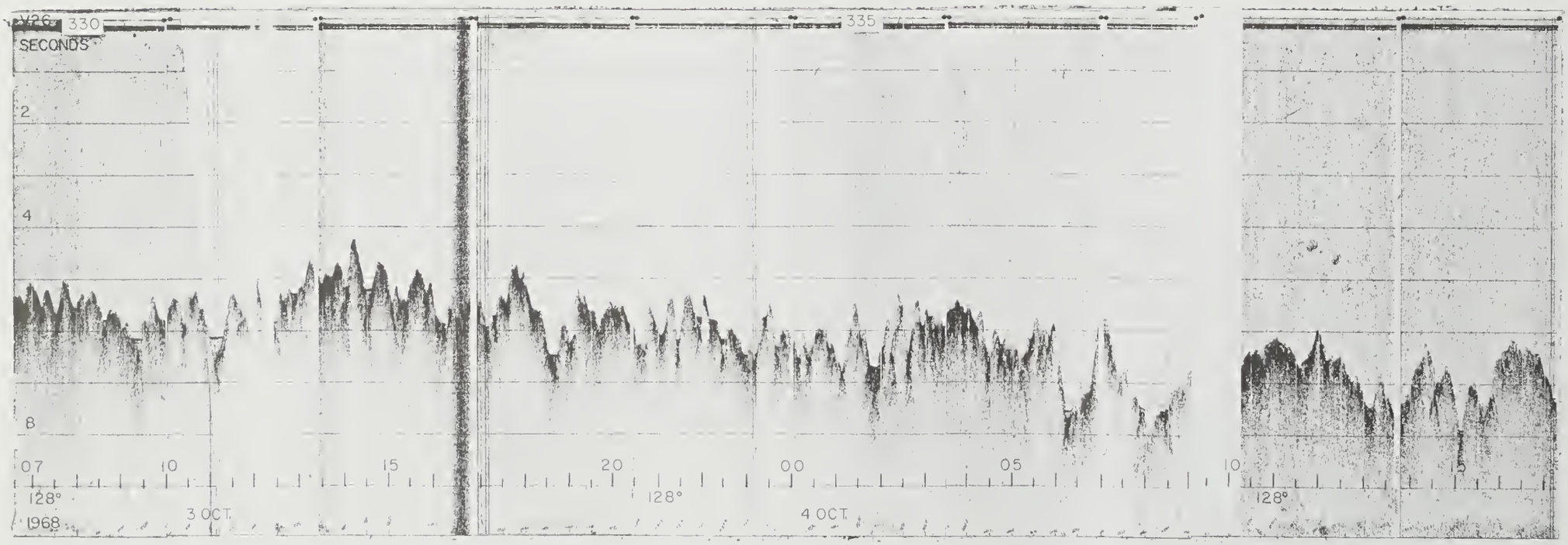

V26
SECONDS
275
S33
2
4
6
8
05
10
15
20
23
00
05
08
13
15
270°
1000°
285°
1968
18 SEPTEMBER
19 SEPTEMBER

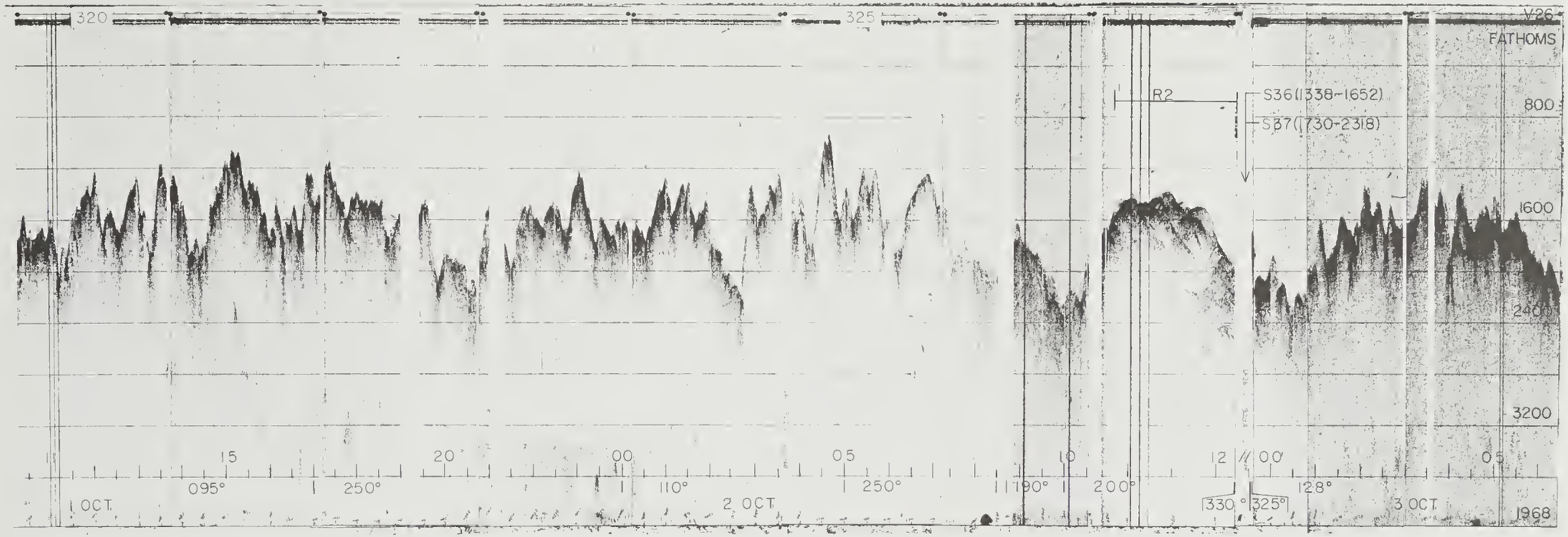

V26 290
SECONDS
295
2
6
8
14
15
20
23
00
05
10
120°
110°
26 SEPT.
27 SEPT.
1968

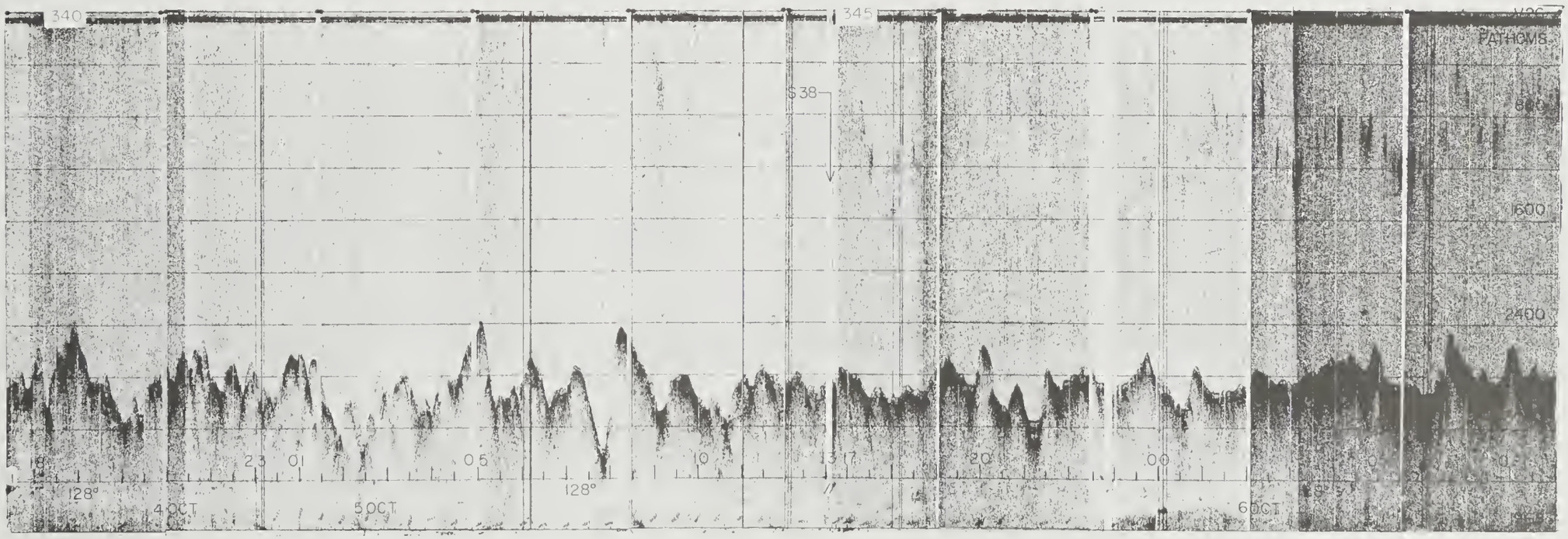

280
285
V26
FATHOMS
800
1600
2400
3200
18
20
23
00
05
285°
19 SEPT
20 SEPTEMBER
1 294°
20
23
00
05
21 SEPTEMBER
315°
1968
BERMUDA II

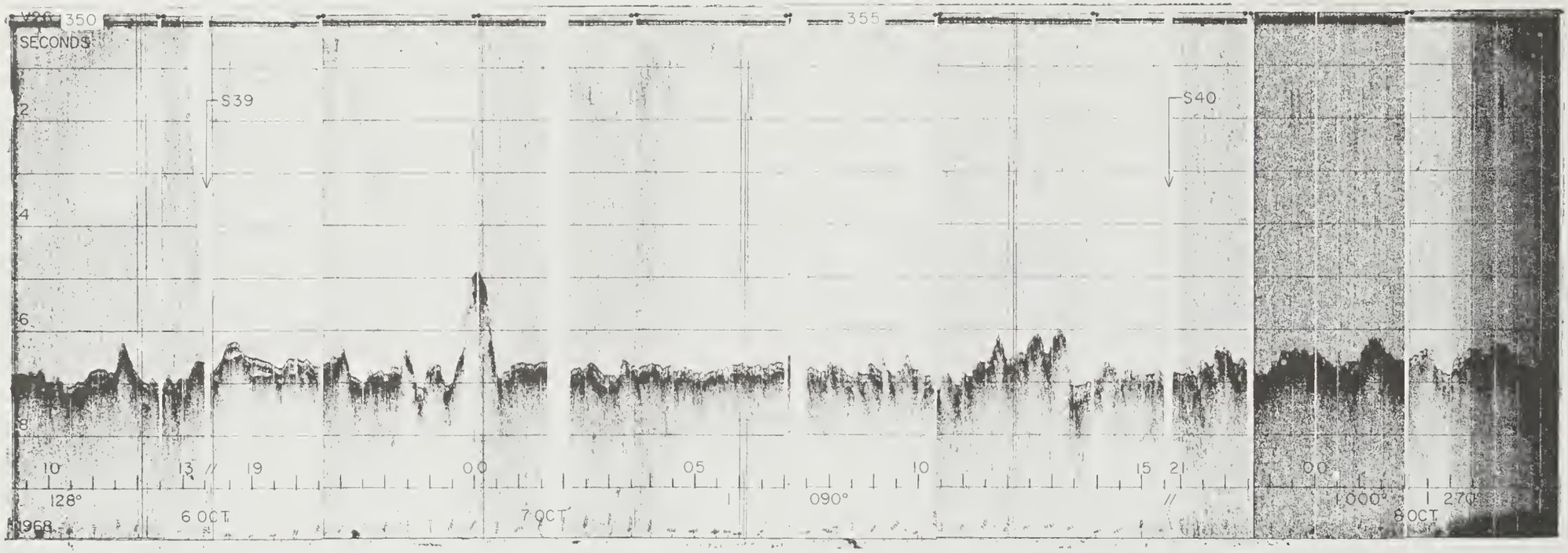

300
305
100°
285
100
220
05
29 SEPT

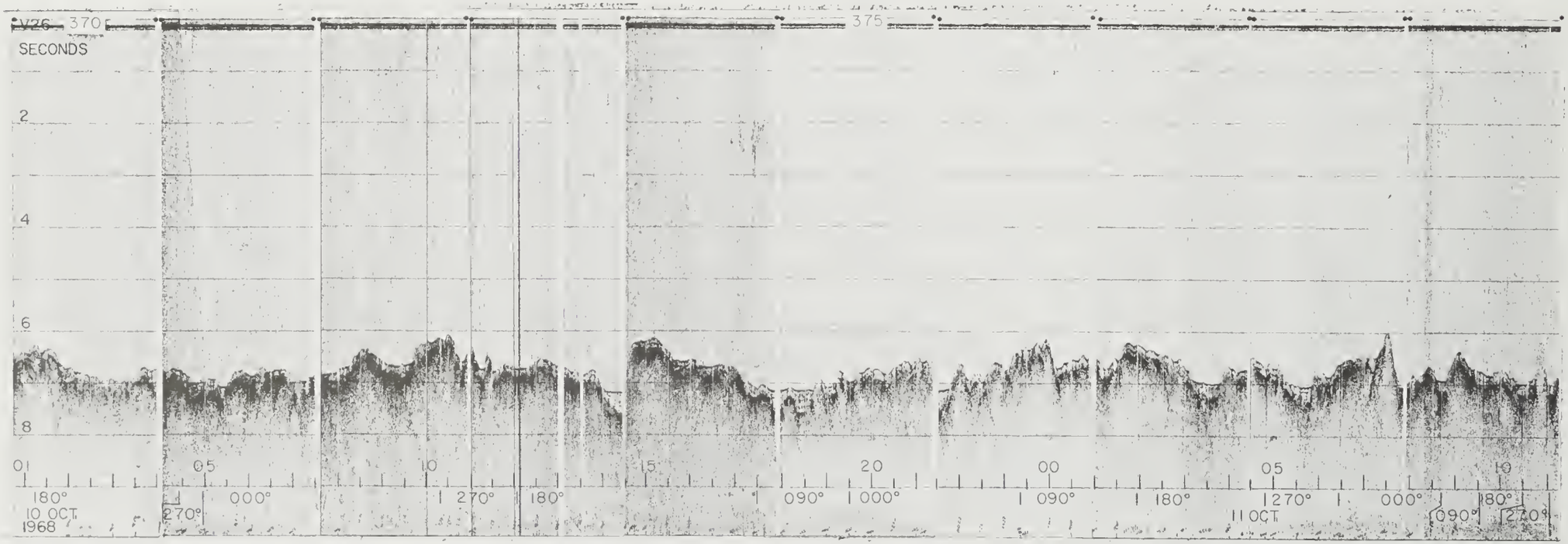

310
315
S 35
00
05
10
14
20
00
05
10
100°
30 SEPT.
095°
1 OCT.
095°

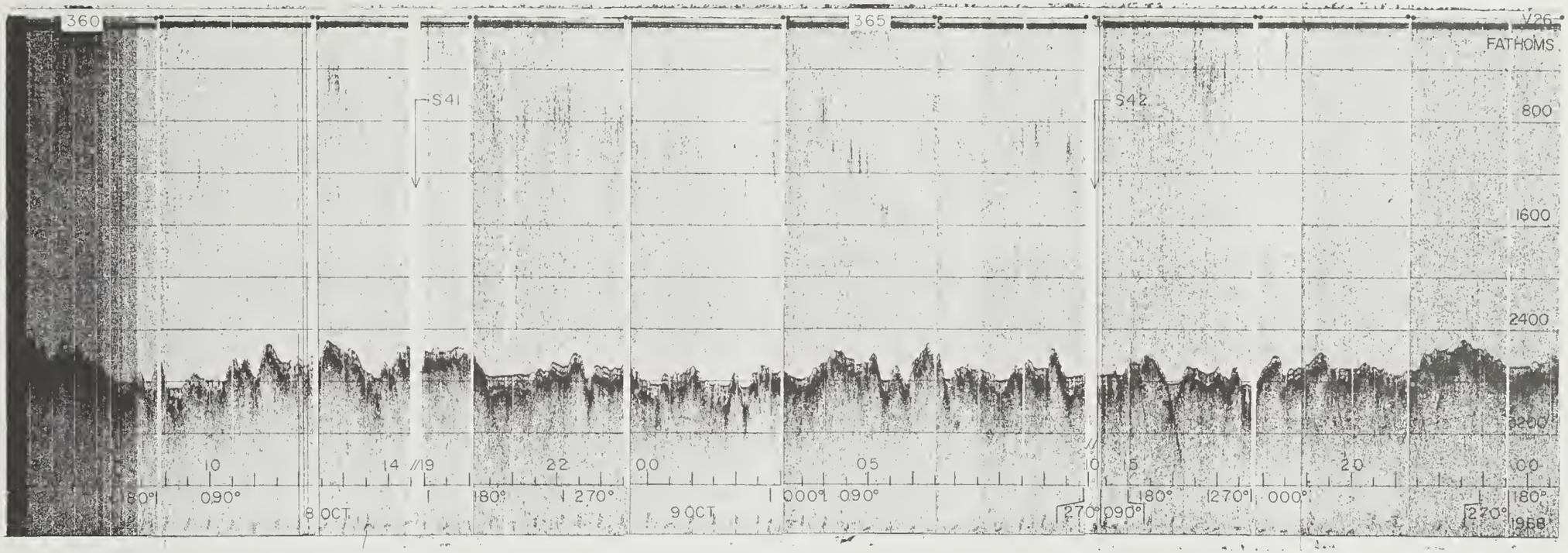

V26
330
335
SECONDS
2
4
8
07
10
15
20
00
05
10
15
128°
3 OCT.
1968
128°
4 OCT.
128°

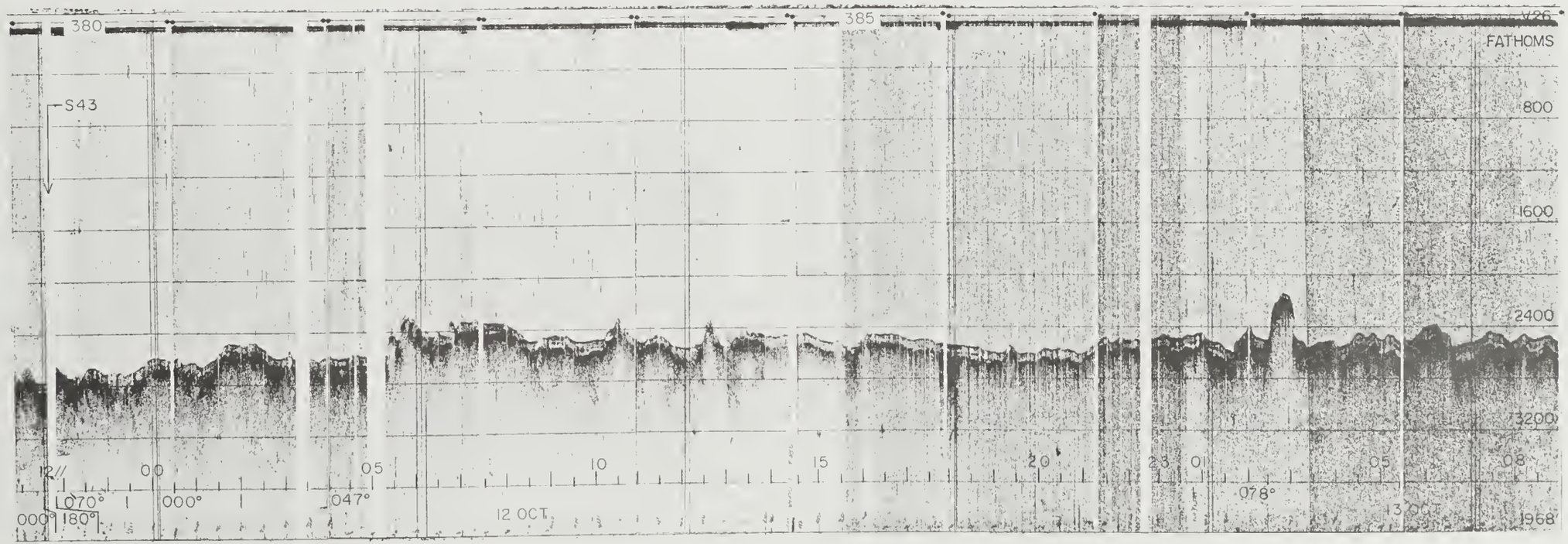

320
325
V26
FATHOMS
R2
S36(1338-1652)
S37(1730-2318)
800
1600
2400
3200
15
095°
250°
1 OCT.
20
00
110°
250°
2 OCT.
05
10
190°
200°
12
00
330°
325°
128°
3 OCT.
05
1968

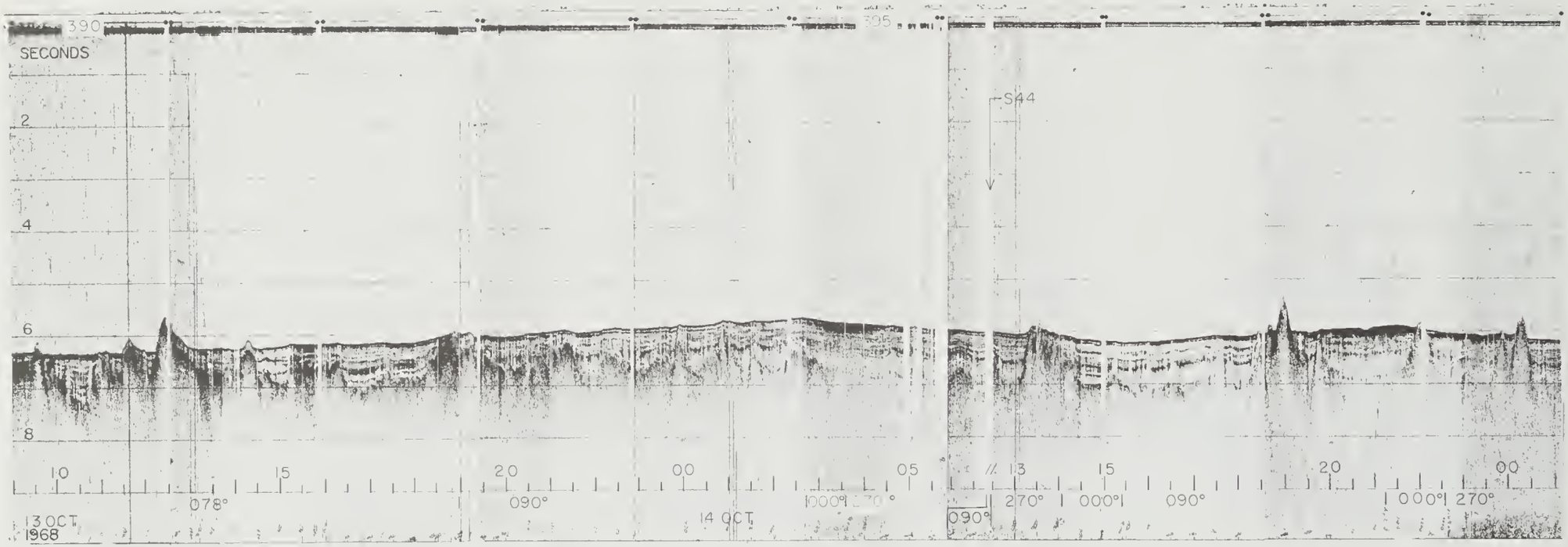

340
345
V26
FATHOMS
S38
800
1600
2400
18
128°
4 OCT.
23
01
05
128°
5 OCT.
10
13
17
20
00
6 OCT.

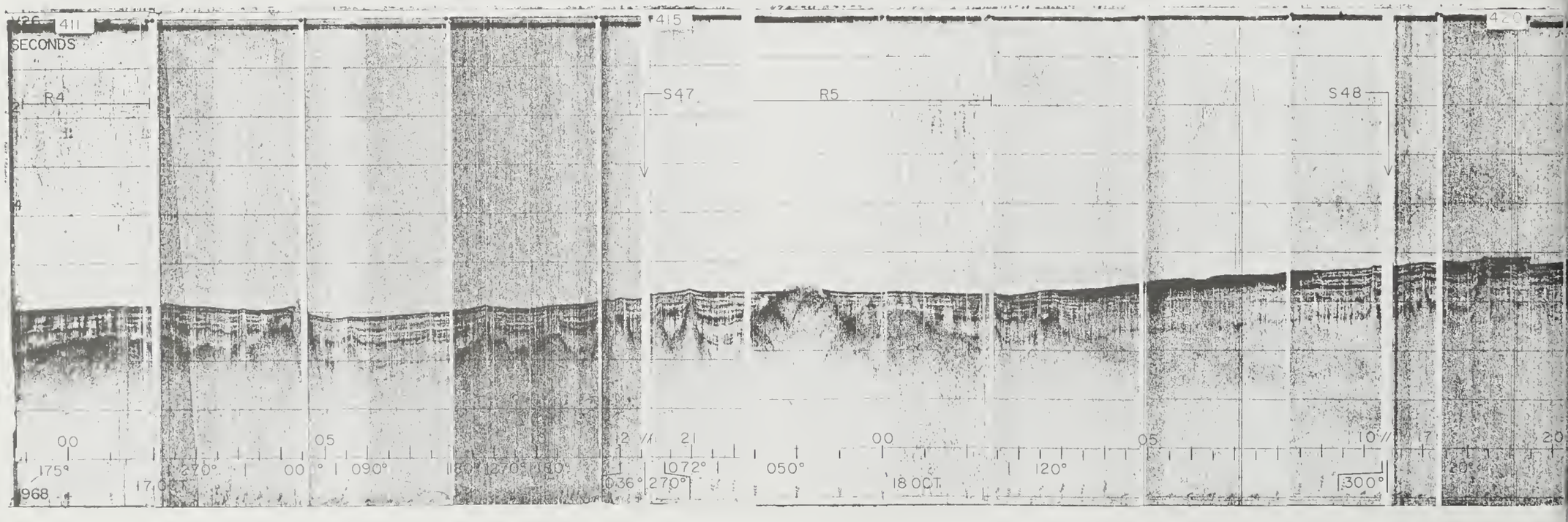

V26 350
355
SECONDS
2
4
6
8
S39
S40
10
13
19
00
05
10
15
21
00
128°
090°
000°
270°
6 OCT
7 OCT
8 OCT
1968

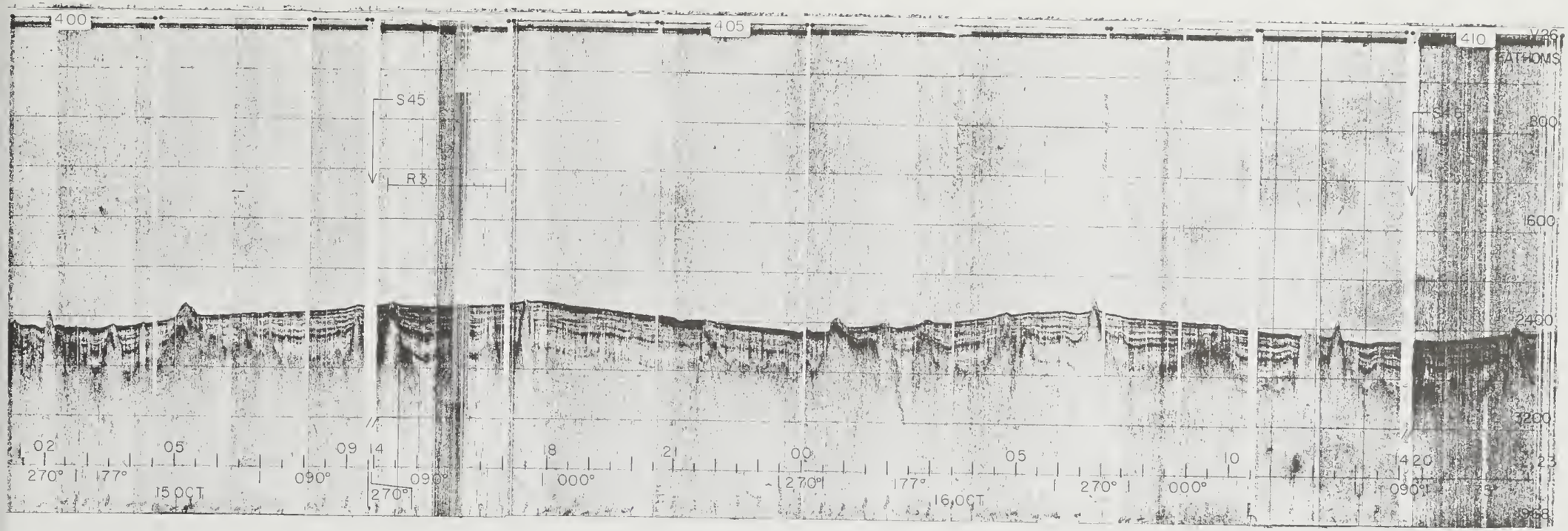

V26 370
375
SECONDS
2
4
6
8
01
05
10
15
20
00
05
10
180°
270°
000°
270°
180°
090°
000°
090°
180°
270°
000°
180°
090°
270°
10 OCT
1968
11 OCT

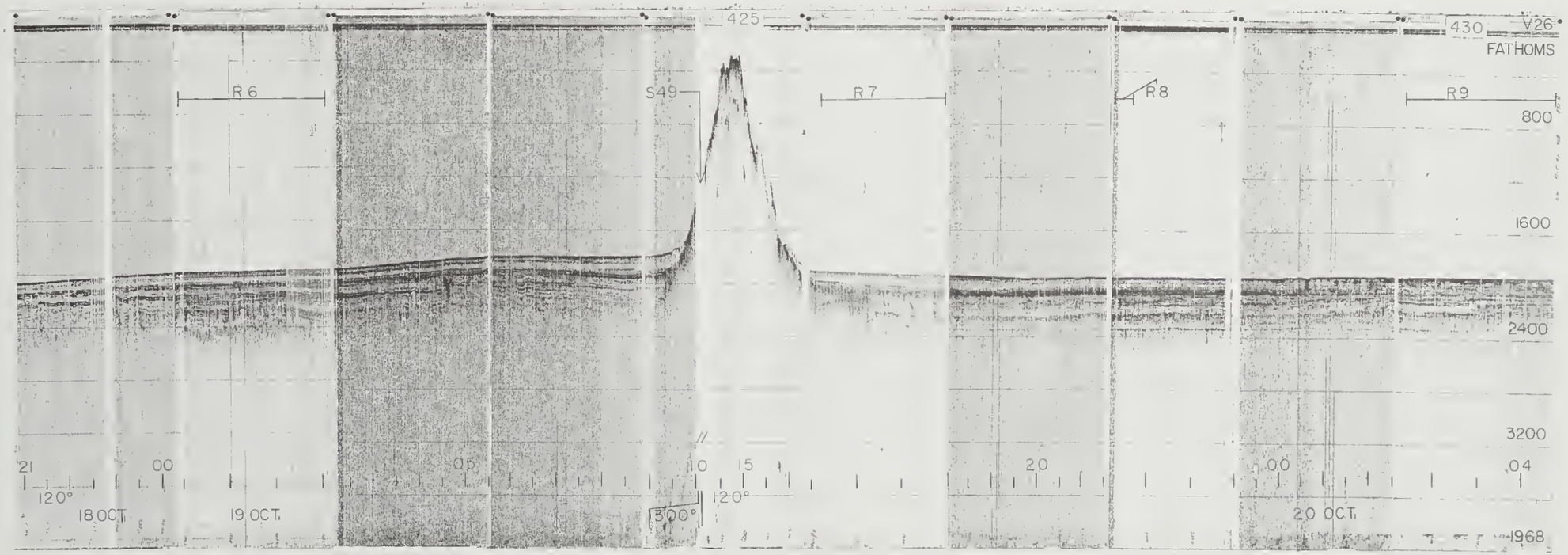

360
365
V26
FATHOMS
S41
S42
800
1600
2400
3200
10
14 //19
22
0.0
05
10
15
20
00
080°
090°
180°
270°
000°
090°
180°
270°
000°
090°
180°
270°
8 OCT
9 OCT
1968

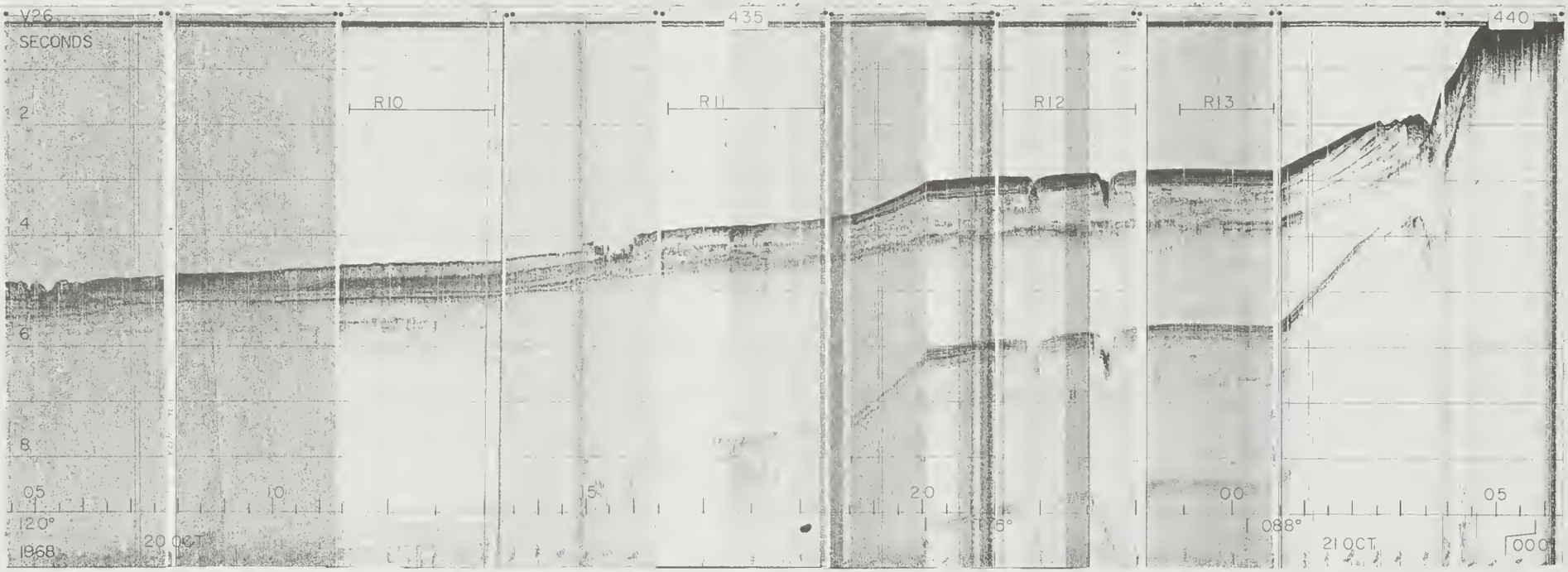

380
385
V26
FATHOMS
S43
800
1600
2400
3200
12 //
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05
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23
01
05
08
070°
000°
047°
078°
000°
180°
12 OCT
13 OCT
1968

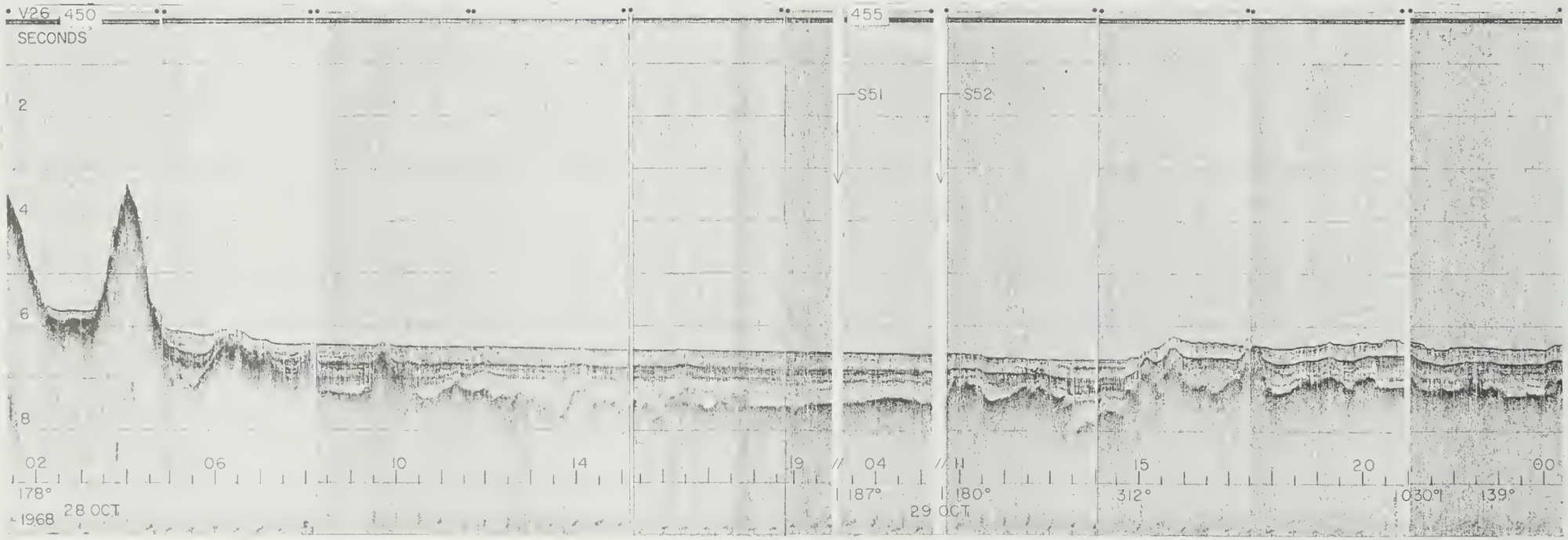

390
SECONDS
2
4
6
8
10
15
20
00
05
078°
090°
1000°
270°
13 OCT.
1968
14 OCT.
395
S44
13
15
20
00
270°
000°
090°
000°
270°
090°

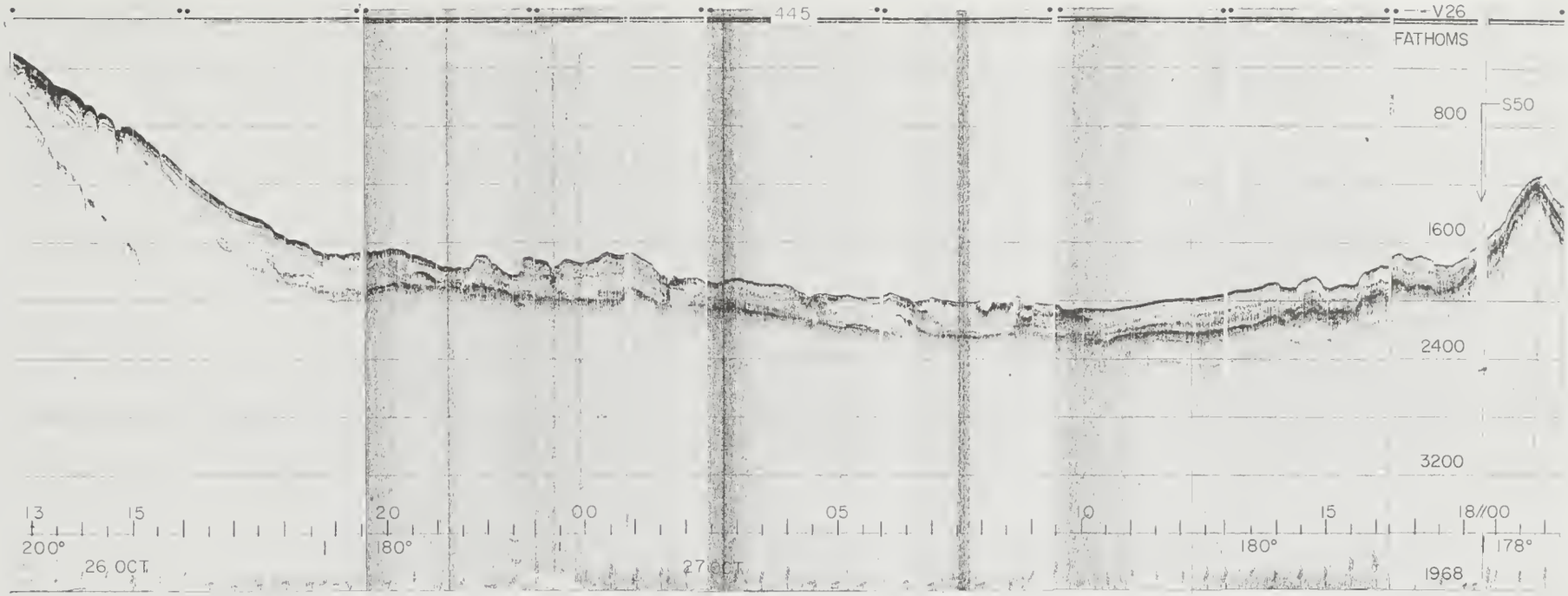

411
SECONDS
R4
00
05
175°
270°
00°
090°
180°
270°
180°
17 OCT.
1968
415
S47
12
21
072°
036°
270°
R5
00
05
050°
120°
18 OCT.
420
S48
10
17
20
300°
20°

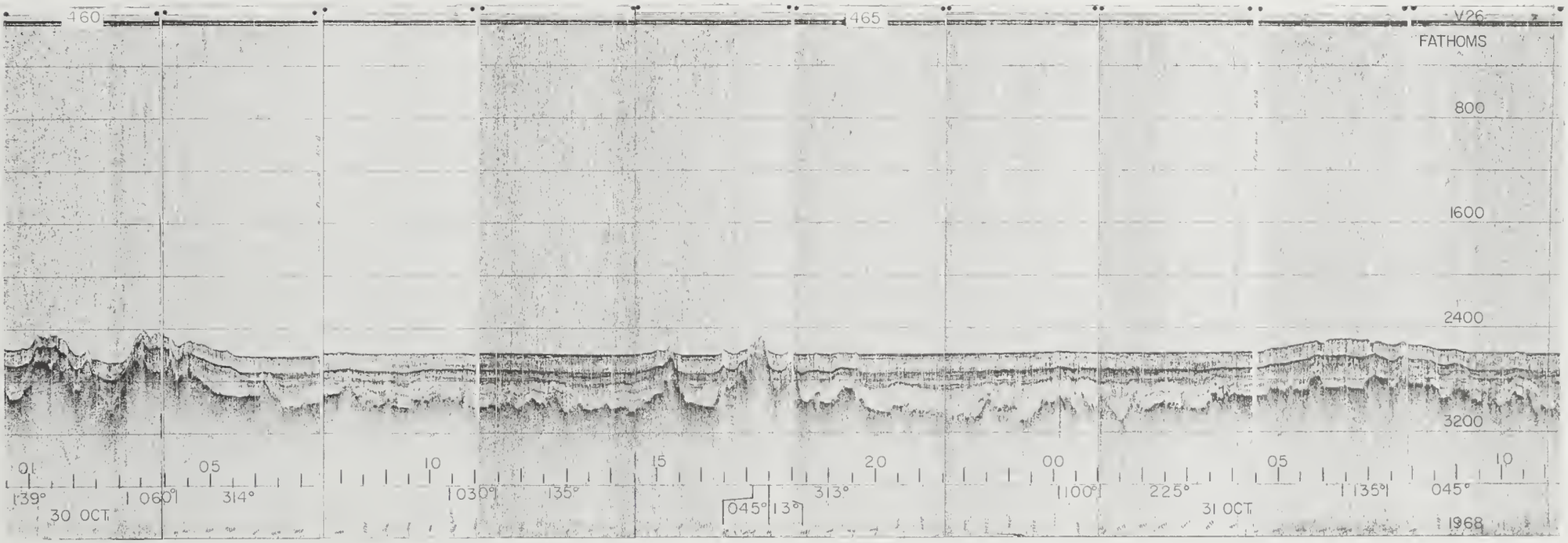

400
405
410
V26
FATHOMS
S45
R5
S46
800
1600
2400
3200
4000
4800
02
05
09
14
18
21
00
05
10
15
270°
177°
090°
090°
270°
000°
270°
177°
270°
000°
090°
15 OCT.
16 OCT.

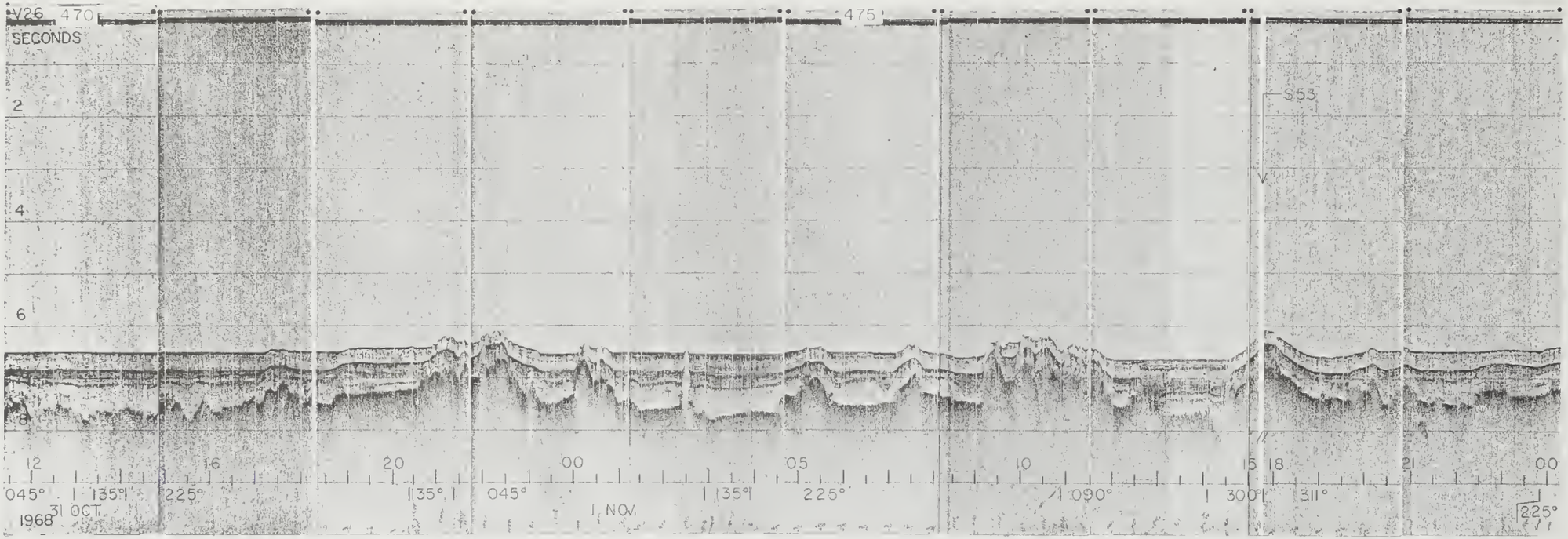

425
430
V26
FATHOMS
R6
S49
R7
R8
R9
800
1600
2400
3200
4000
4800
21
00
05
10
15
20
00
04
120°
120°
300°
18 OCT.
19 OCT.
20 OCT.

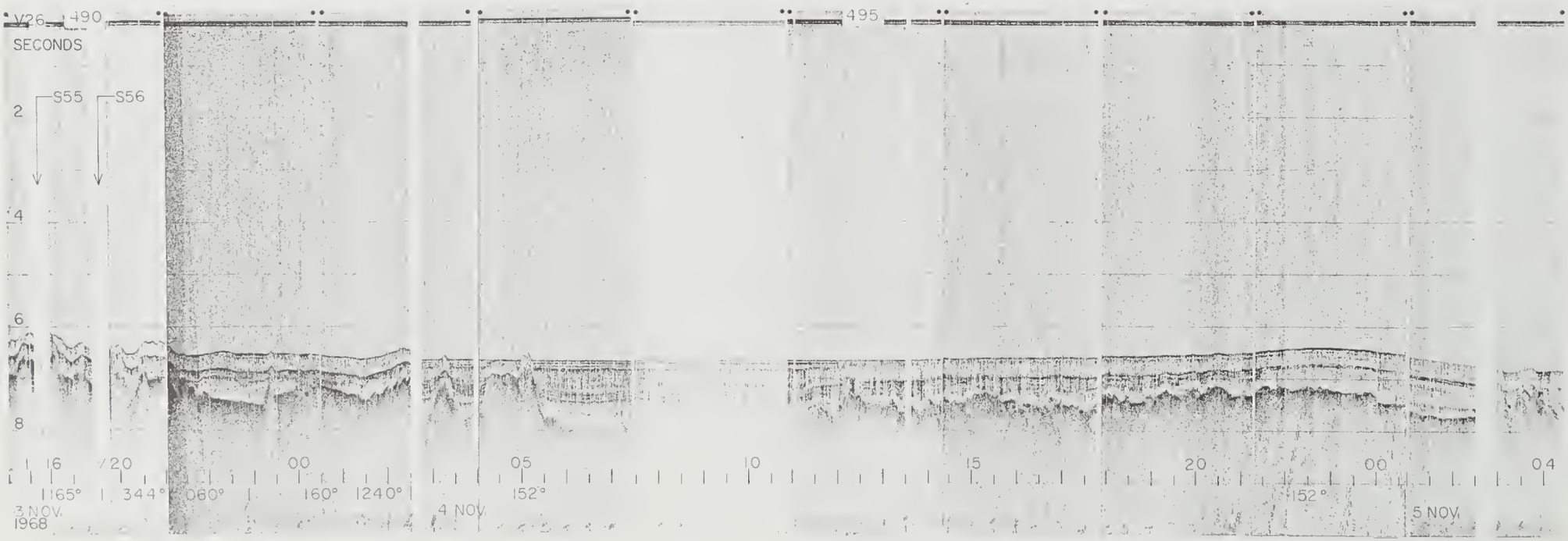

V26
SECONDS
435
440
R10
R11
R12
R13
2
4
6
8
05
10
15
20
00
05
120°
088°
1968
20 OCT.
21 OCT.
000
DAKAR, SENEGAL

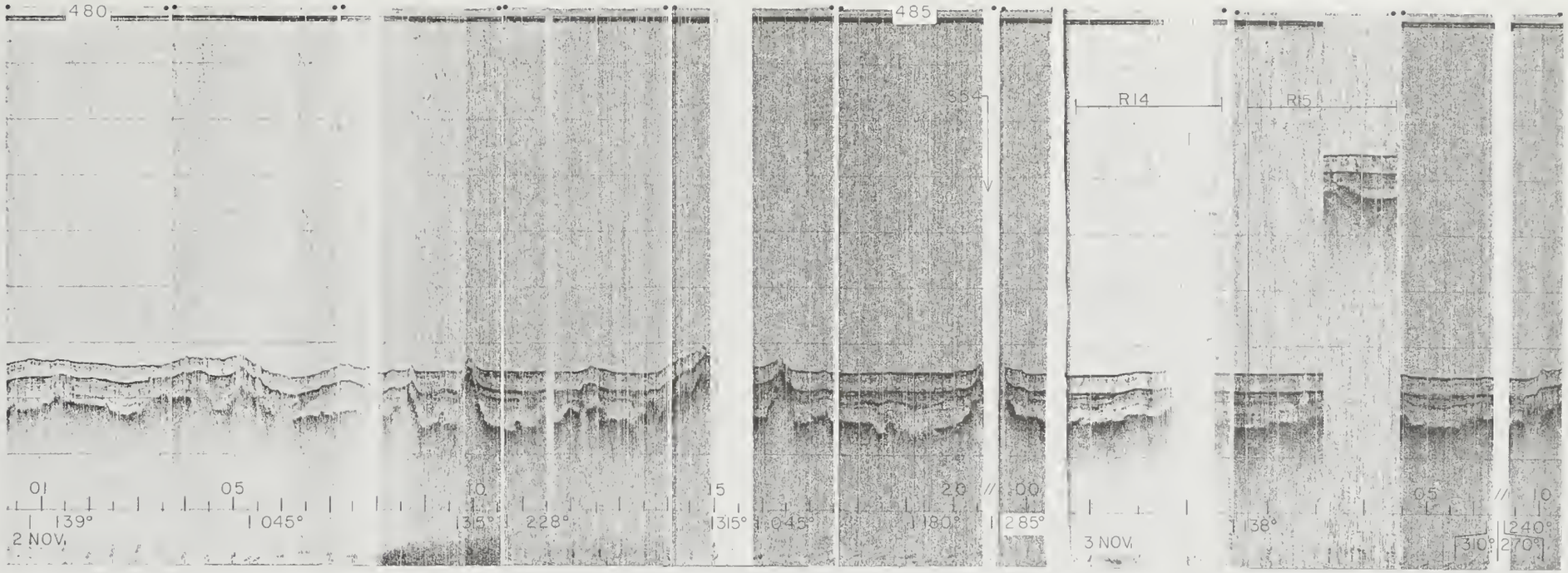

V26
450
455
SECONDS
S51
S52
2
4
6
8
02
06
10
14
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04
11
15
20
00
178°
187°
180°
312°
030°
139°
1968
28 OCT.
29 OCT.

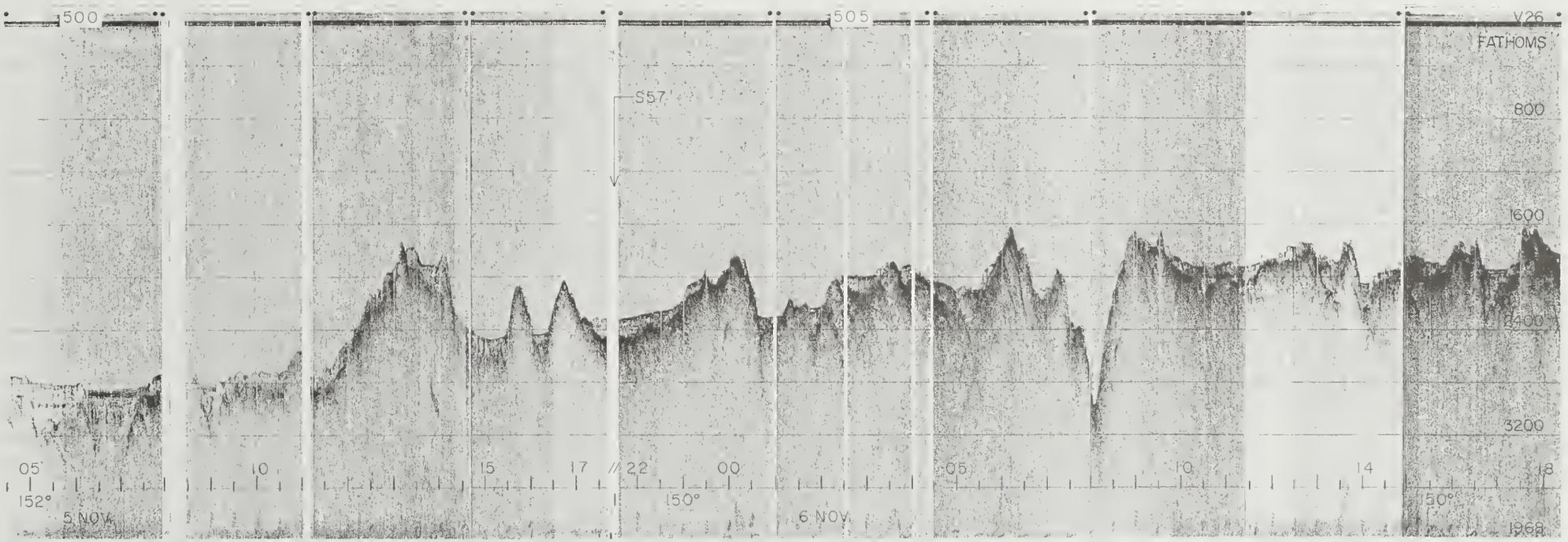

445
V26
FATHOMS
800
S50
1600
2400
3200
13
15
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00
05
10
15
18//00
200°
180°
180°
178°
26 OCT.
27 OCT.
1968

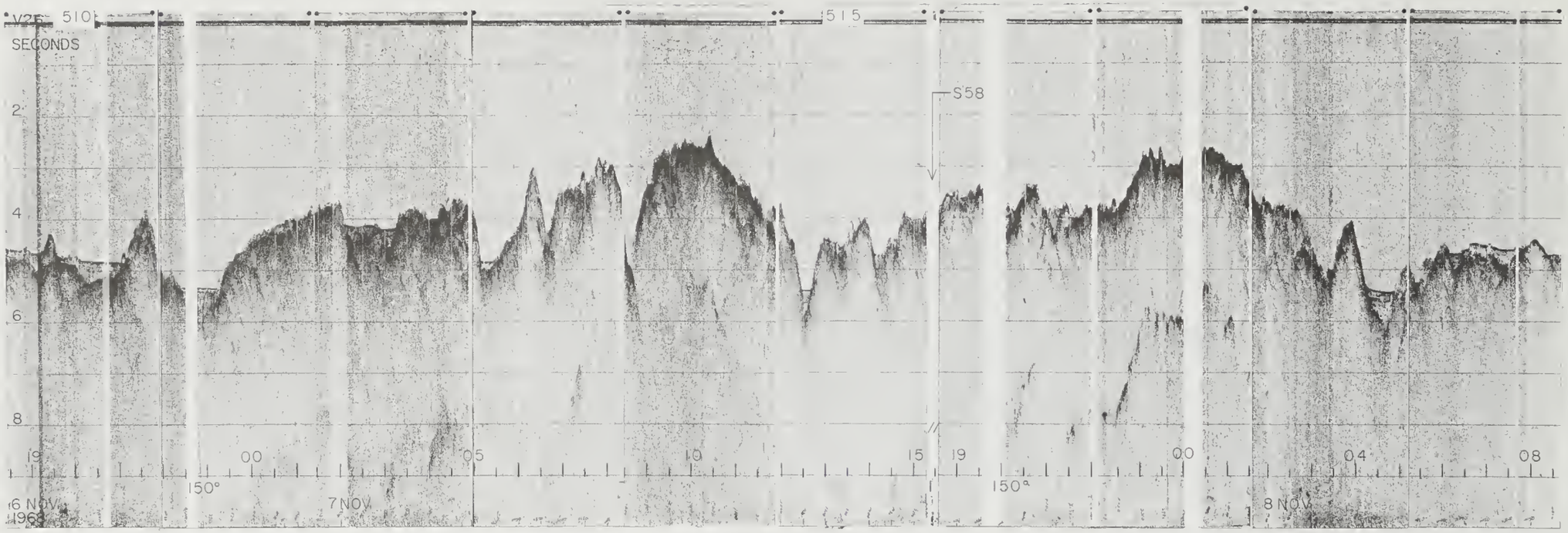

460
465
V26
FATHOMS
800
1600
2400
3200
01
05
10
15
20
00
05
10
139°
060°
314°
030°
135°
045°
313°
100°
225°
135°
045°
30 OCT.
31 OCT.
1968

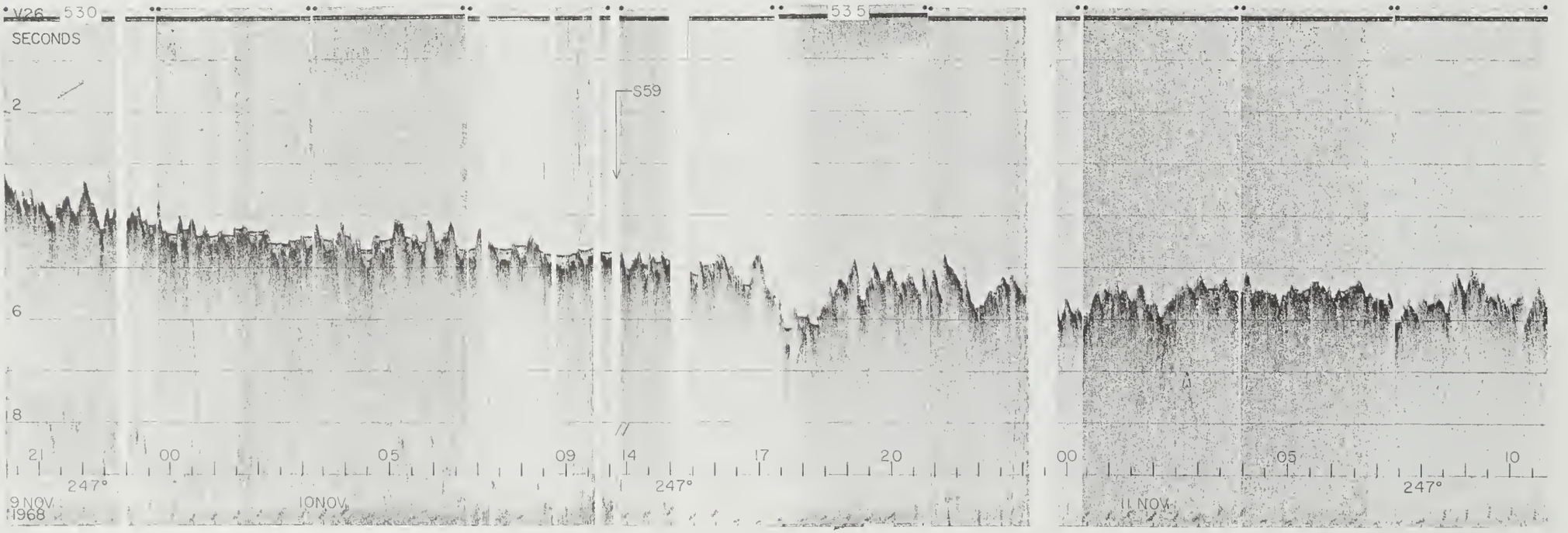

V26 470
SECONDS
2
4
6
8
475
S53
12
16
20
00
05
10
15
18
21
00
045°
135°
225°
135°
045°
135°
225°
090°
300°
311°
225°
31 OCT.
1968
1 NOV.

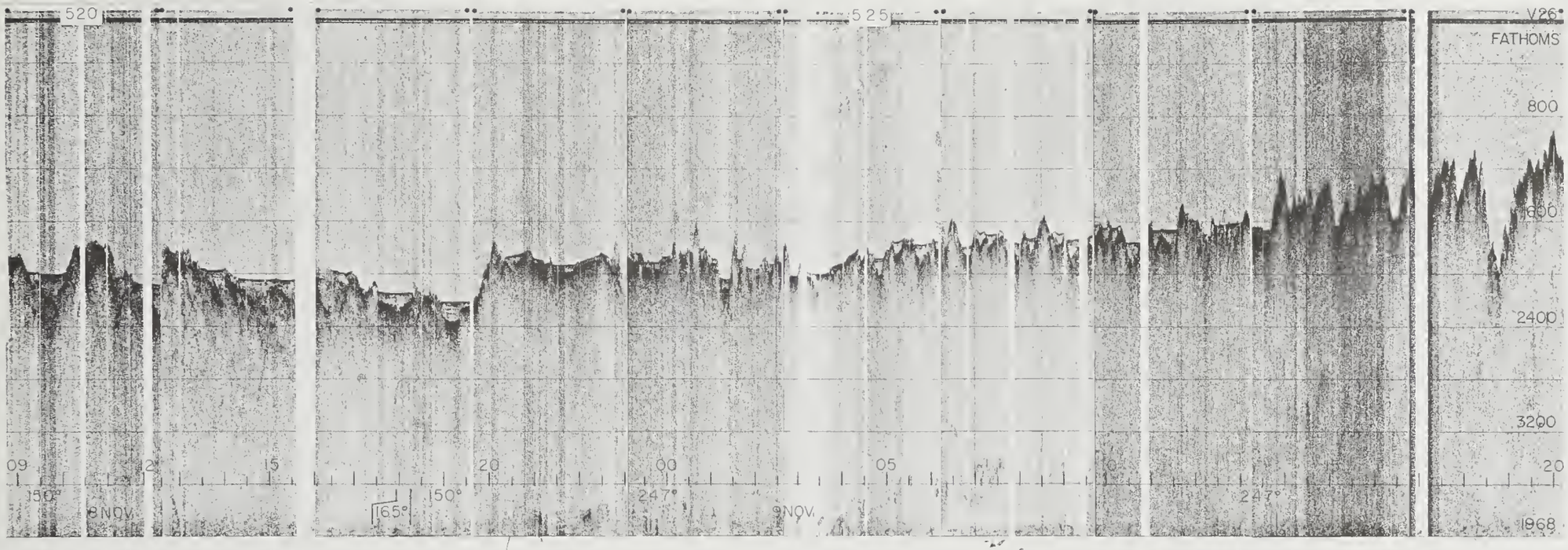

V26 490
SECONDS
2
4
6
8
495
S55
S56
16
20
00
05
10
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20
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04
165°
344°
060°
160°
240°
152°
152°
3 NOV.
1968
4 NOV.
5 NOV.

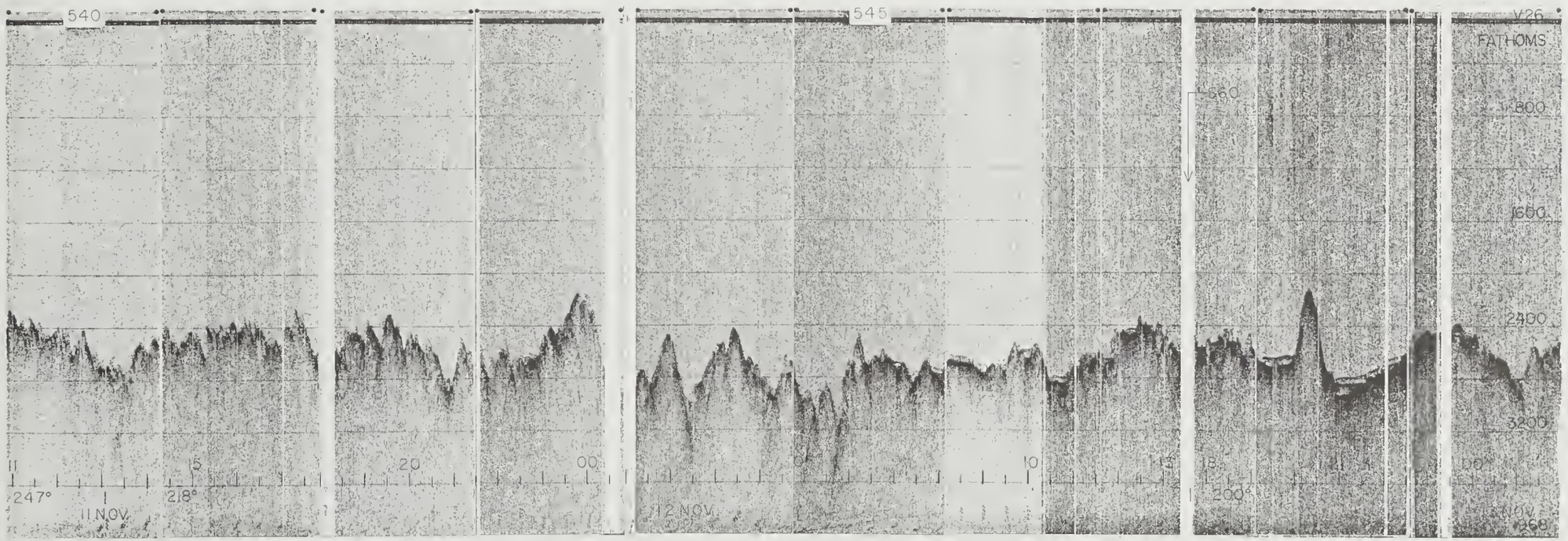

480
485
S54
R14
R15
01
05
10
15
20
00
05
10
139°
045°
315°
228°
315°
045°
180°
285°
138°
240°
270°
310°
2 NOV.
3 NOV.

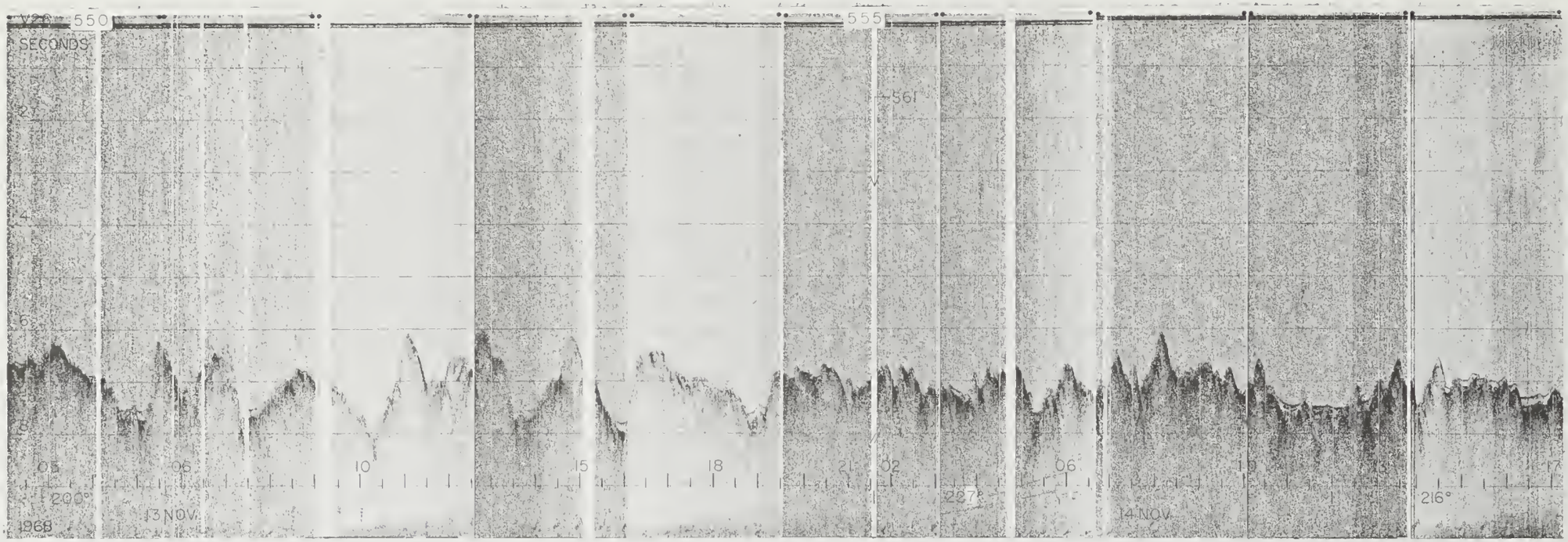

500
505
V26
FATHOMS
S57
800
1600
2400
3200
05
10
15
17
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00
05
10
14
18
152°
150°
150°
5 NOV.
6 NOV.
1968

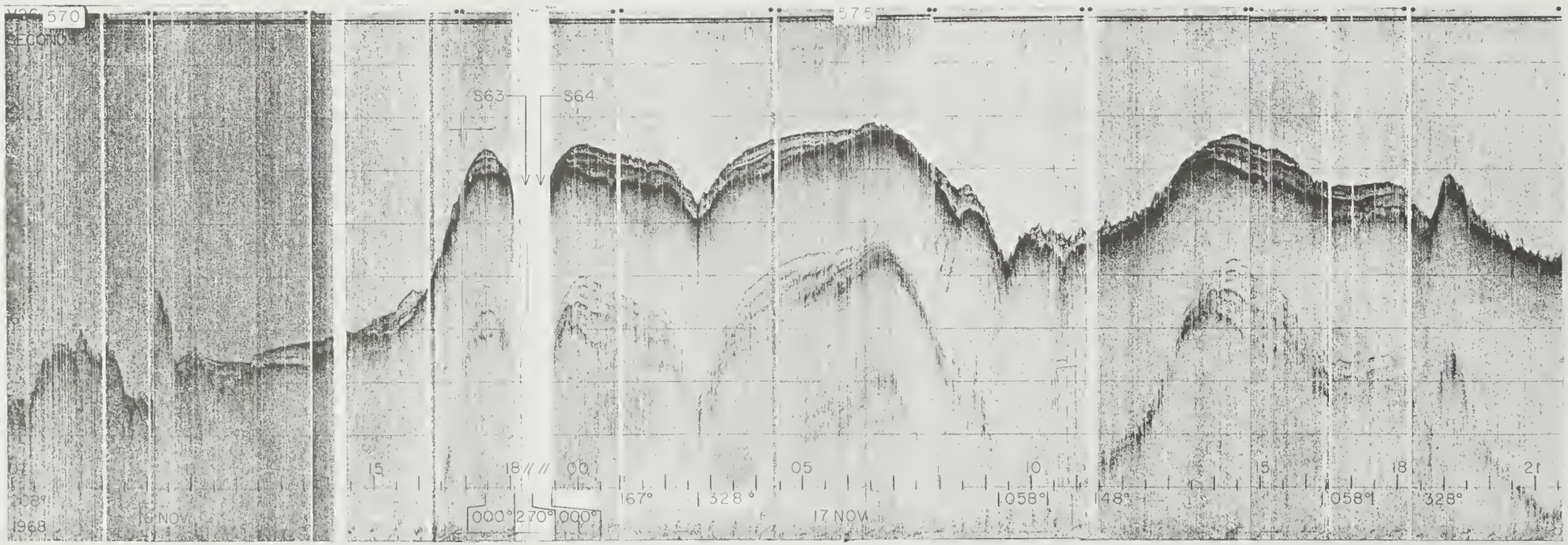

V26 510
SECONDS
2
4
6
8
S58
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04
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150°
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1968
7 NOV
8 NOV

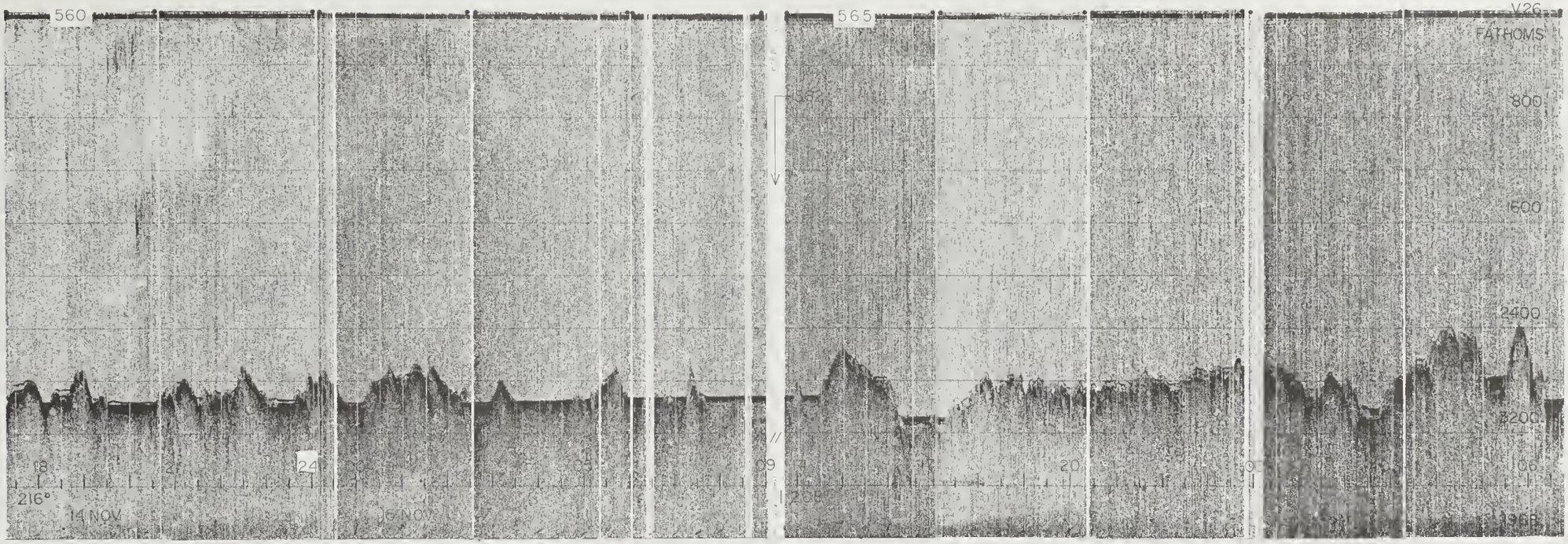

V26 530
SECONDS
2
6
8
S59
535
21
00
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14
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20
00
05
10
247°
247°
247°
9 NOV.
1968
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11 NOV.

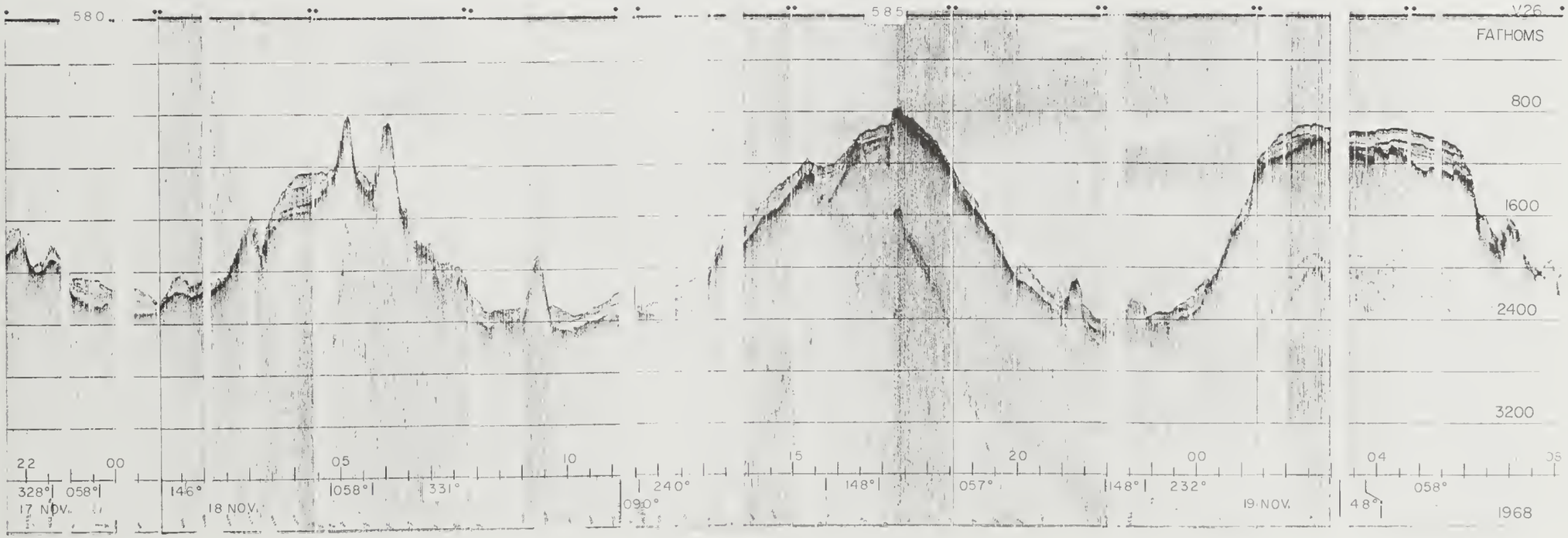

520
525
V26
FATHOMS
800
1600
2400
3200
09
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20
00
05
10
150°
8 NOV.
165°
150°
247°
9 NOV.
247°
20
1968

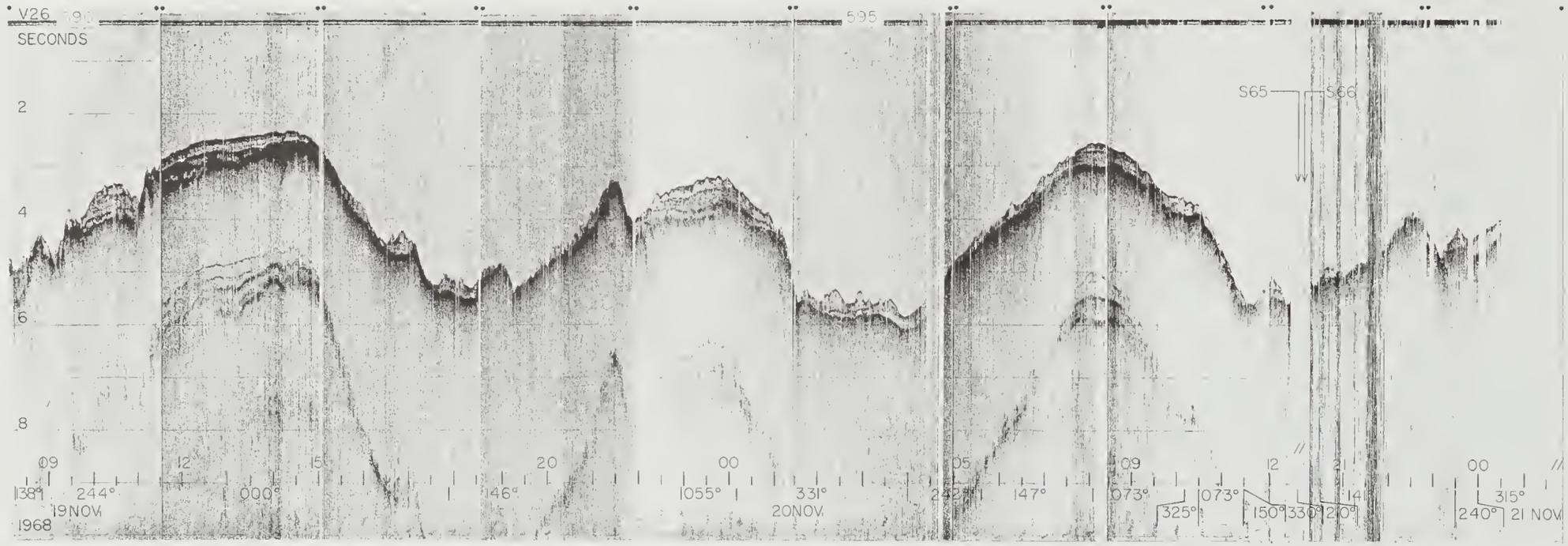

540
545
V26
FATHOMS
660
800
1600
2400
3200
11
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20
00
10
15
18
00
247°
11 NOV.
218°
12 NOV.
200°
NOV.
1968

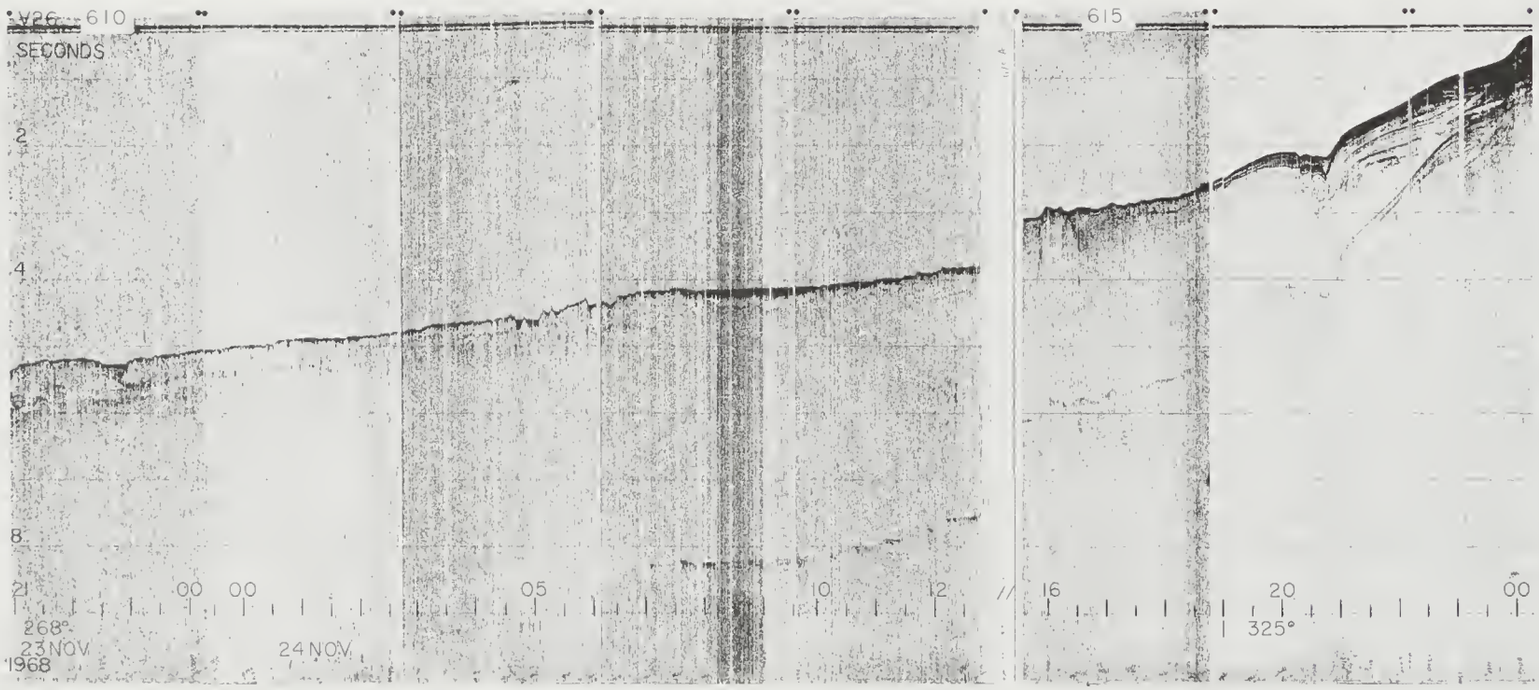

550
555
SECONDS
561
05
06
10
15
18
21
02
06
15
17
200°
227°
216°
13 NOV.
14 NOV.
1968


570
575
SECONDS
S63
S64
15
18
00
05
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15
18
21
167°
328°
058°
148°
058°
328°
000°270°000°
16 NOV.
17 NOV.
1968

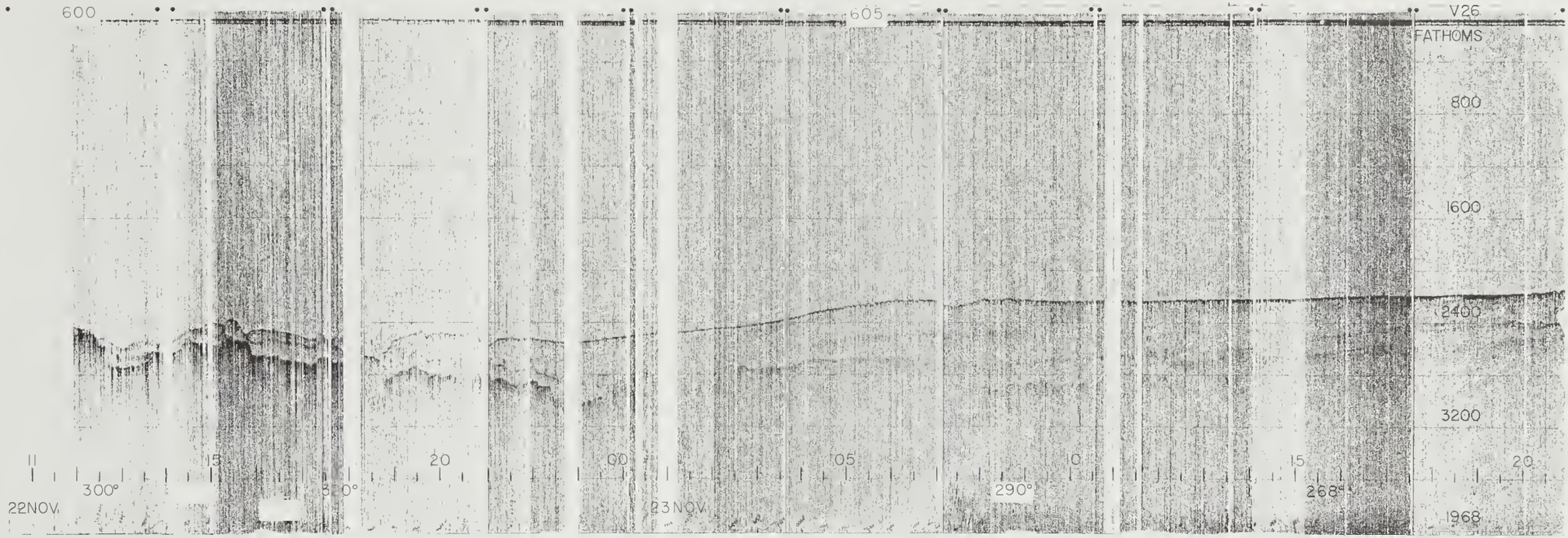

560
565
V26
FATHOMS
800
1600
2400
3200
1968
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24
09
20
216°
14 NOV.
16 NOV.

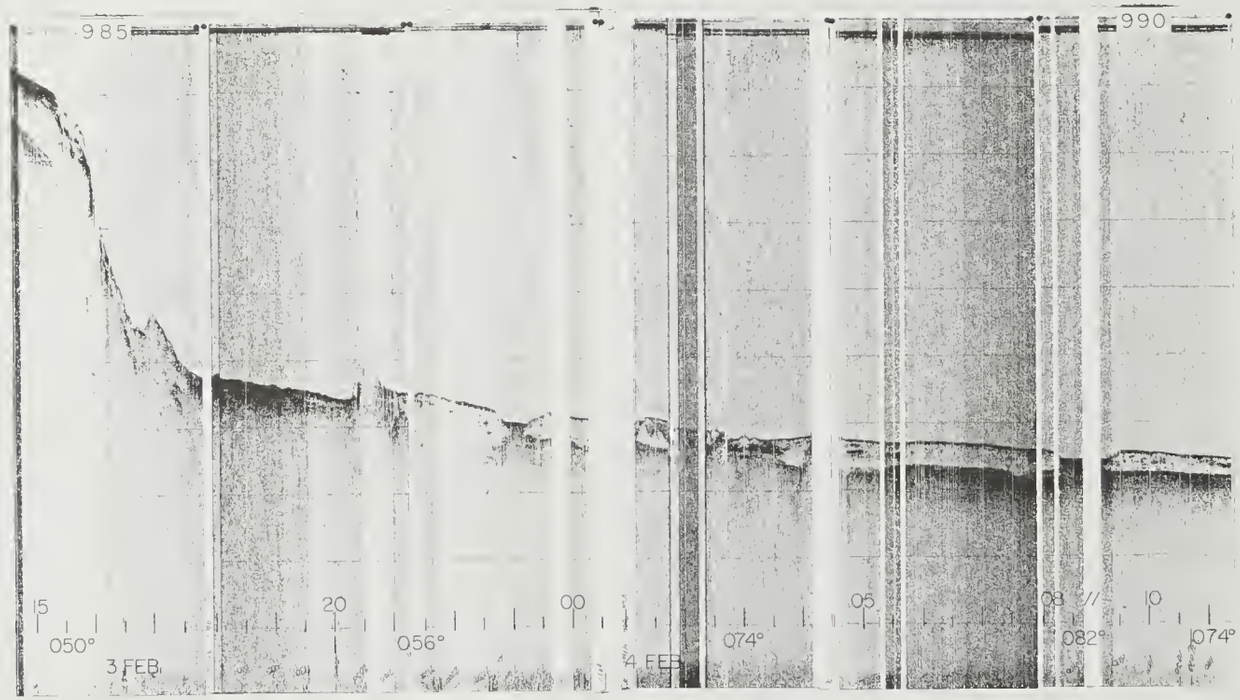

580
585
V26
FATHOMS
800
1600
2400
3200
1968
22
00
05
10
15
20
00
04
328°
058°
146°
058°
331°
240°
090°
148°
057°
148°
232°
058°
48°
17 NOV.
18 NOV.
19 NOV.

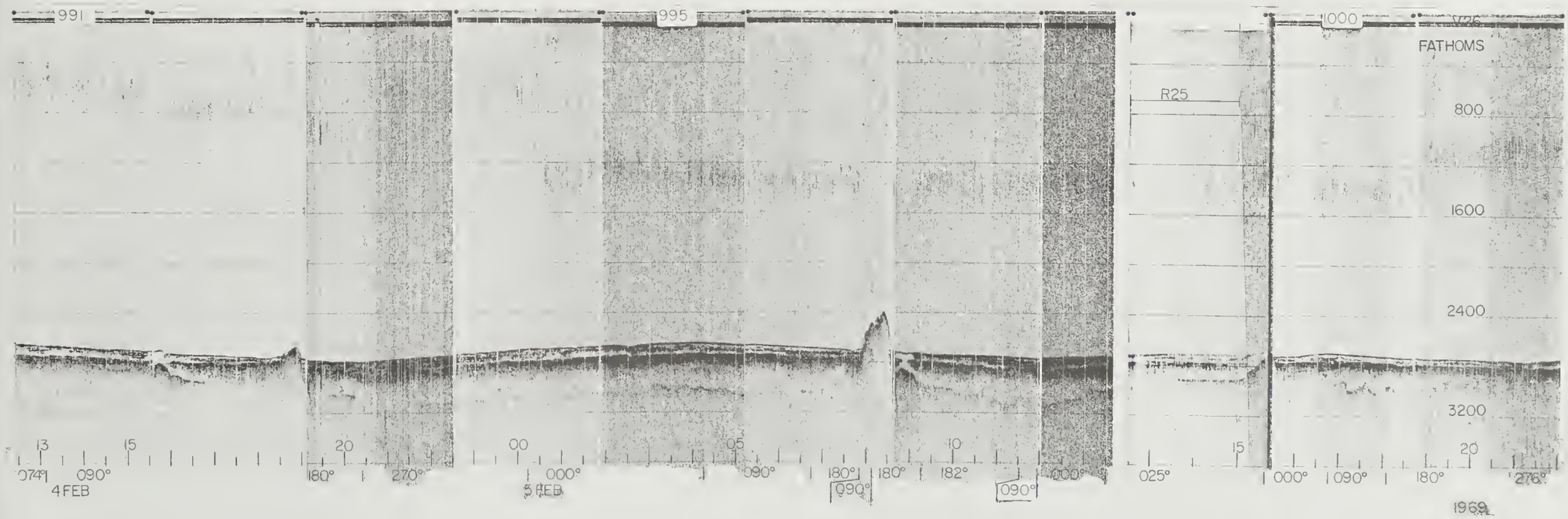


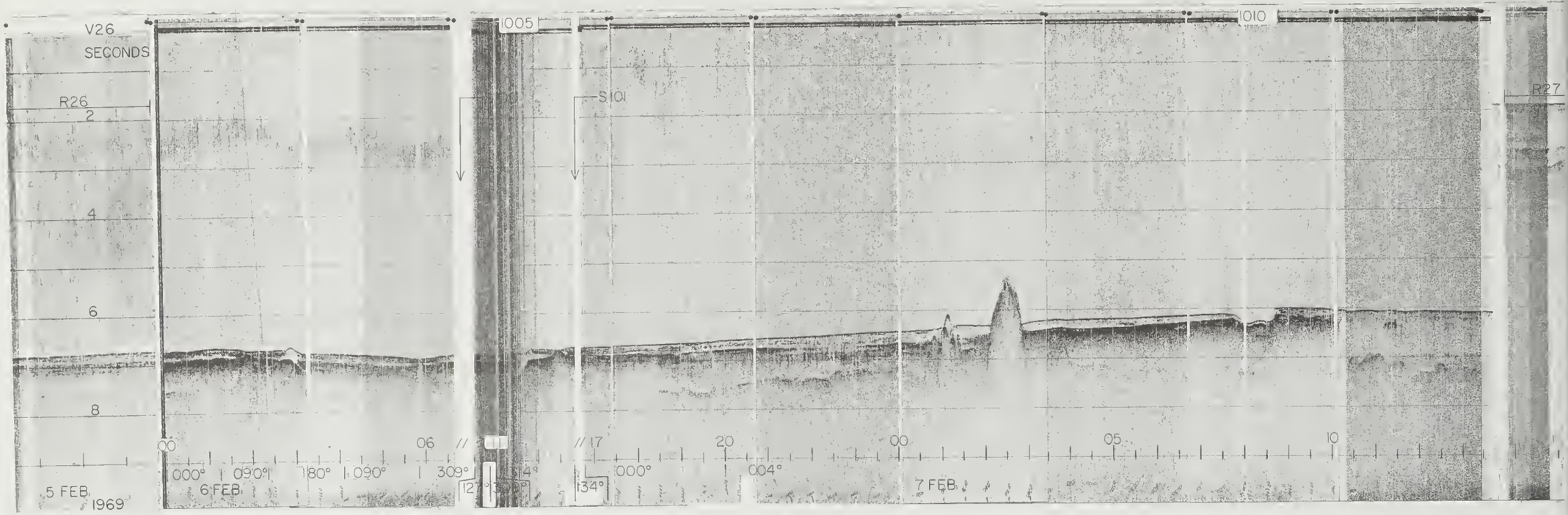


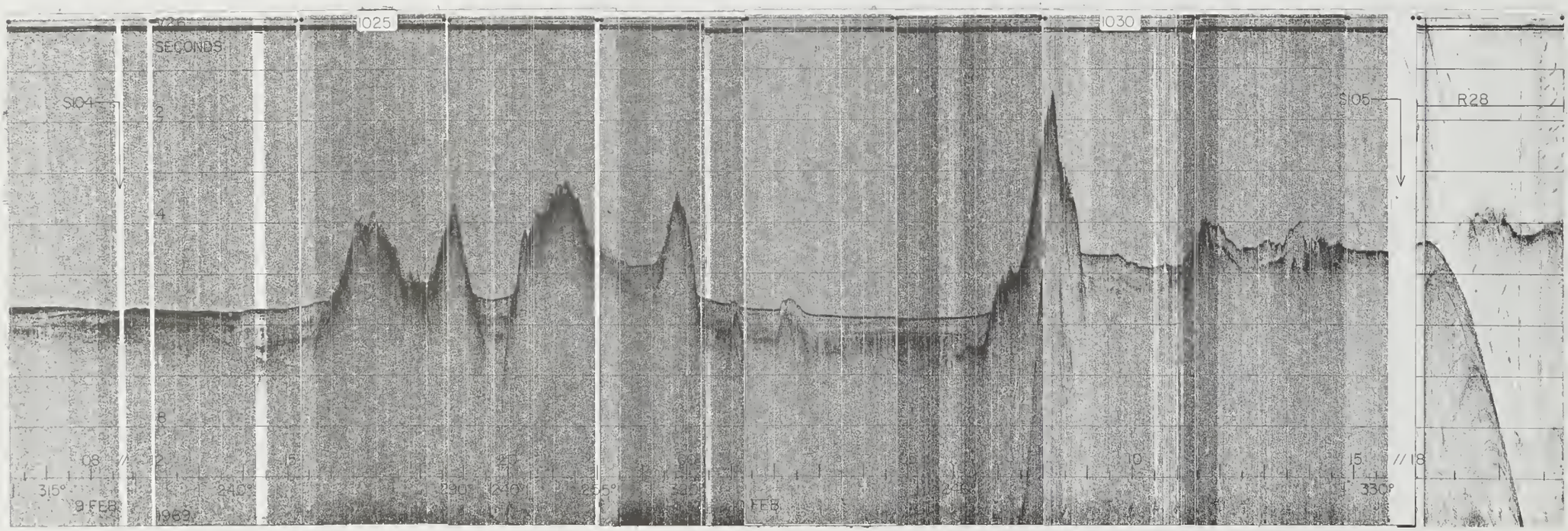
RIO DE JANEIRO BRAZIL

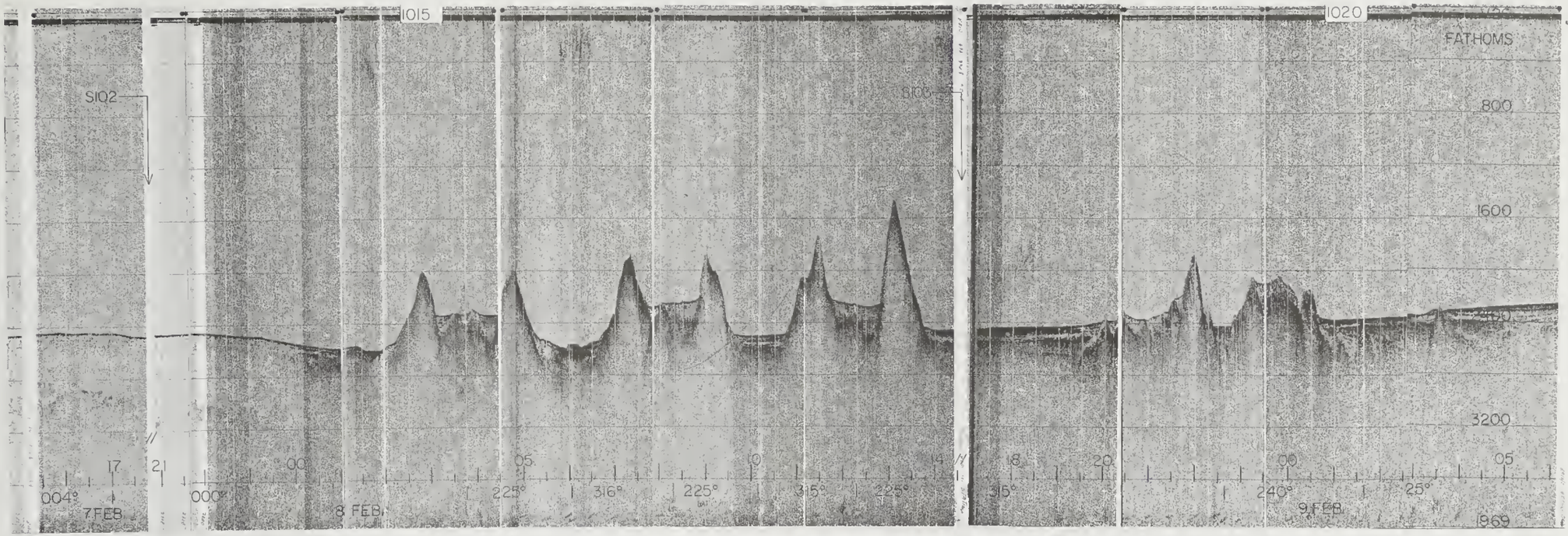

600
605
V26
FATHOMS
800
1600
2400
3200
1968
11
15
20
00
05
10
15
20
300°
310°
290°
268°
22NOV.
23NOV.

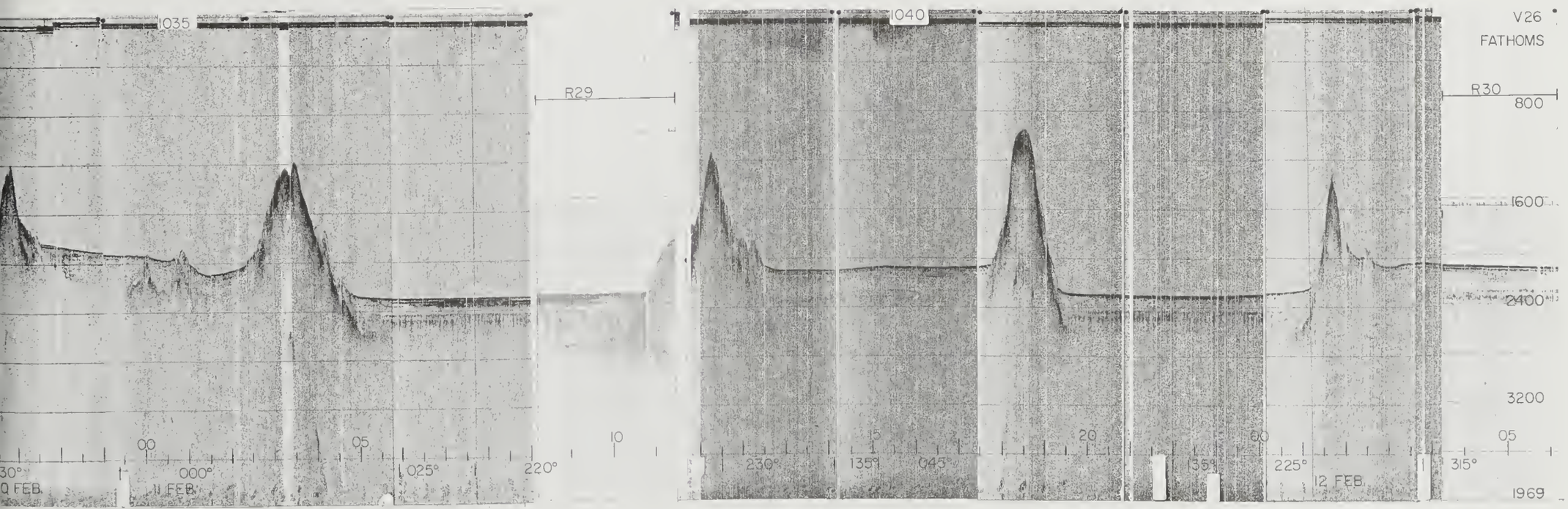

RECIFE
985
990
15
20
00
05
08
10
050°
056°
074°
082°
074°
3 FEB
4 FEB

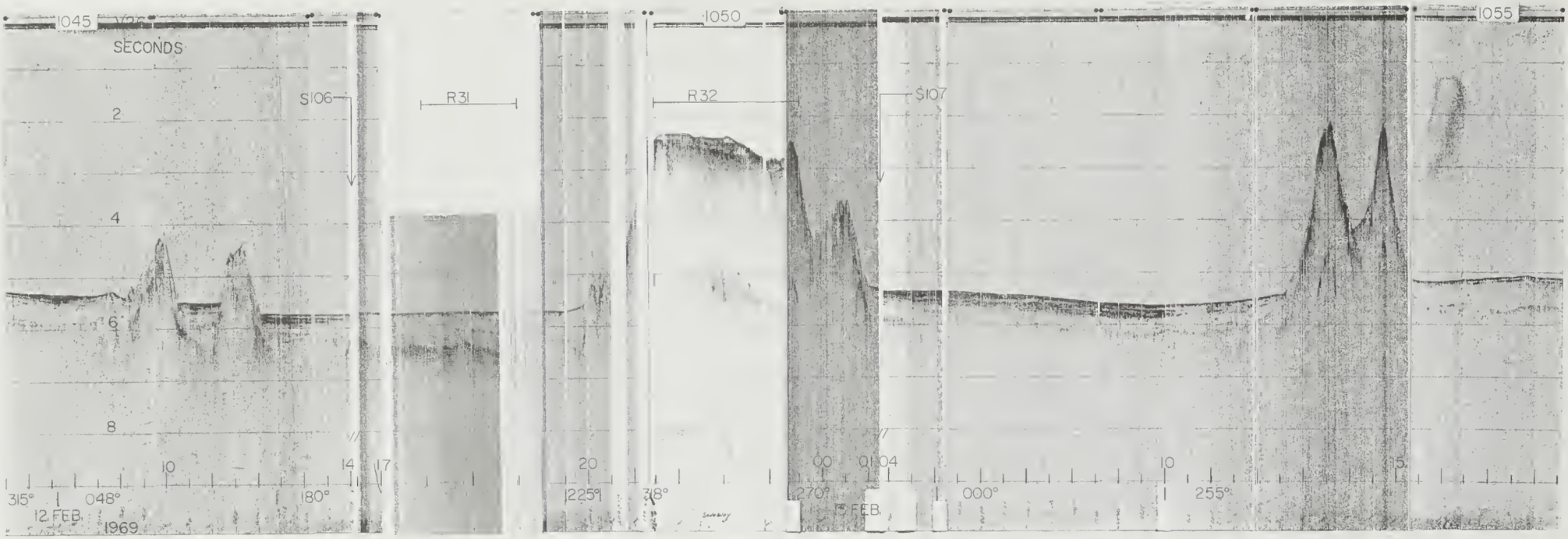

991
995
1000
FATHOMS
R25
800
1600
2400
3200
13
15
20
00
05
10
15
20
0741
090°
180°
270°
000°
090°
180°
090°
180°
182°
090°
090°
025°
000°
090°
180°
276°
4 FEB
5 FEB
1969

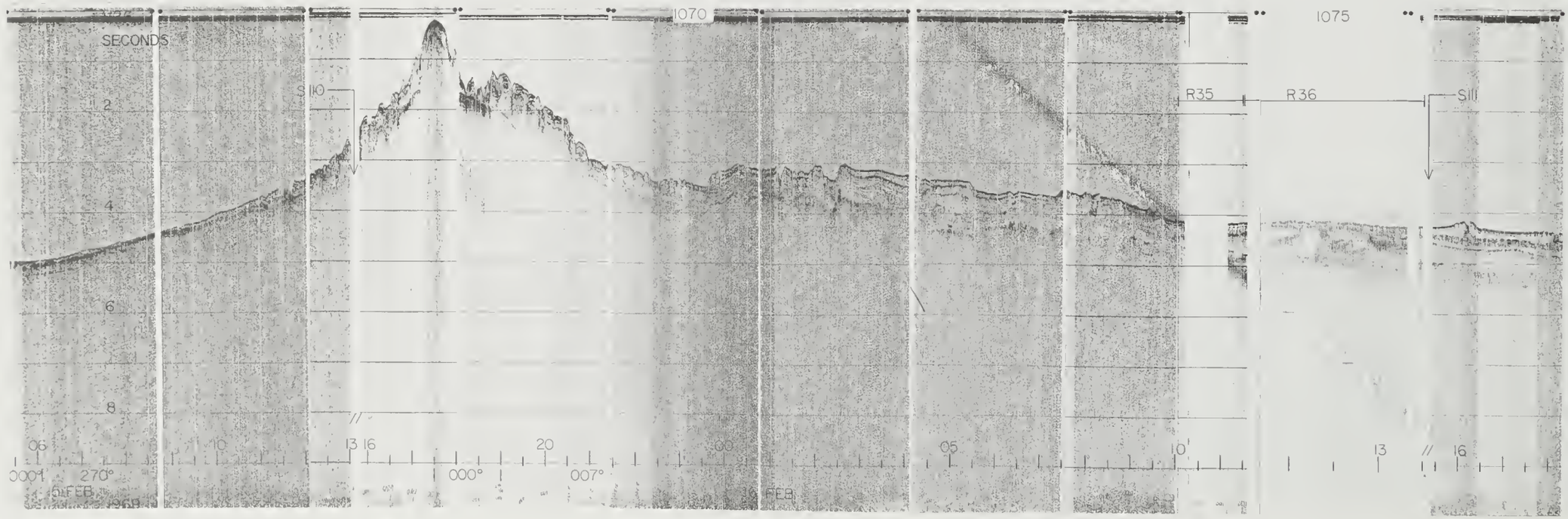

V26
SECONDS
R26
2
4
6
8
1005
S101
1010
R27
00
06
// 17
20
00
05
10
000°
090°
180°
090°
309°
000°
004°
5 FEB 1969
6 FEB
7 FEB

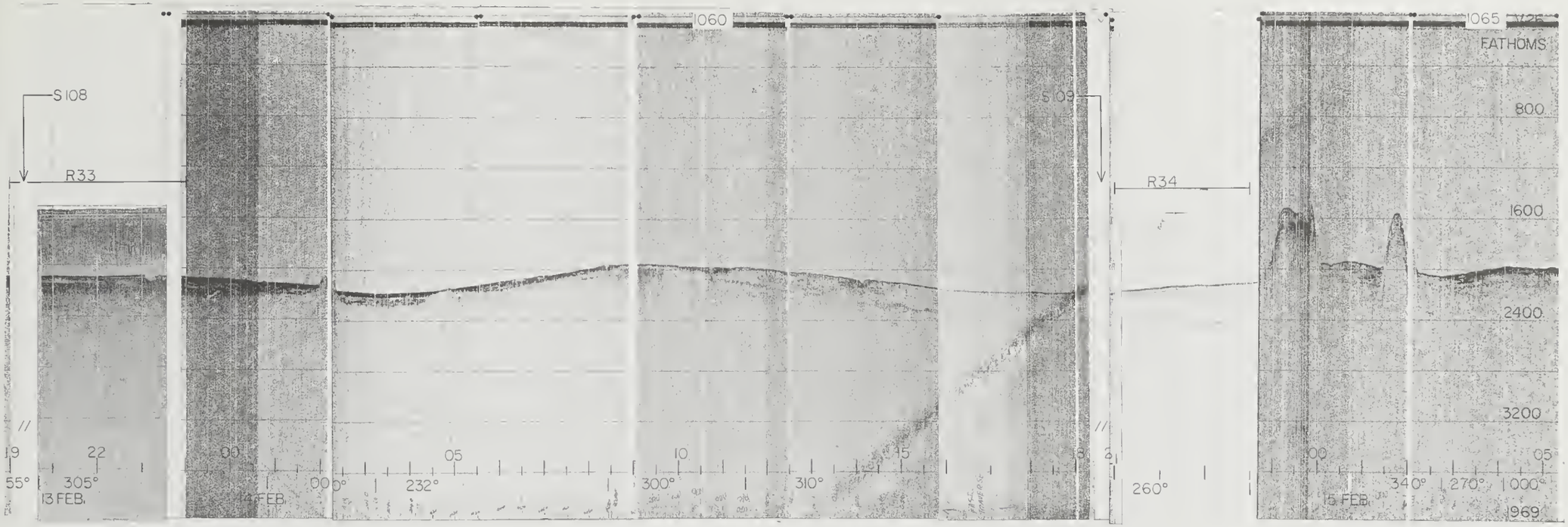

V26
SECONDS
1025
1030
S104
S105
R28
2
4
8
08
15
10
15
// 18
315°
240°
290°
240°
255°
240°
330°
9 FEB 1969
FEB

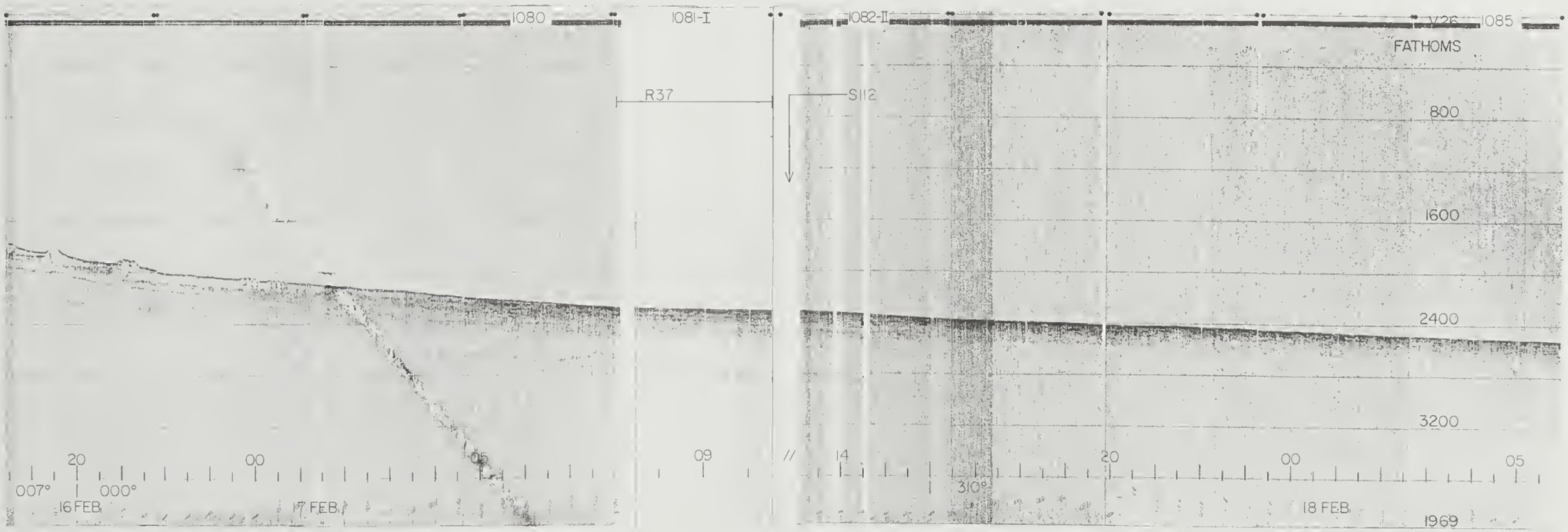

1015
S1Q2
8100
17
21
00
05
10
14
004°
000°
225°
316°
225°
315°
225°
7 FEB.
8 FEB.
1020
FATHOMS
800
1600
3200
18
20
00
05
315°
240°
25°
9 FEB.
1969

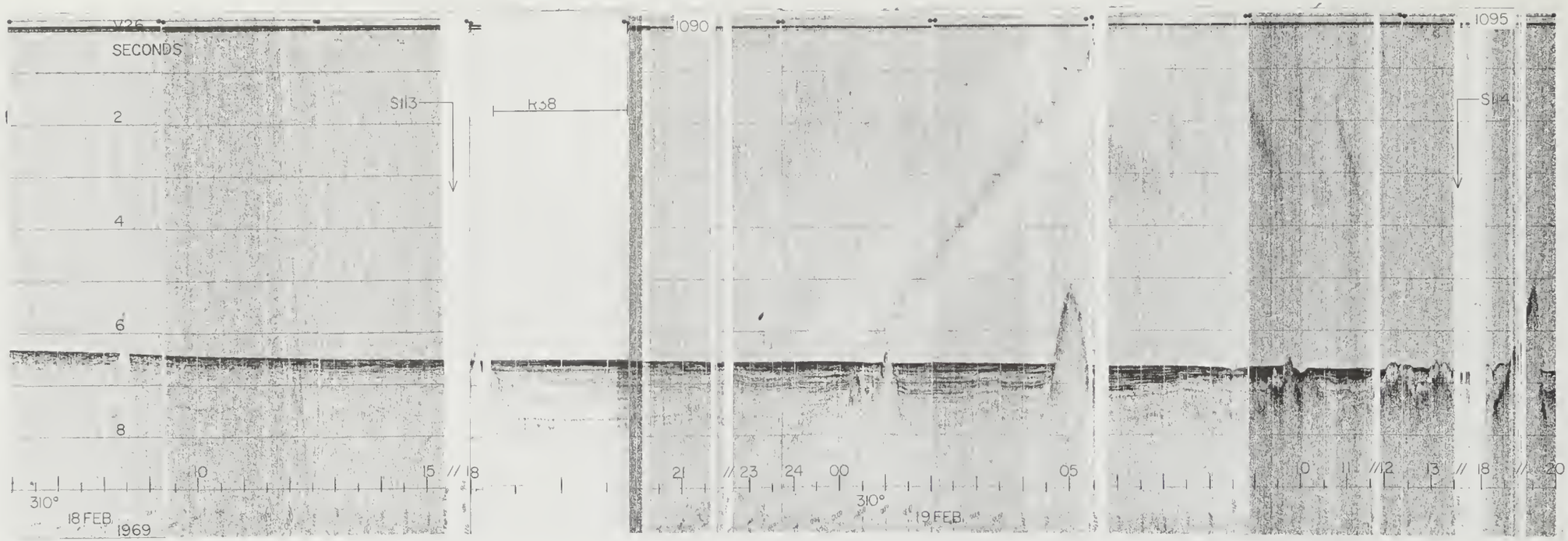

1035
R29
00
05
10
30°
000°
025°
220°
Q FEB.
11 FEB.
1040
V26
FATHOMS
R30
800
1600
2400
3200
15
20
00
05
230°
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045°
135°
225°
315°
12 FEB.
1969

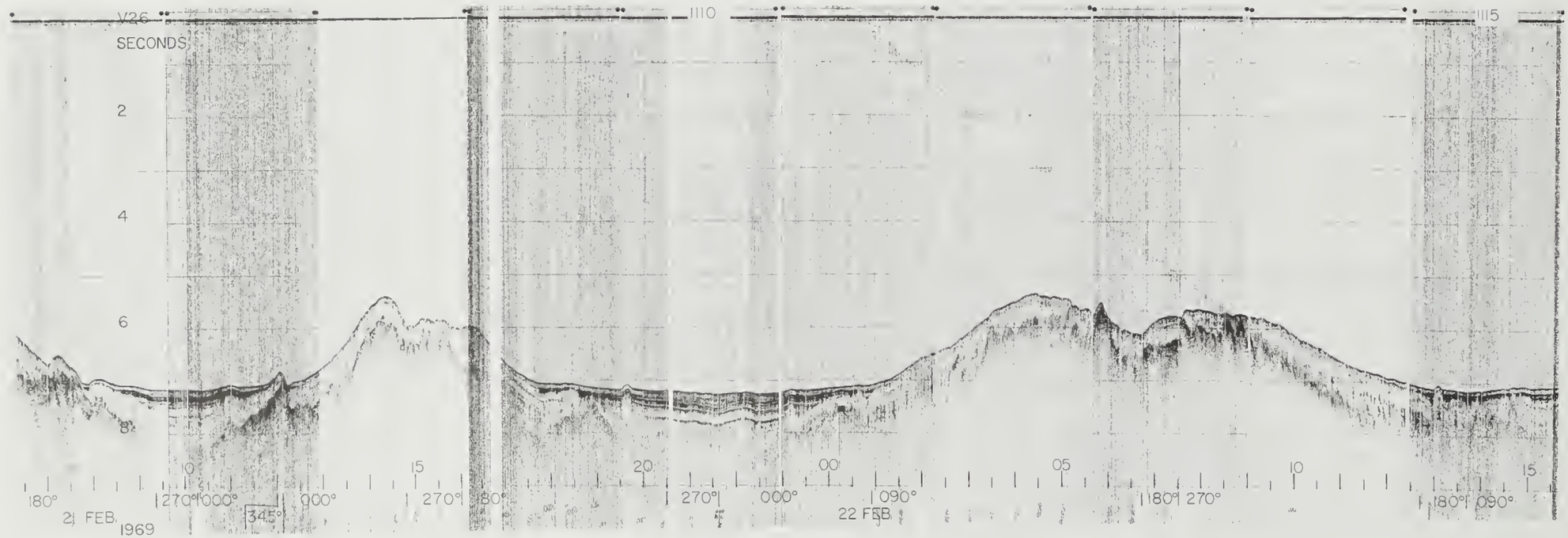

1045
SECONDS
S106
R31
1050
R32
S107
1055
2
4
6
8
315°
048°
180°
12 FEB.
1969
1225
038°
270°
000°
255°
13 FEB.

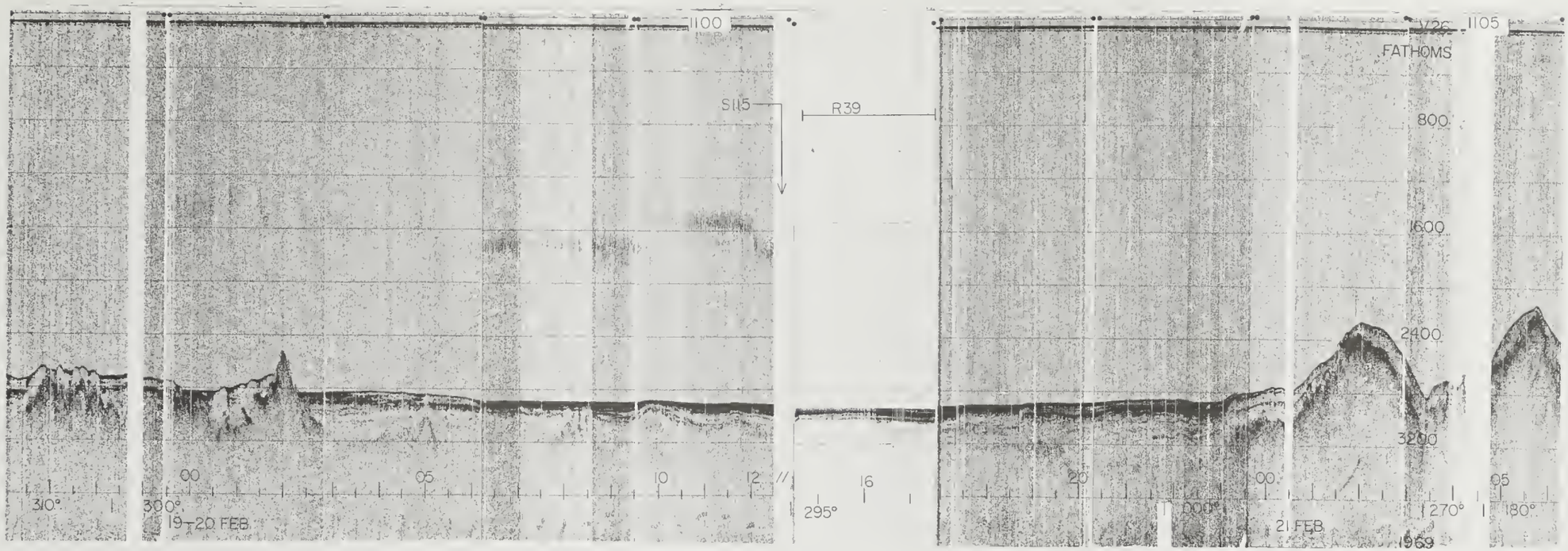

SECONDS
S110
1070
1075
R35
R36
S111
2
4
6
8
270°
000°
007°
6 FEB.
FEB.

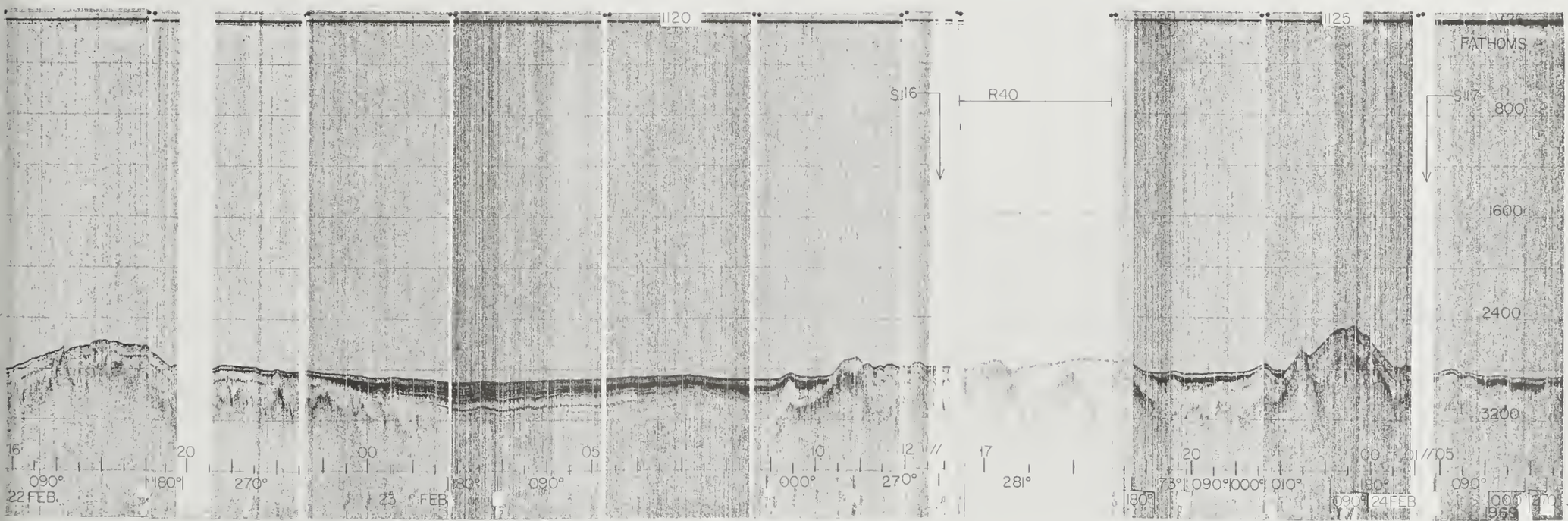

S108
R33
060
S109
R34
1065
V26
FATHOMS
800
1600
2400
3200
19
22
00
05
10
15
55°
305°
000°
232°
300°
310°
260°
340°
270°
000°
13 FEB.
14 FEB.
15 FEB.
1969

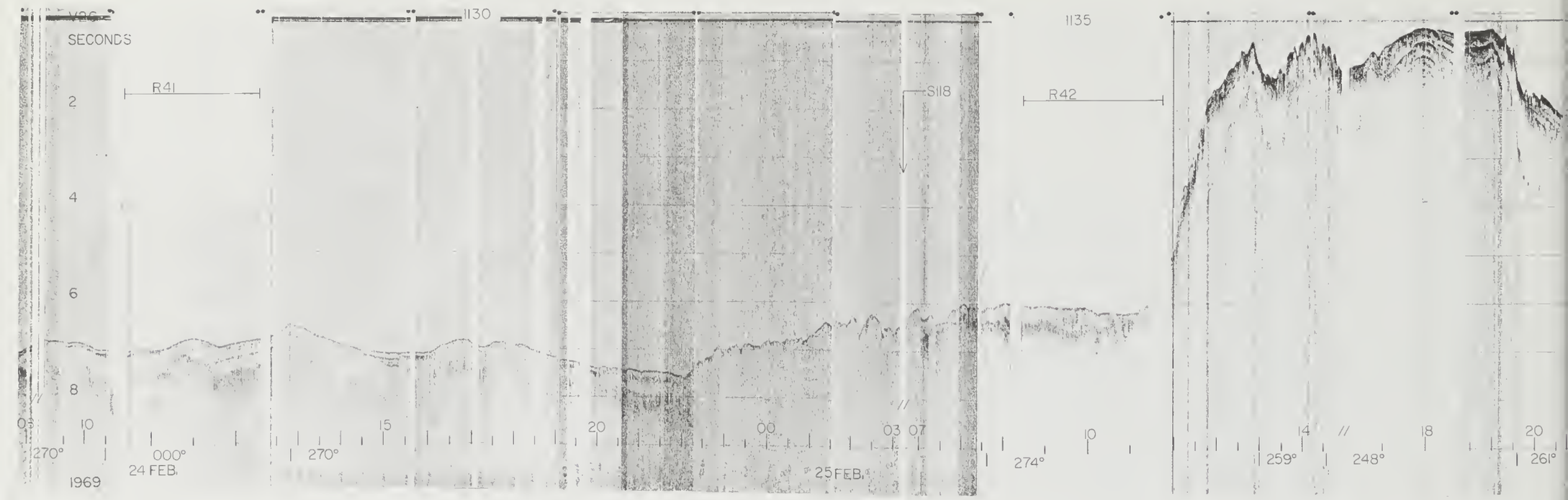

1080
1081-I
1082-II
V26
1085
FATHOMS
R37
S112
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1600
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3200
20
00
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09
14
007°
000°
310°
16 FEB.
17 FEB.
18 FEB.
1969

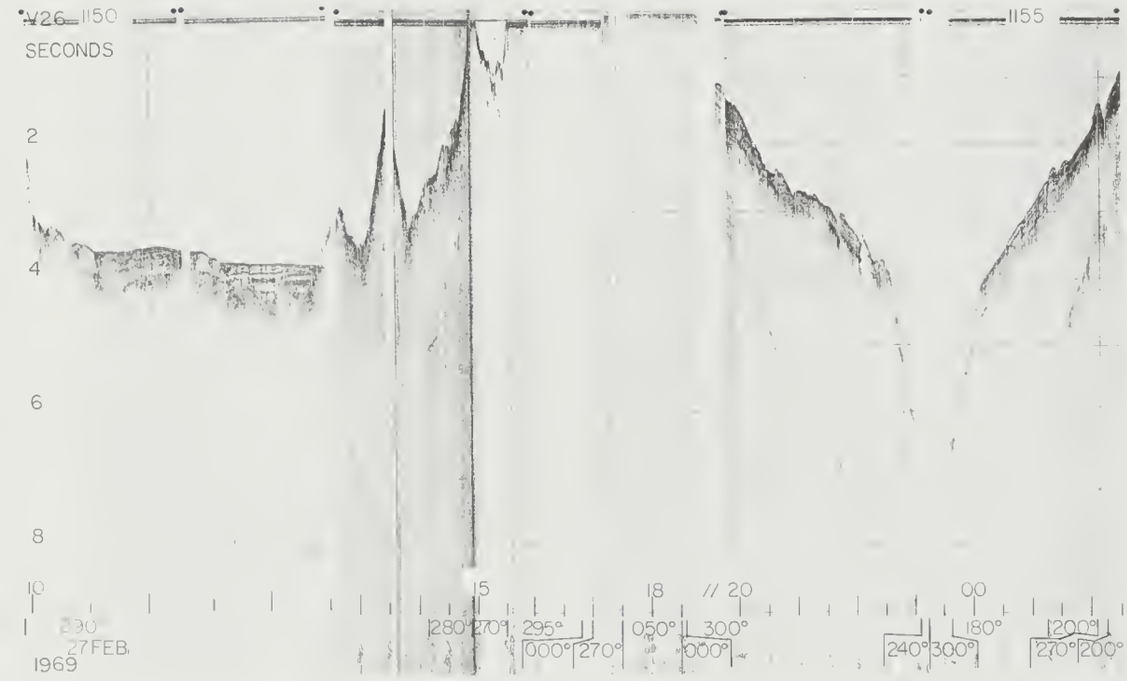

V26
SECONDS
2
4
6
8
S113
K58
1090
1095
S114
10
15
18
21
23
24
00
05
10
12
13
18
20
310°
18 FEB.
1969
310°
19 FEB.


V26
SECONDS
2
4
6
8
1110
1115
10
15
20
00
05
10
15
180°
270°
000°
345°
000°
270°
180°
270°
000°
090°
180°
270°
180°
090°
21 FEB.
1969
22 FEB.

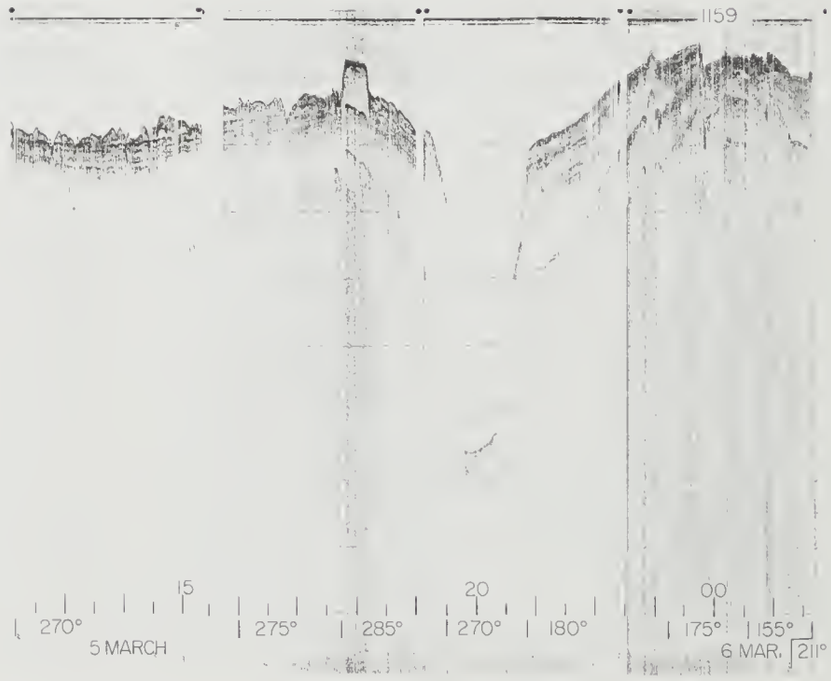

1100
S115
R39
1105
FATHOMS
800
1600
2400
3200
310°
300°
19-20 FEB.
00
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16
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20
000°
00
05
270°
180°
21 FEB.
1969

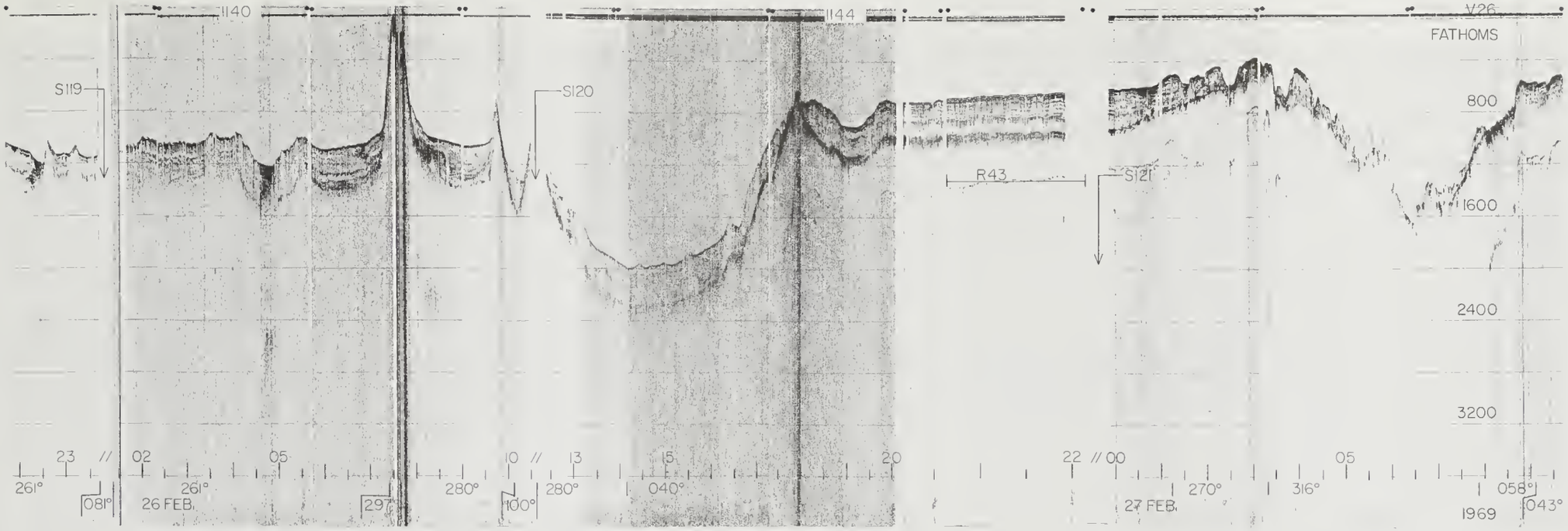

1120
S116
R40
1125
FATHOMS
S117
800
1600
2400
3200
16
20
090°
180°
22 FEB.
00
270°
23 FEB.
05
180°
090°
10
12
000°
270°
17
281°
20
00
05
073°
090°
000°
010°
180°
090°
24 FEB.
090°
000°
1969

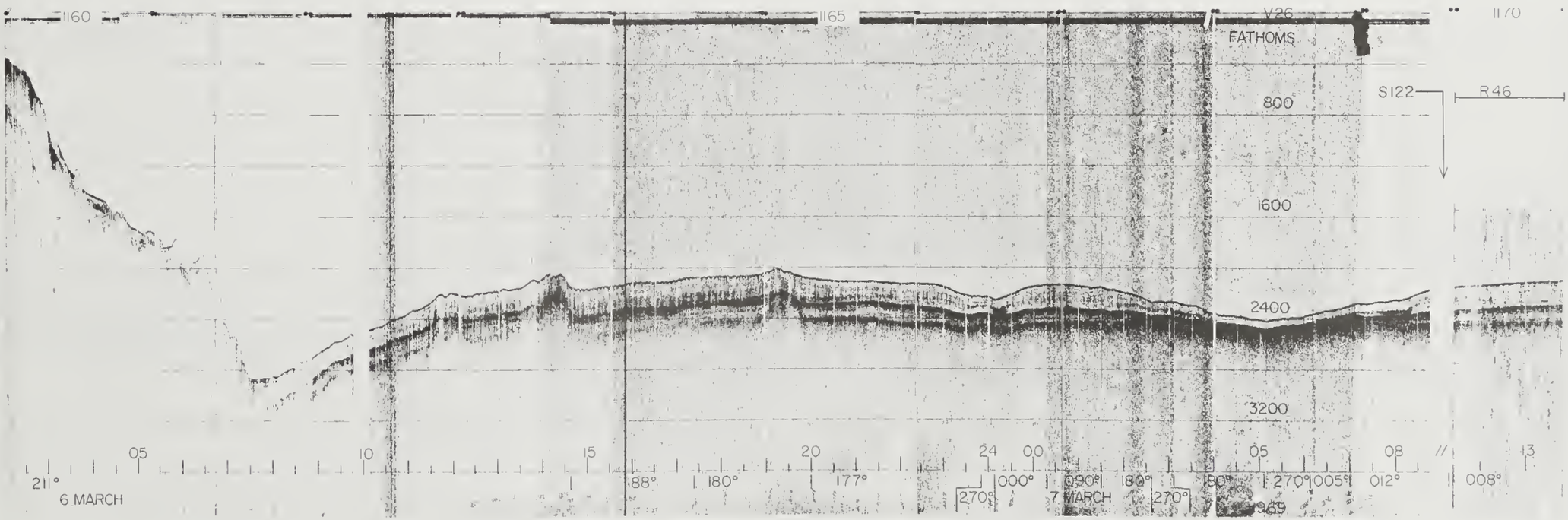

V26
SECONDS
1130
R41
S118
1135
R42
2
4
6
8
10
15
20
00
03
07
10
14
18
20
270°
000°
270°
274°
259°
248°
261°
24 FEB.
1969
25 FEB.

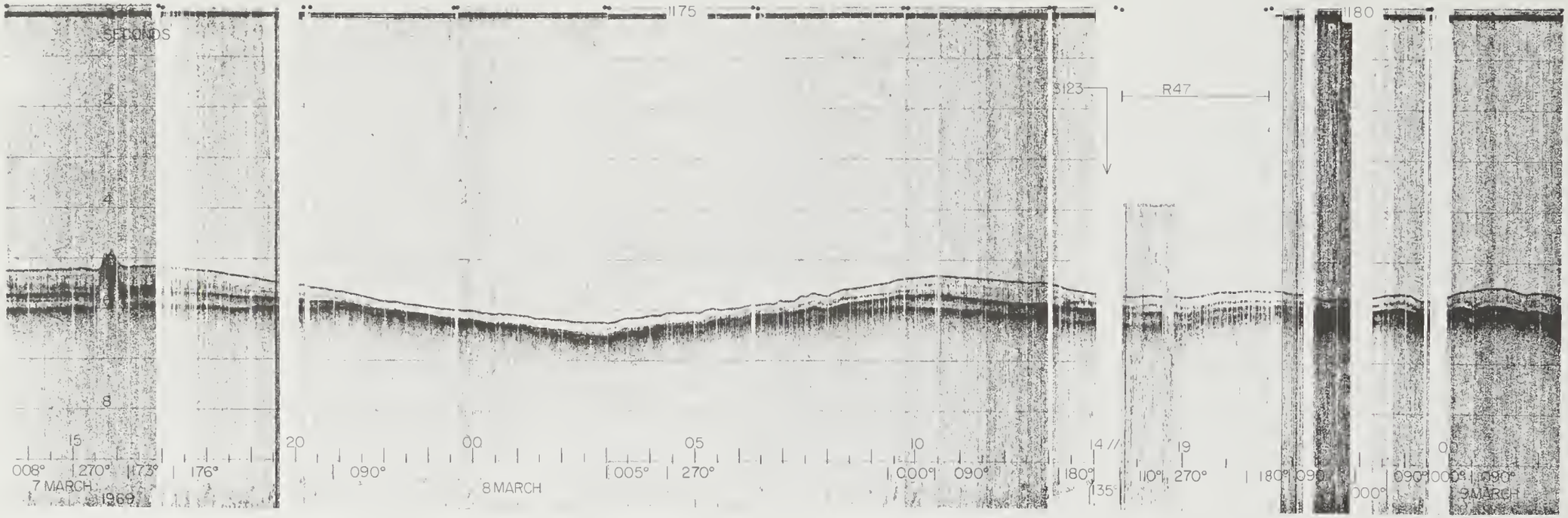

V26
1150
SECONDS
1155
2
4
6
8
10
15
18
20
00
280°
270°
295°
000°
270°
050°
300°
000°
240°
300°
180°
270°
200°
27 FEB.
1969

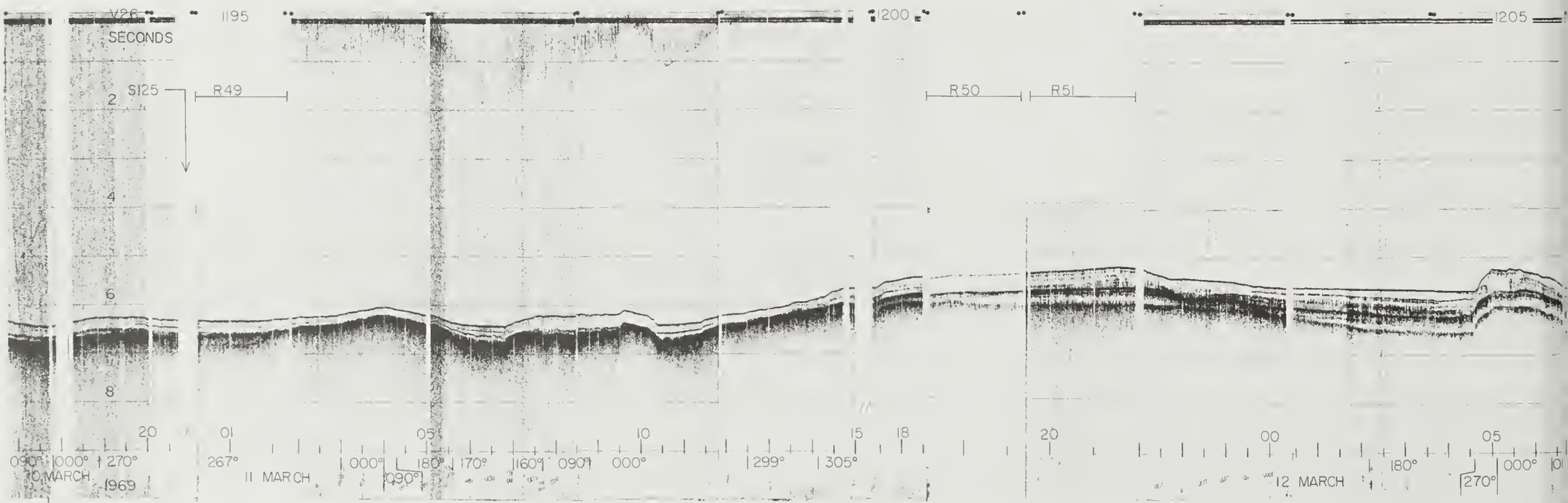
SAN JUAN

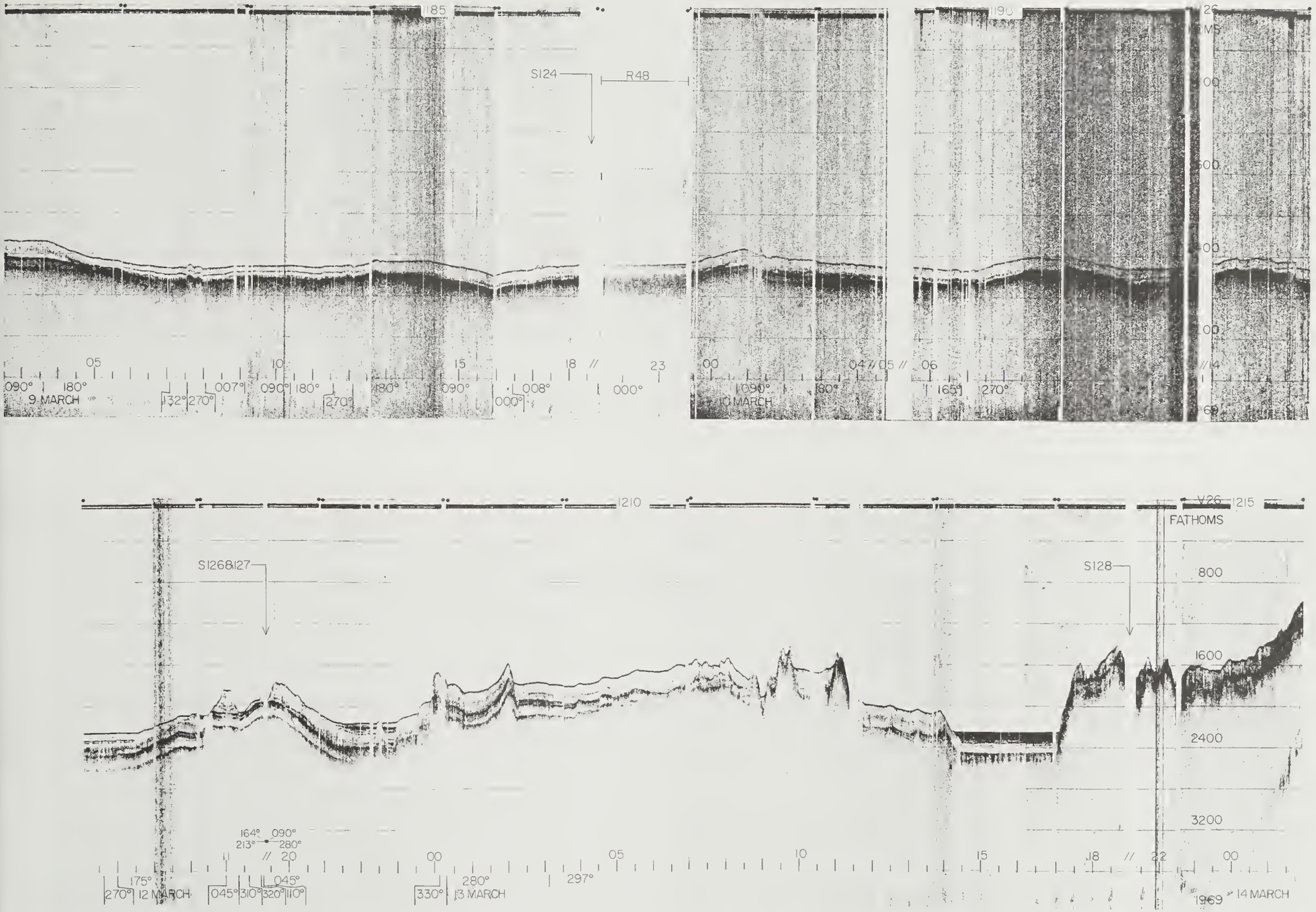

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15
20
00
270°
275°
285°
270°
180°
175°
155°
5 MARCH
6 MAR.
211°

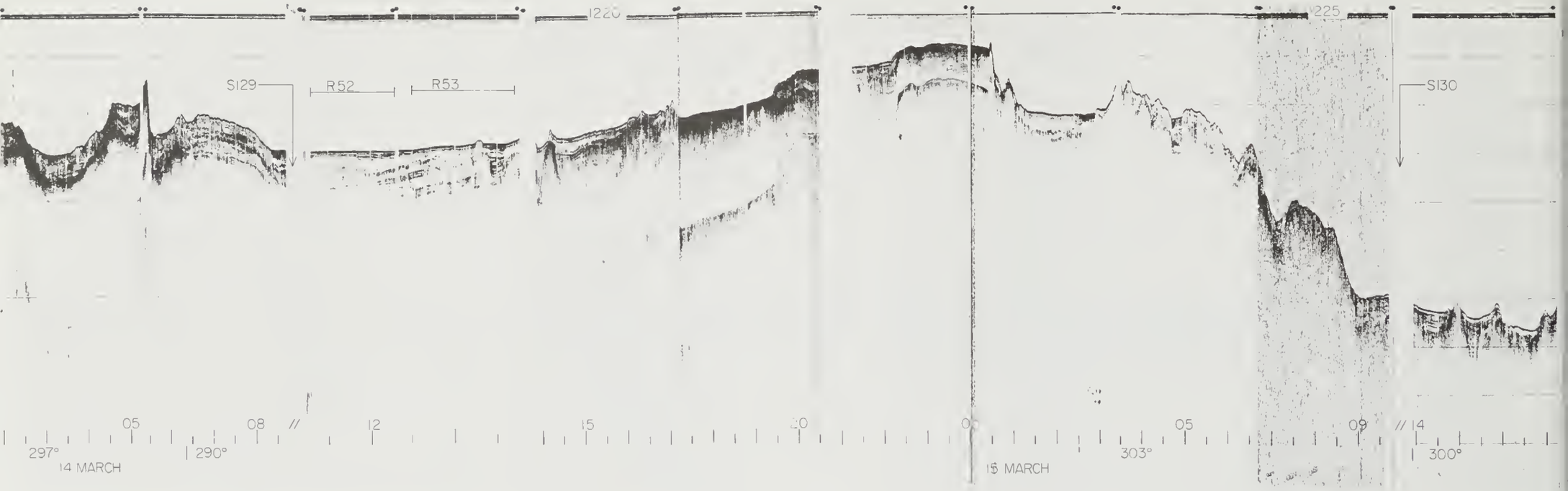

1140
1144
V26
FATHOMS
S119
S120
R43
S121
800
1600
2400
3200
23 // 02
05
10 // 13
15
20
22 // 00
05
261°
261°
280°
280°
040°
270°
316°
058°
081°
297°
100°
043°
26 FEB.
27 FEB.
1969

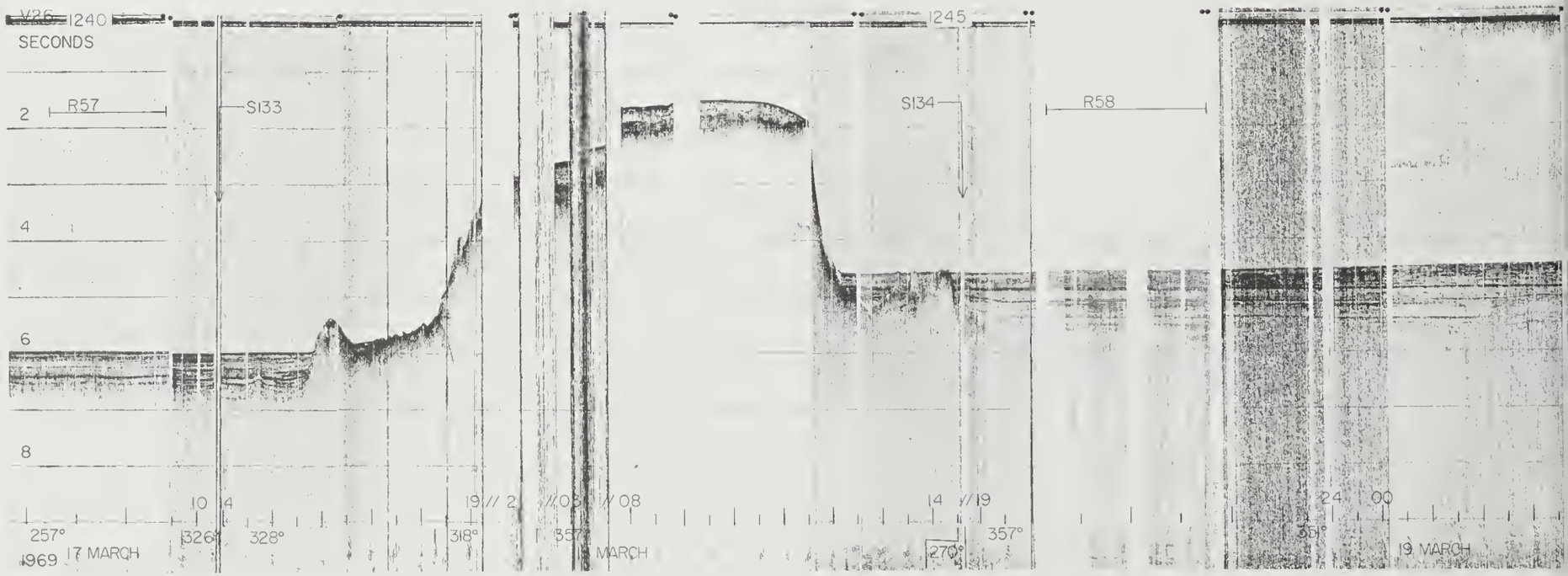

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1165
V26
FATHOMS
1170
S122
R46
800
1600
2400
3200
05
10
15
20
24 00
05
08 // 13
211°
188°
180°
177°
270°
000°
090°
180°
270°
180°
270°
005°
012°
008°
6 MARCH
7 MARCH
969

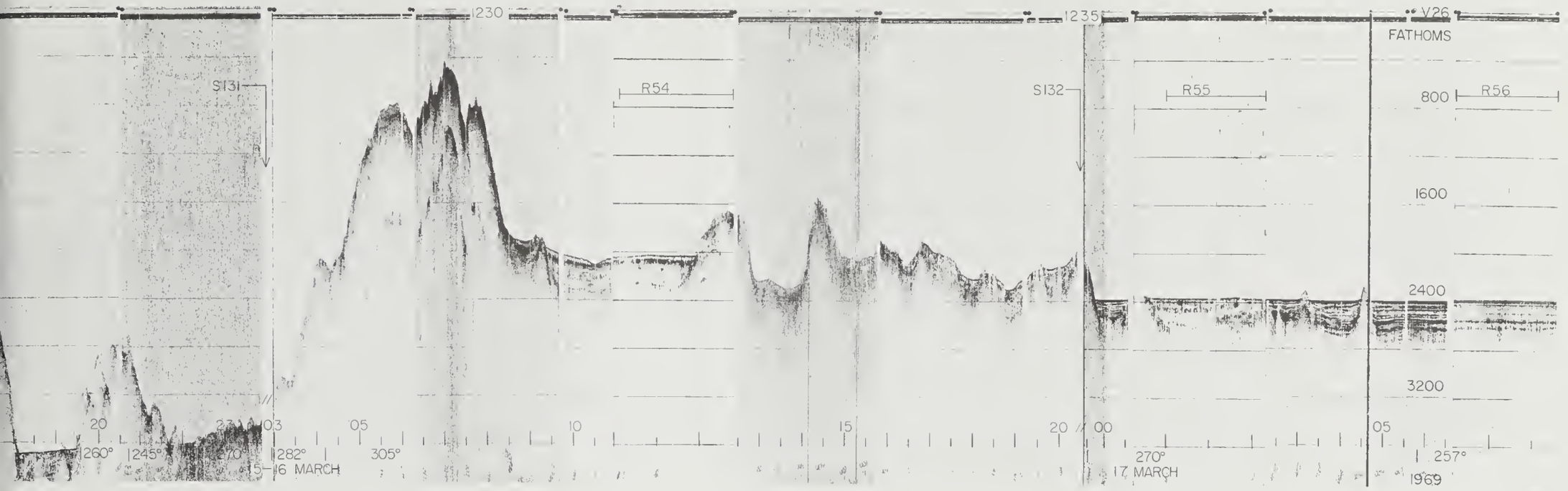

SECONDS
2
4
6
8
1175
1180
S123
R47
15
20
00
05
10
14
19
008°
270°
173°
176°
090°
005°
270°
000°
090°
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135°
110°
270°
180°
090°
090°
000°
090°
7 MARCH
1969
8 MARCH
9 MARCH

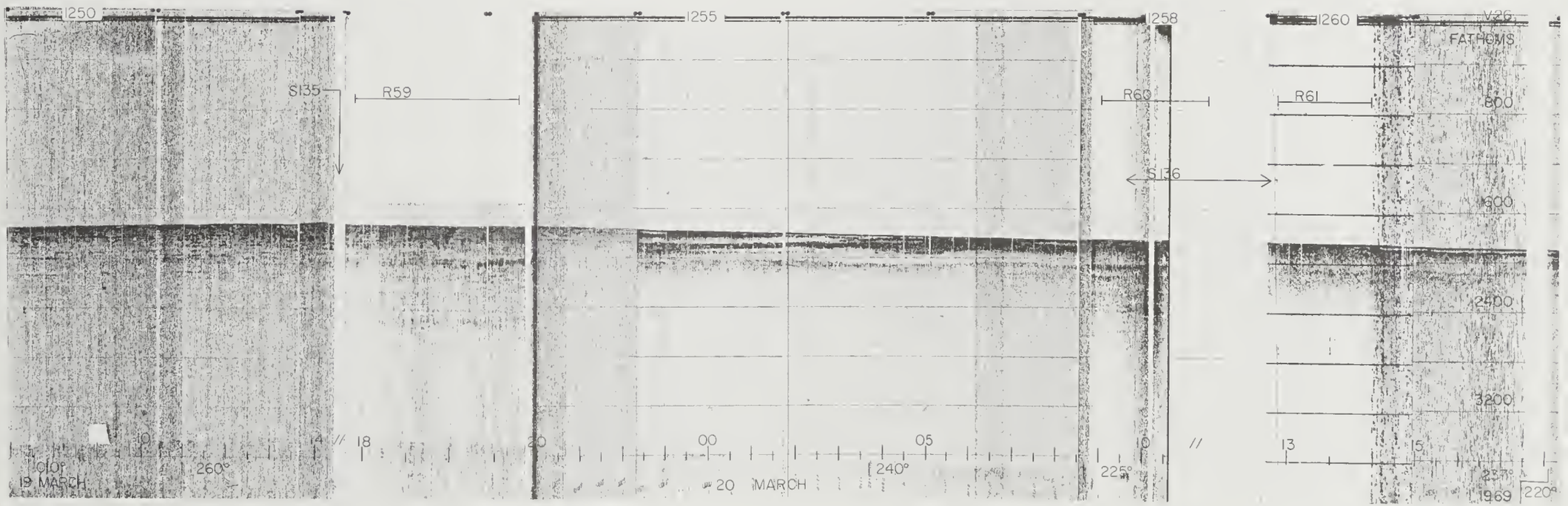

V26
SECONDS
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4
6
8
1195
1200
1205
S125
R49
R50
R51
20
01
05
10
15
18
20
00
05
090°
000°
270°
267°
000°
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170°
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299°
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1969
11 MARCH
12 MARCH

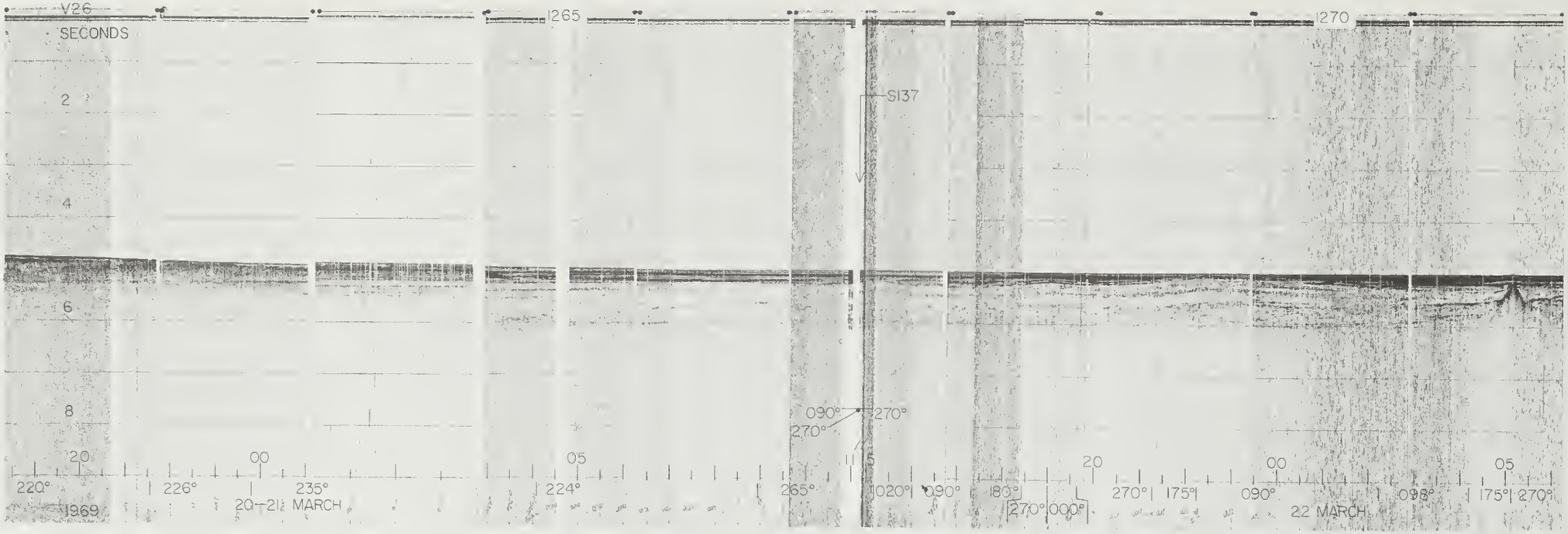

1185
S124
R48
1190
05
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15
18 // 23
00
04 // 05 // 06
090° 180°
9 MARCH
132° 270°
007° 090° 180°
270°
180° 090°
000°
008°
000°
090° 180°
10 MARCH
165°
270°
1210
S126 S127
S128
V26 1215
FATHOMS
800
1600
2400
3200
164° 090°
213° 280°
// 20
00
05
10
15
18 // 22
00
175°
270° 12 MARCH
045° 310° 320° 110°
045°
330°
280°
297°
13 MARCH
1969
14 MARCH

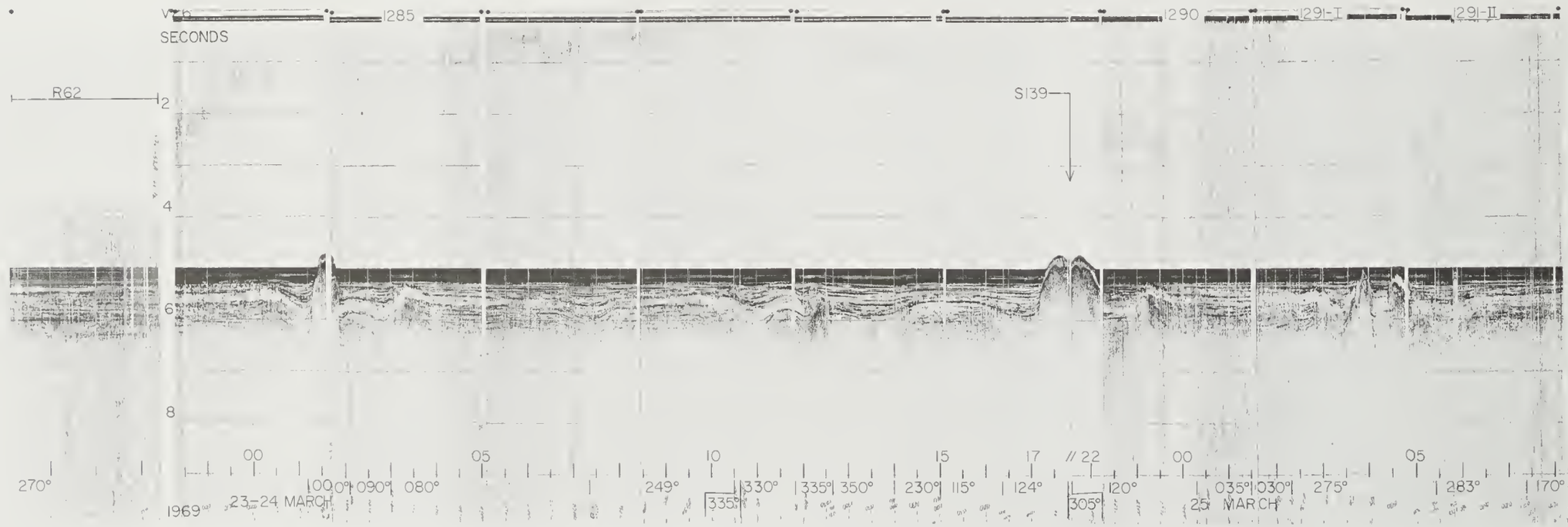

1220
S129
R52
R53
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15 MARCH

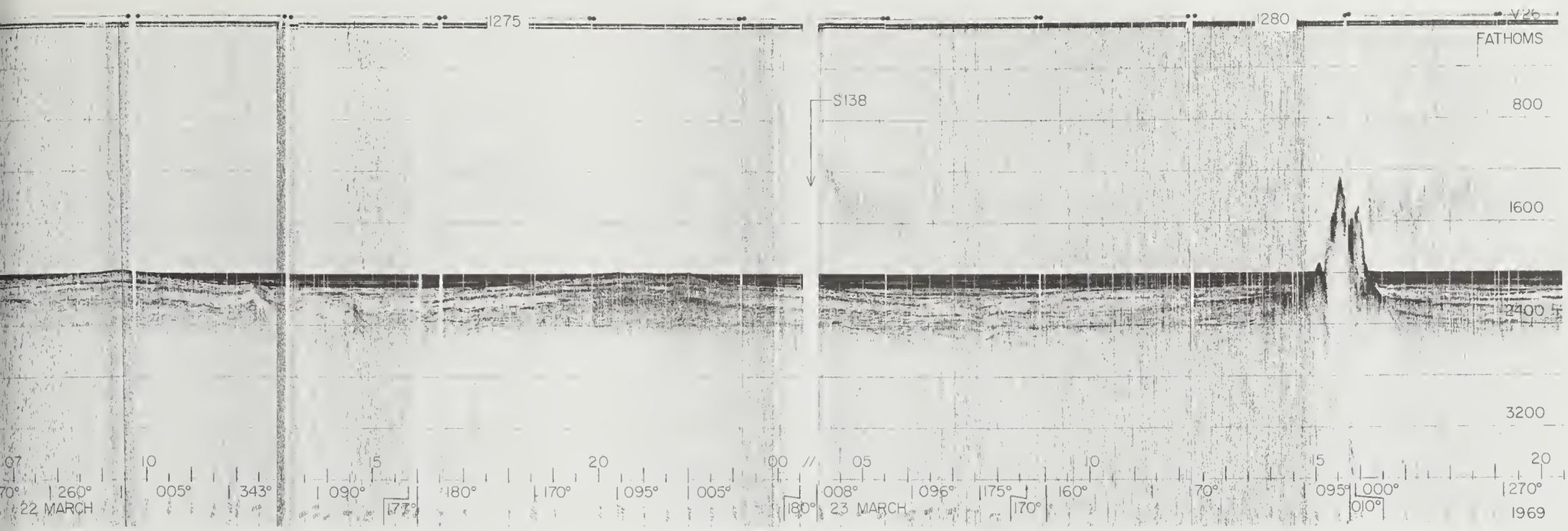

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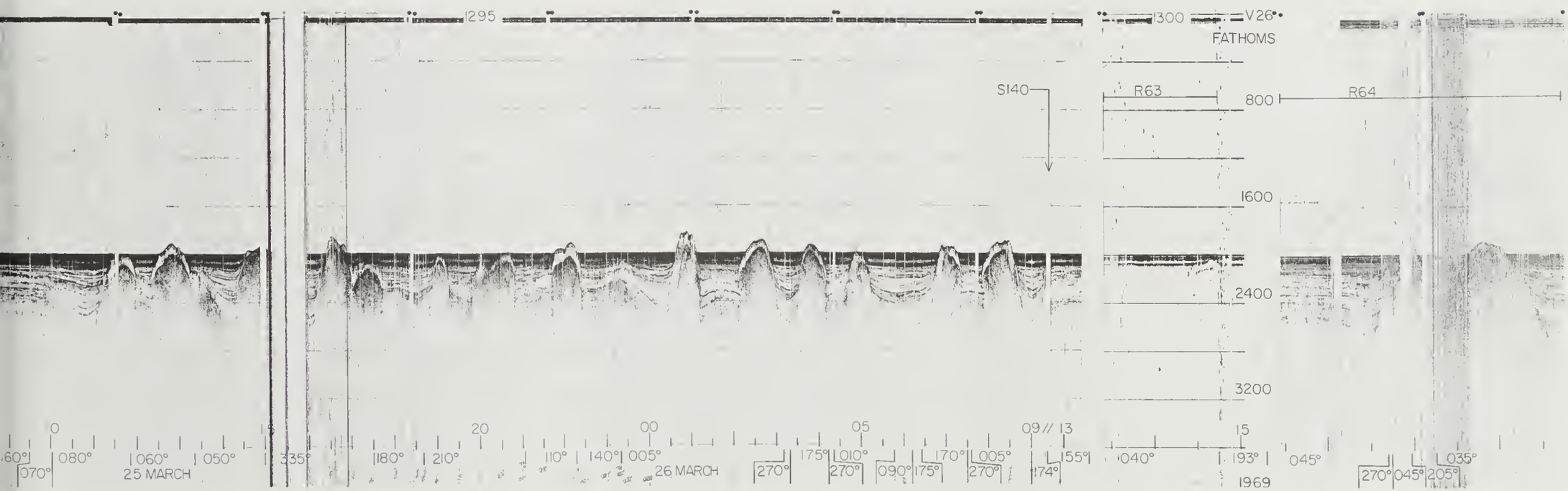

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305°
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15-16 MARCH
17 MARCH
1969

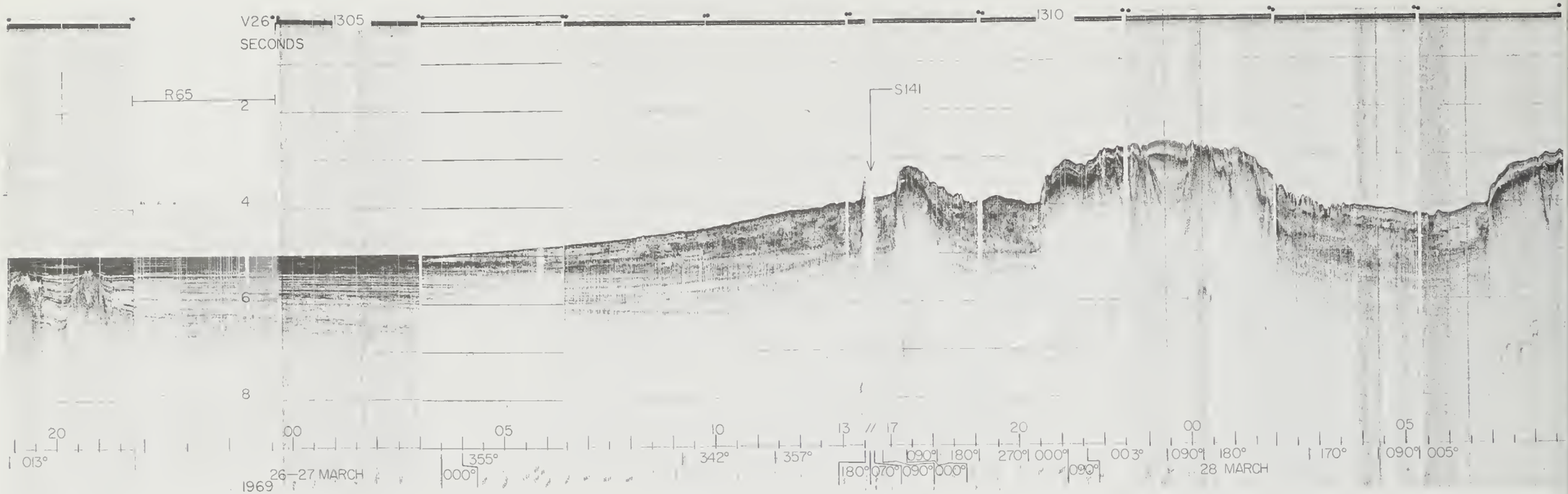

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R59
R60
R61
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19 MARCH
20 MARCH
1969

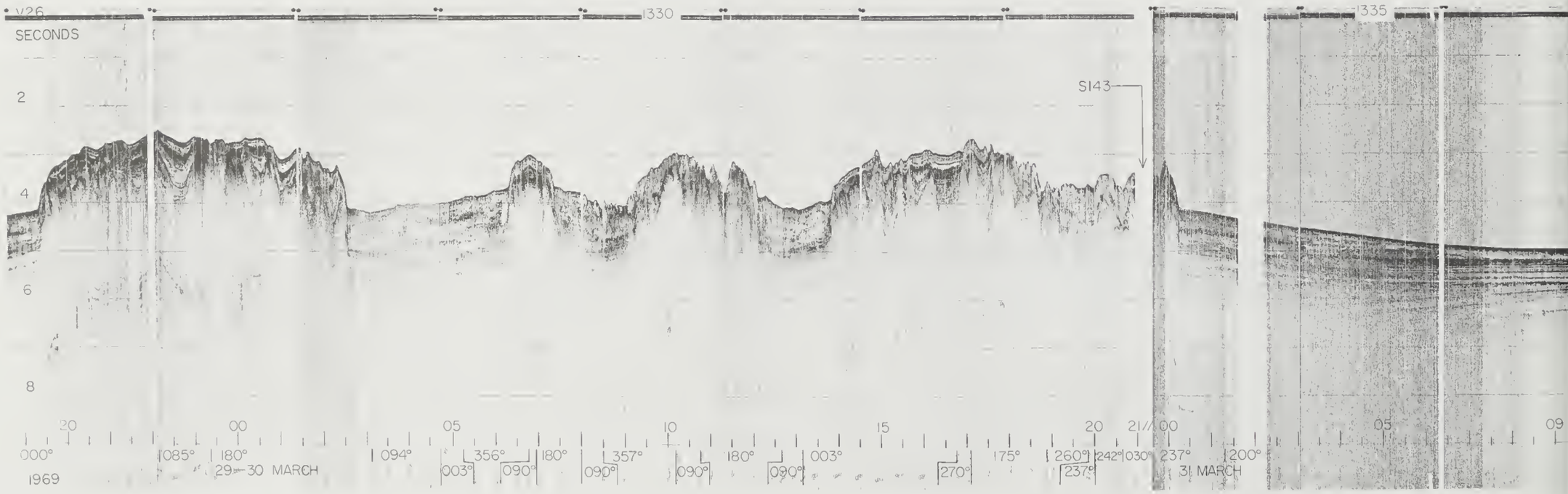

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05
220°
226°
235°
224°
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1969
20–21 MARCH
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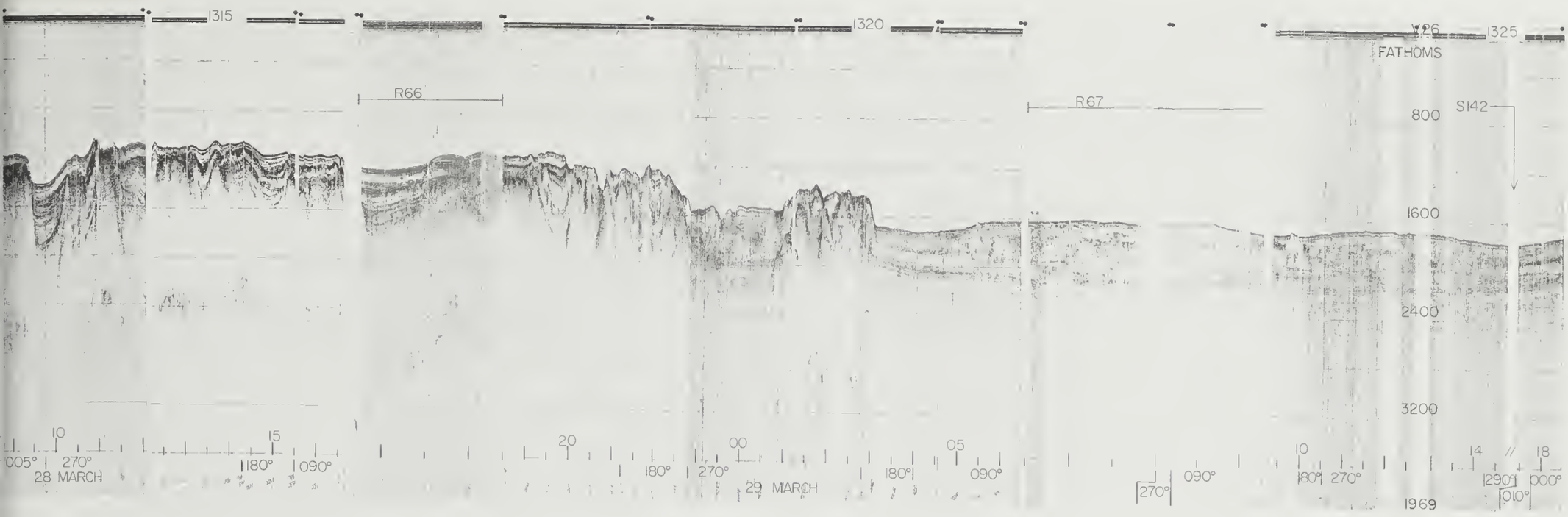

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22
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05
270°
100°
090°
080°
249°
330°
335°
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1969
23–24 MARCH
25 MARCH

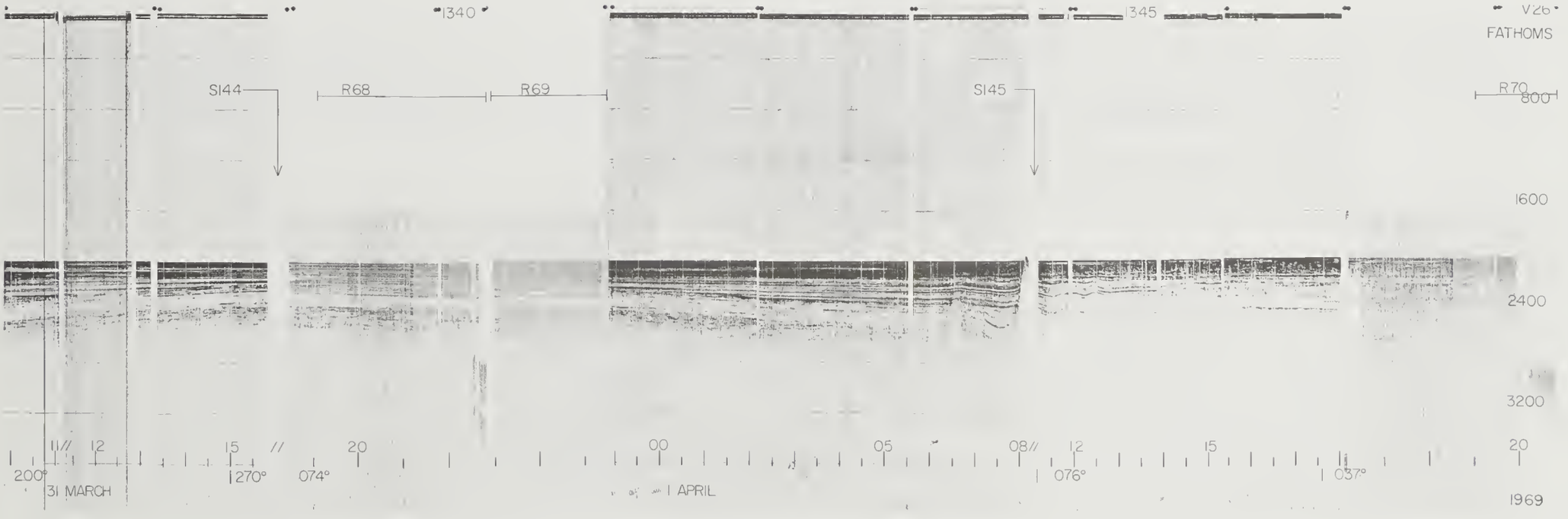

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005°
343°
090°
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22 MARCH
23 MARCH
1969

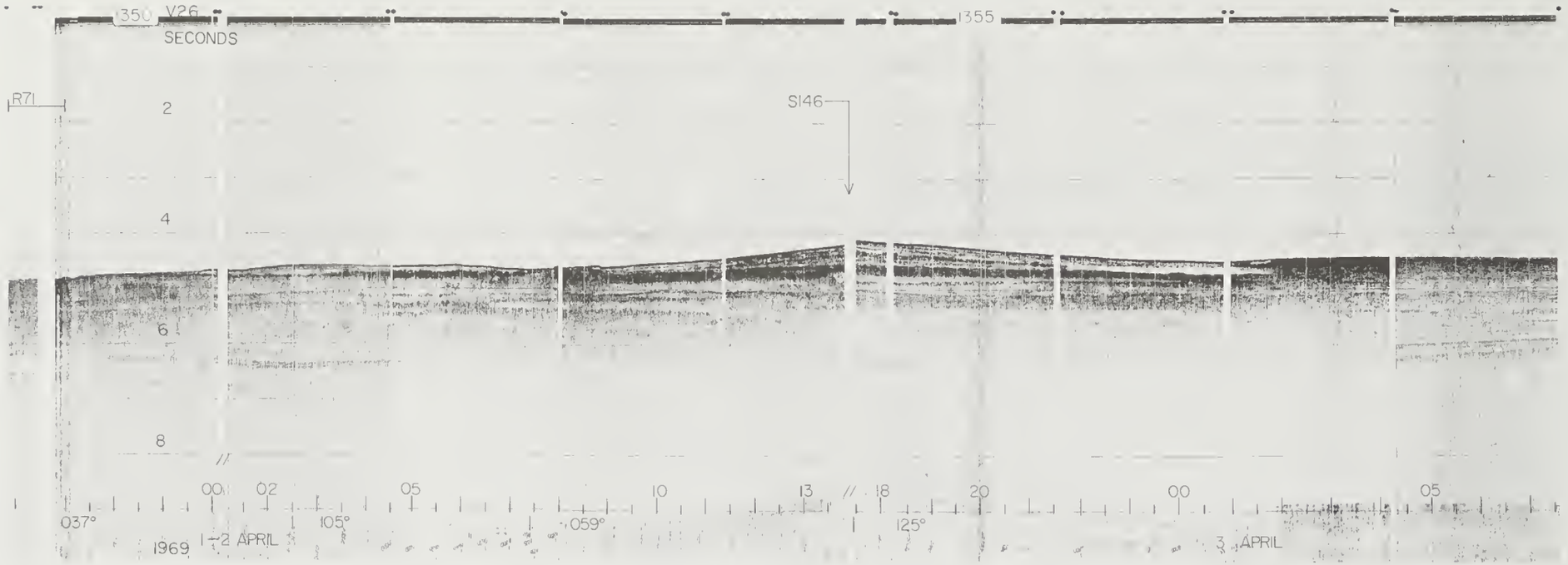

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210°
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010°
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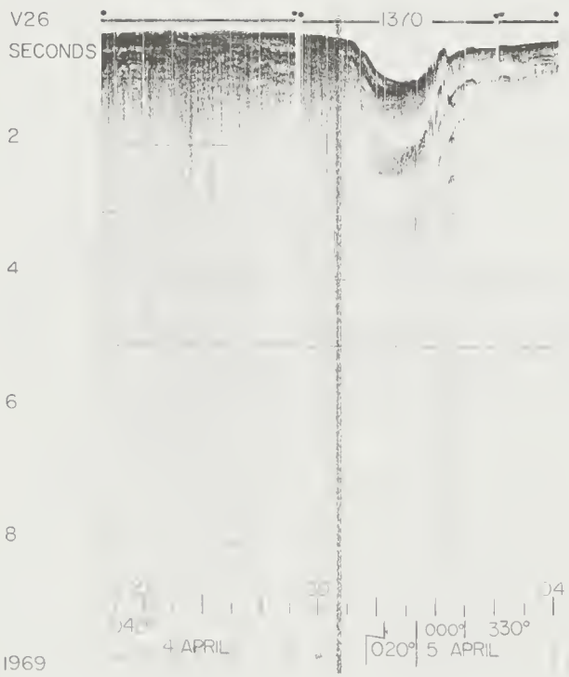

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013°
355°
000°
342°
357°
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170°
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26–27 MARCH
1969
28 MARCH

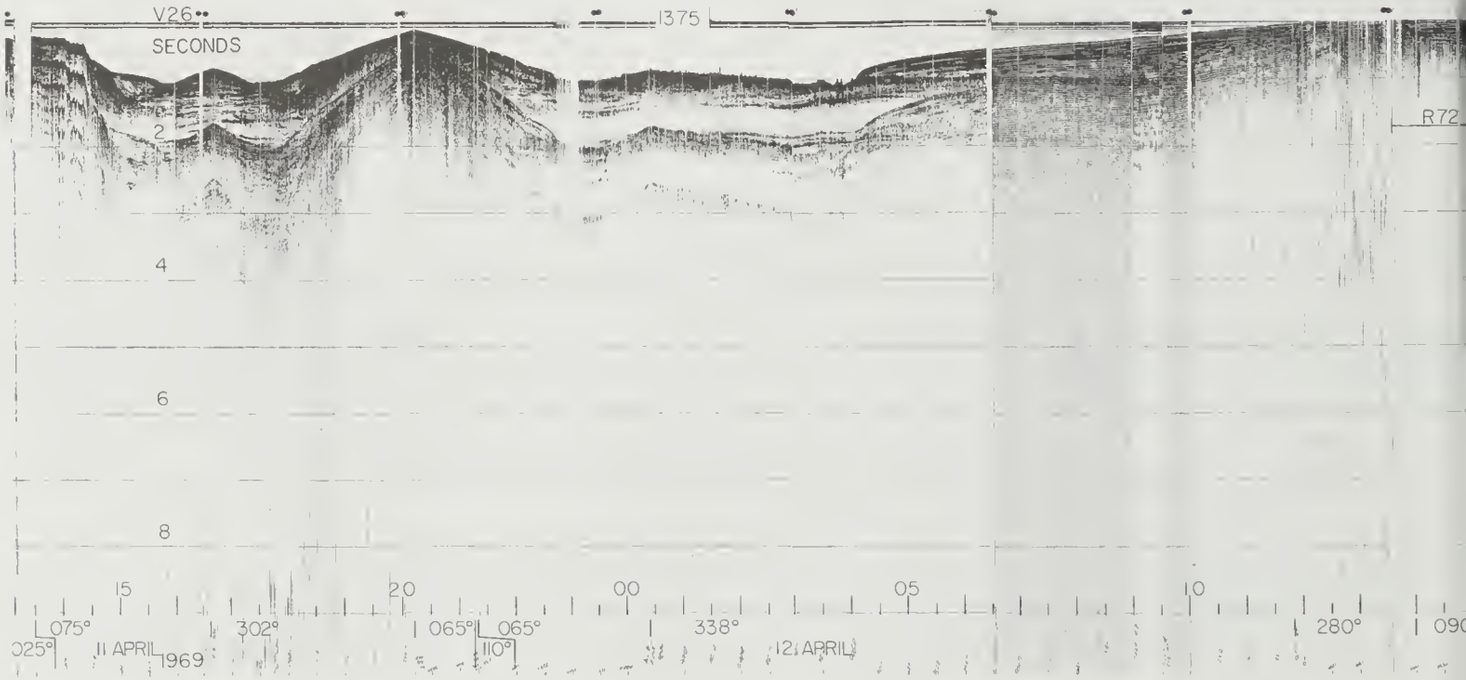

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094°
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29–30 MARCH
31 MARCH
1969

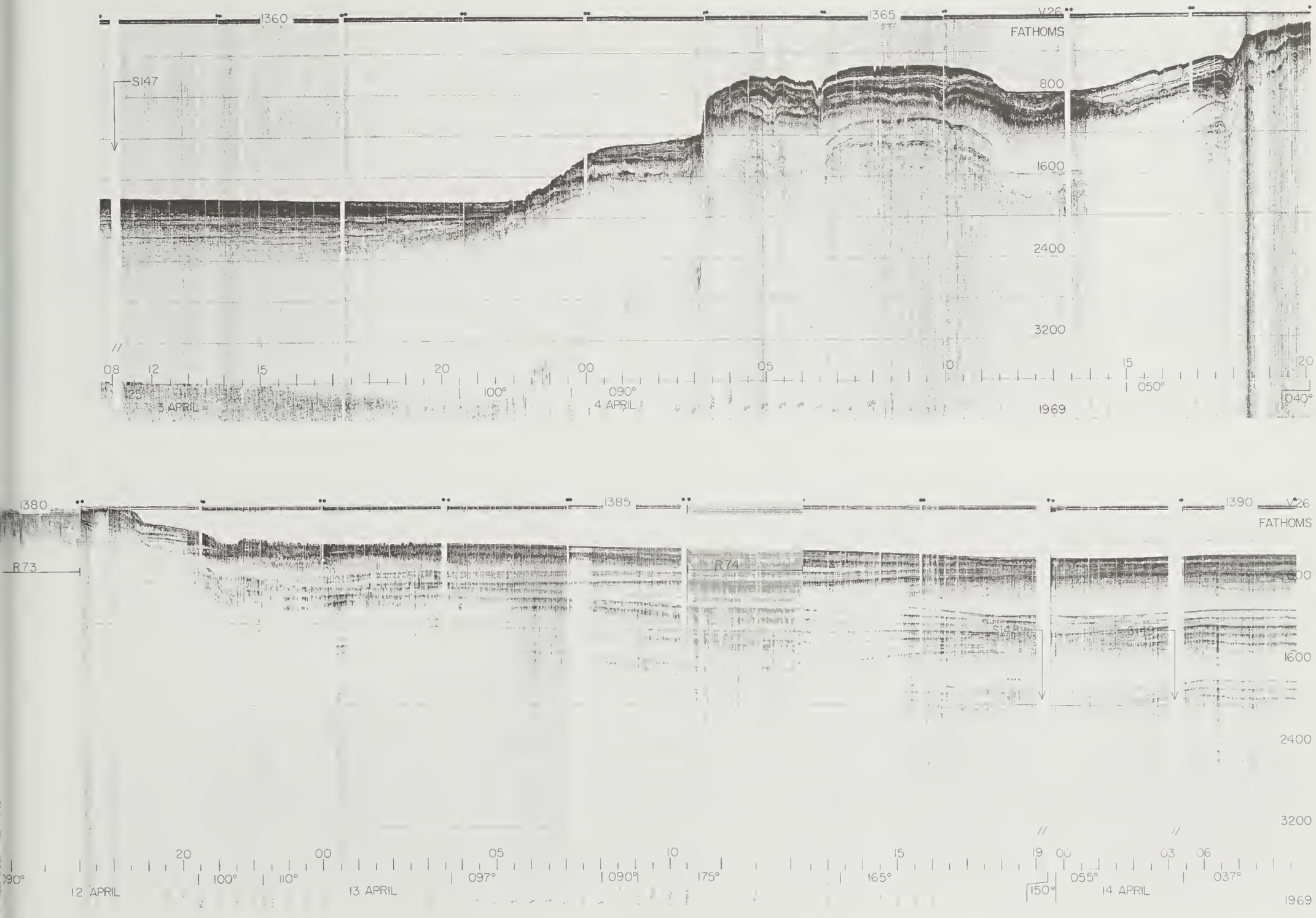

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10
14
18
005°
270°
180°
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1969

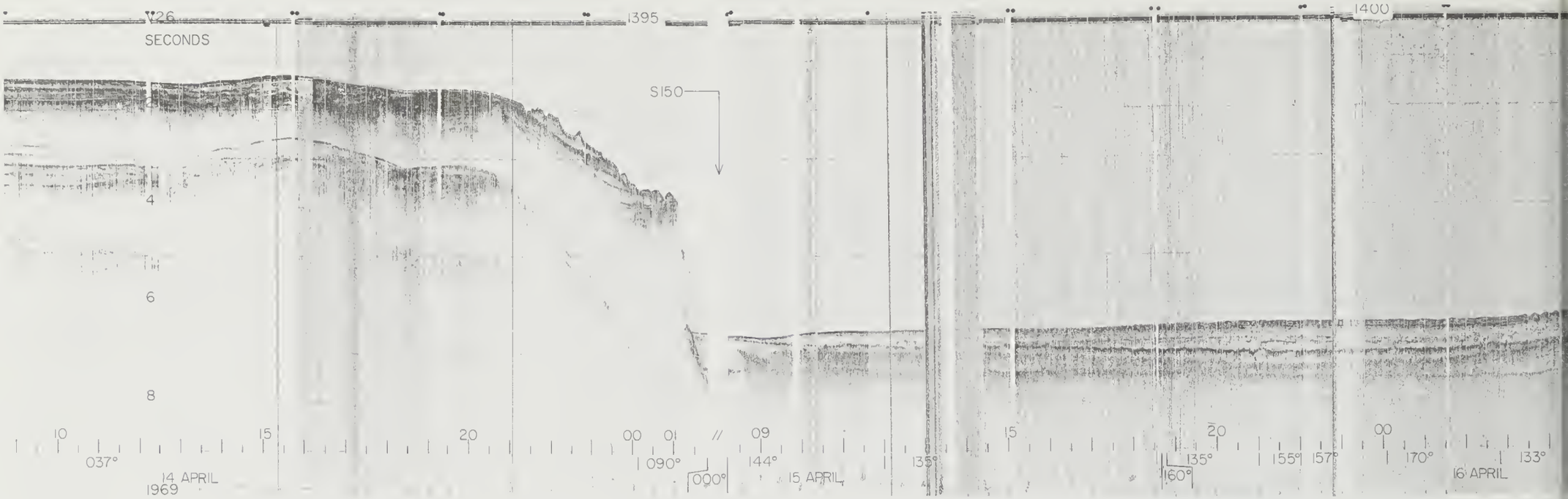

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076°
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1 APRIL
1969

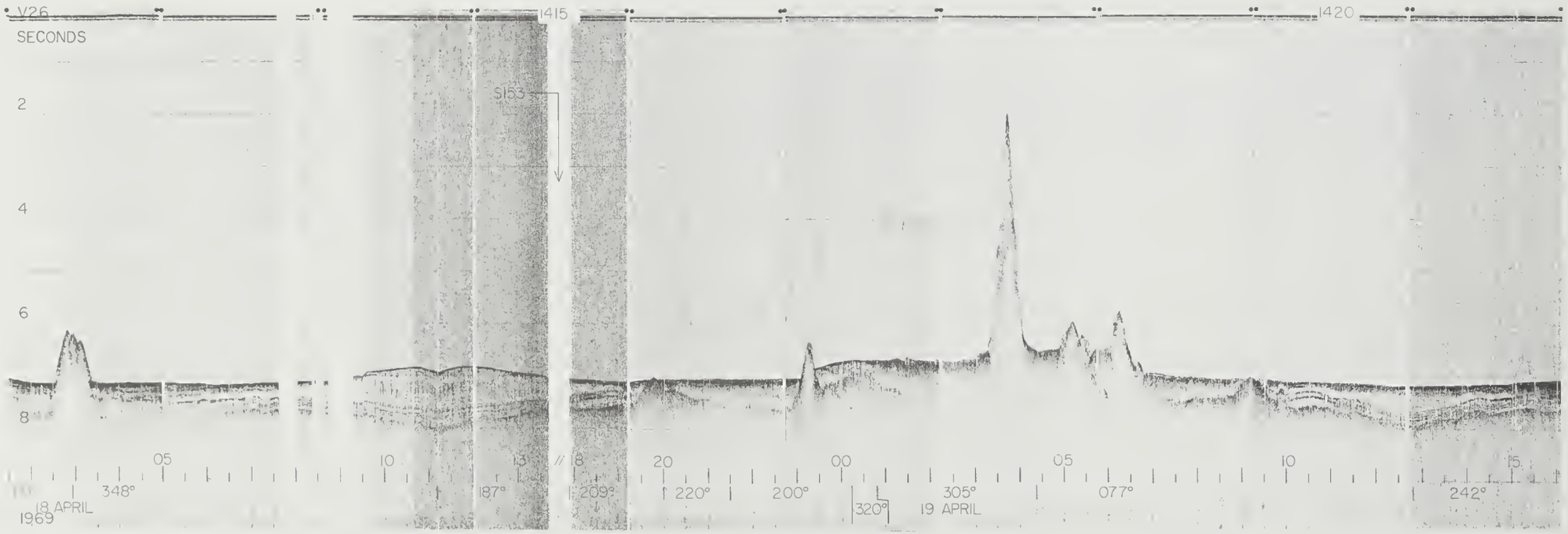

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059°
125°
1969
1-2 APRIL
3 APRIL

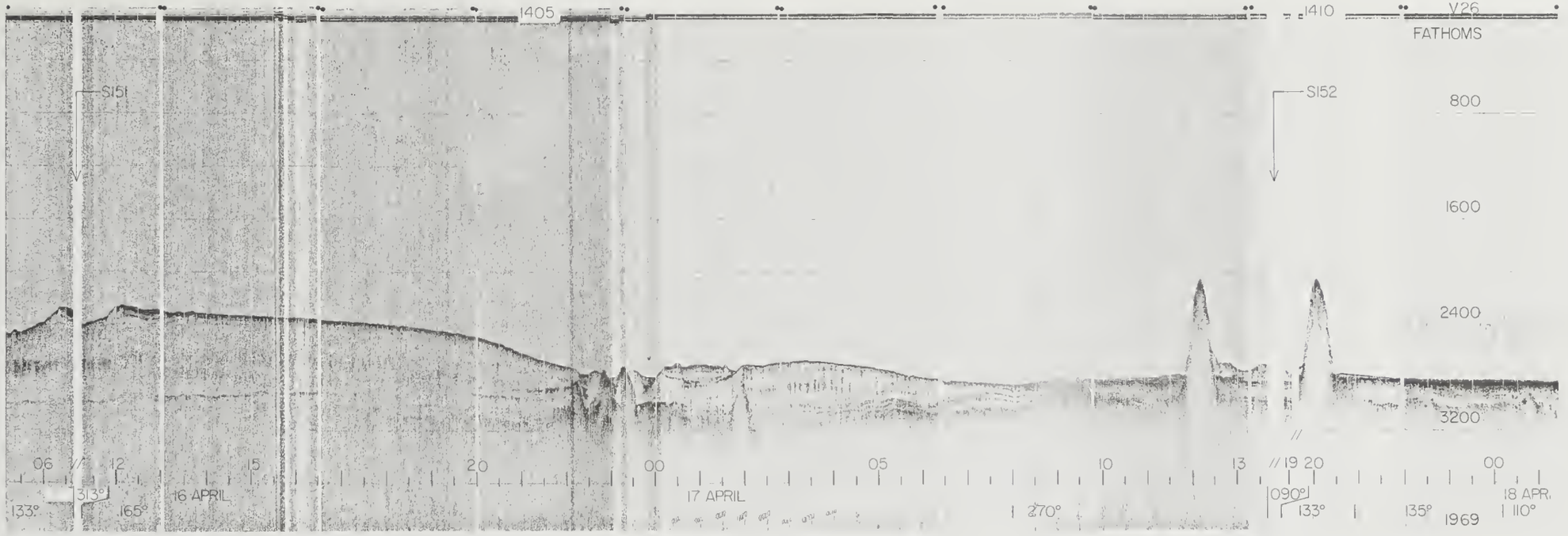

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SECONDS
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330°
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1969

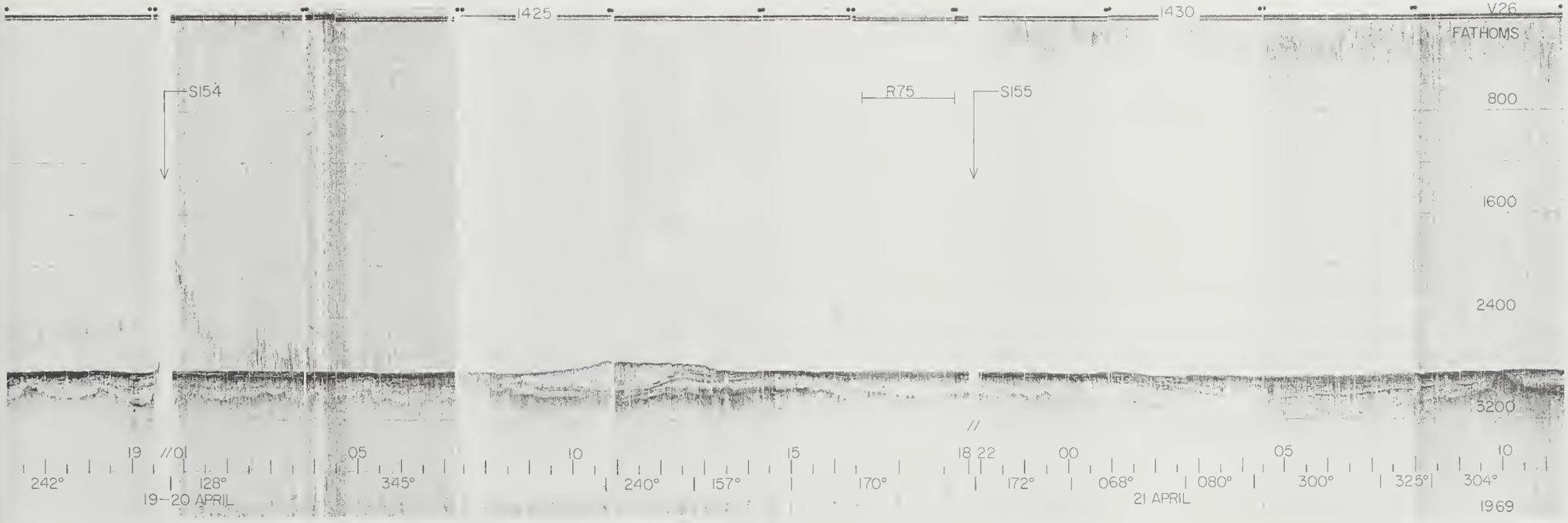

V26
SECONDS
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R72
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065°
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280°
025°
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11 APRIL 1969
12 APRIL

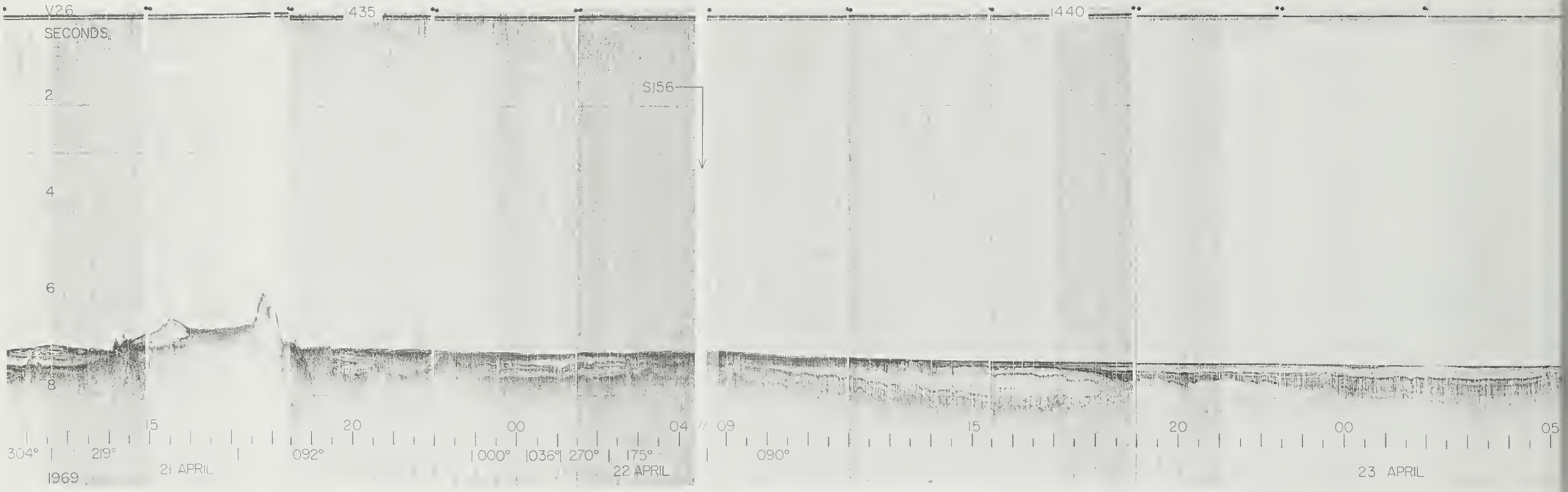

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1365
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FATHOMS
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3200
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20
00
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20
100°
090°
050°
040°
3 APRIL
4 APRIL
1969
1380
1385
1390
V26
FATHOMS
R73
R74
S148
1600
2400
3200
20
00
05
10
15
19
00
03
06
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037°
12 APRIL
13 APRIL
14 APRIL
1969

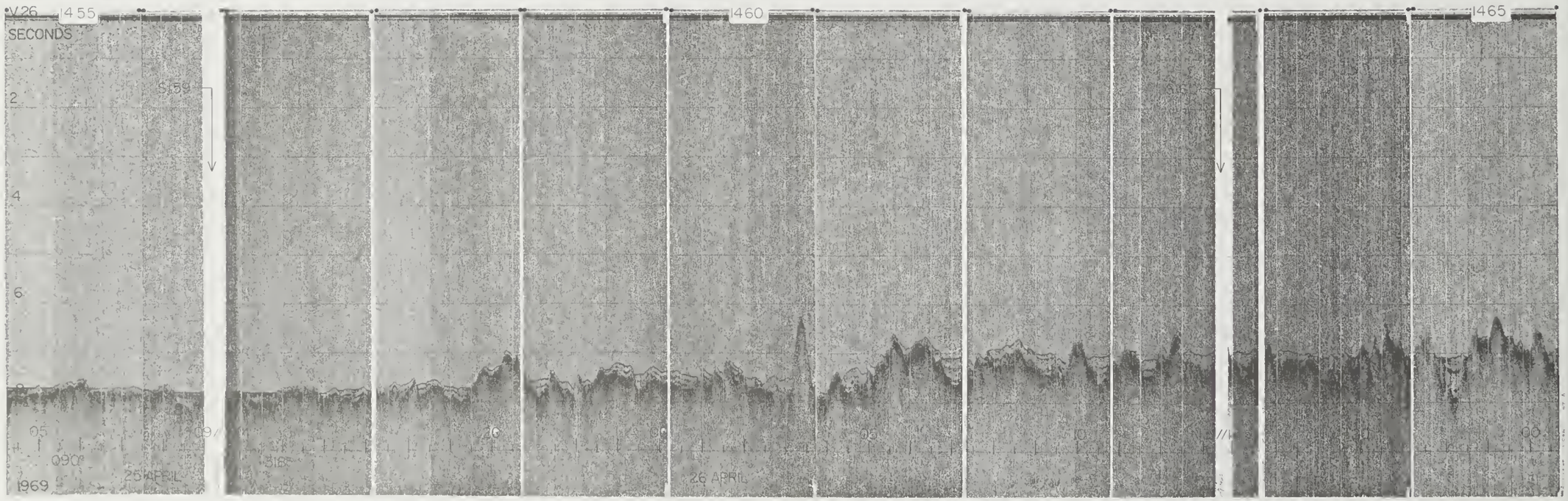

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133°
16 APRIL

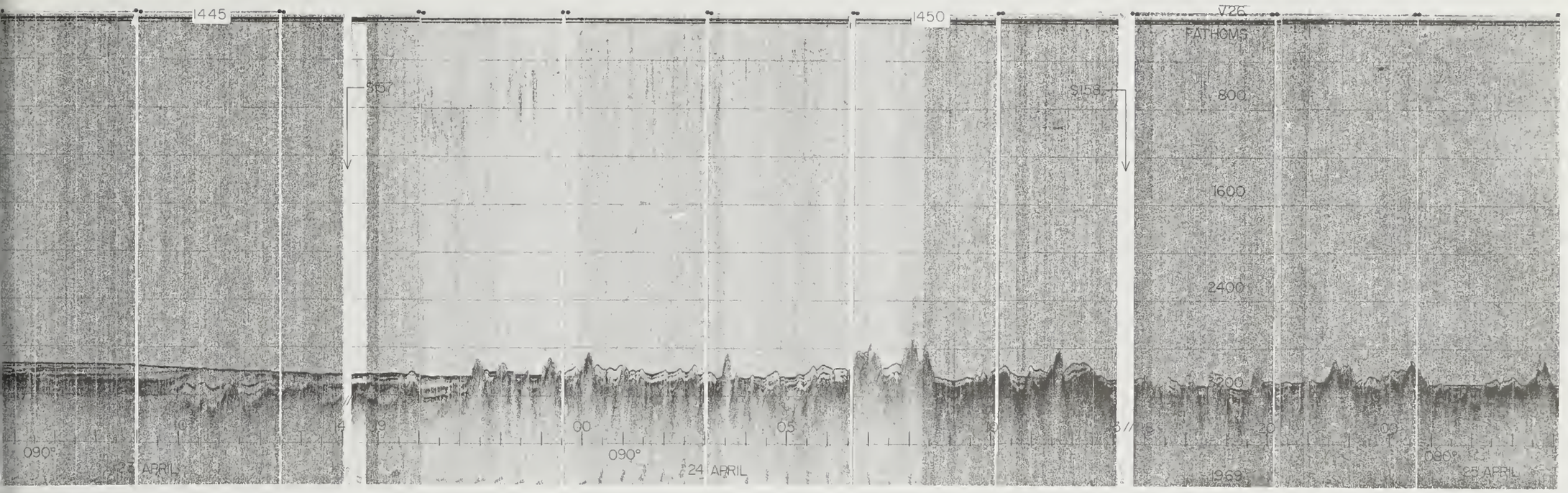

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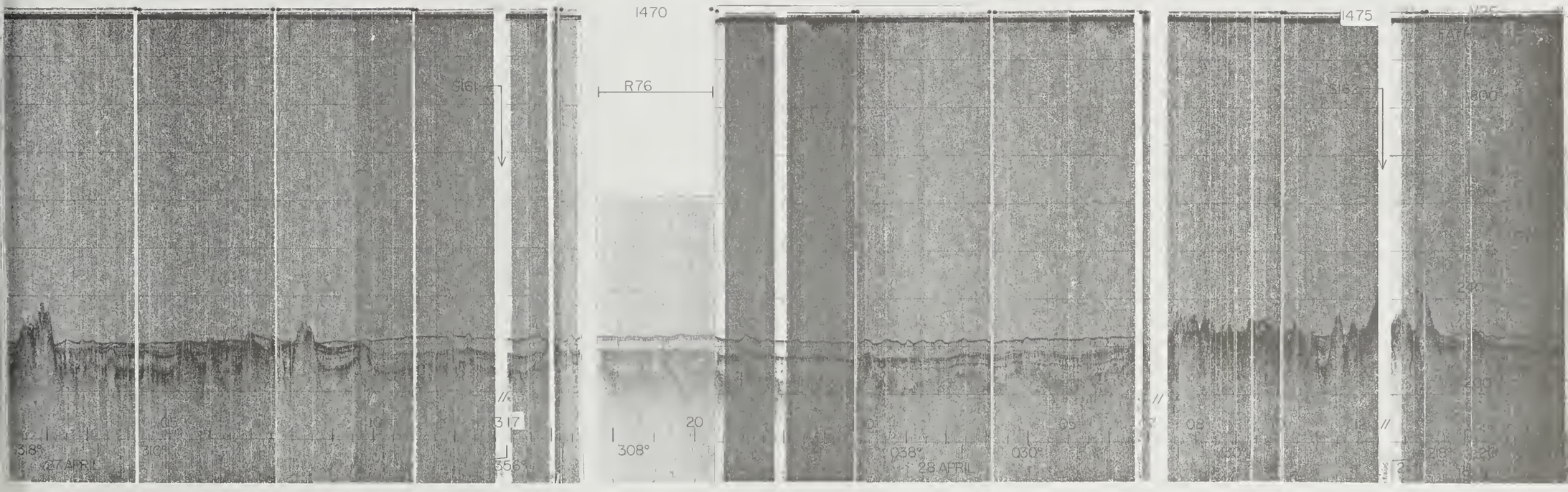

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S152
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2400
3200
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19
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165°
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18 APR.
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110°
1969

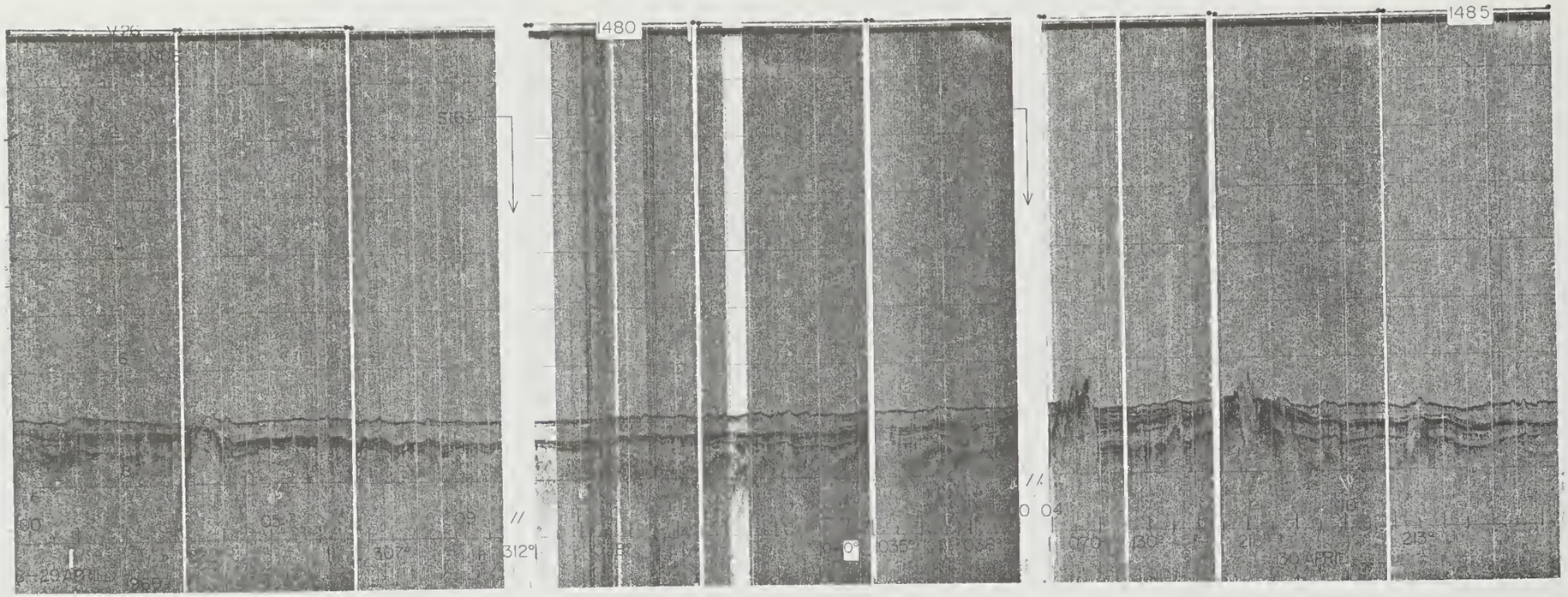

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R75
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19–20 APRIL
21 APRIL
1969

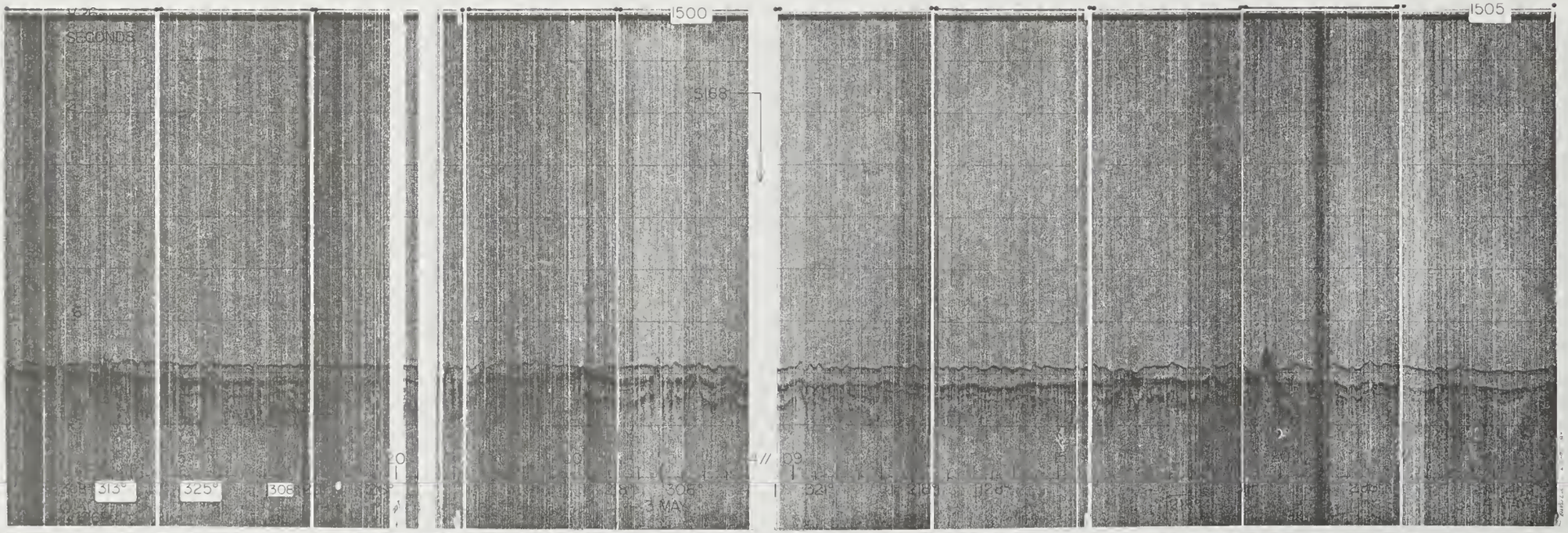

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22 APRIL
23 APRIL

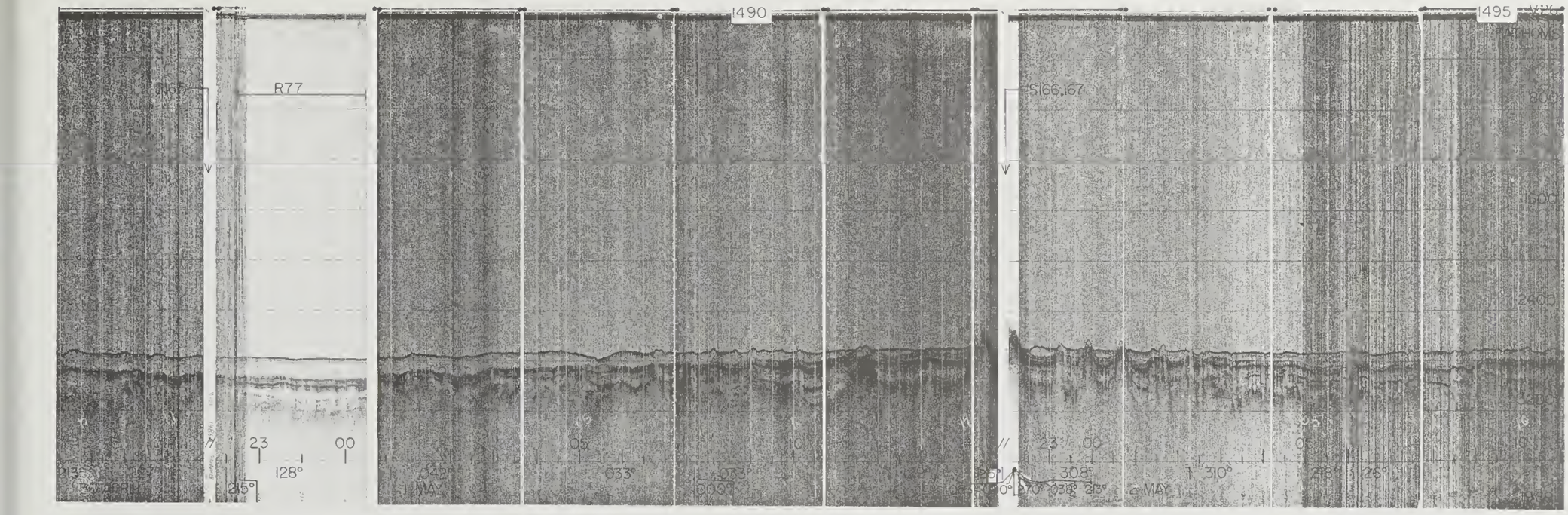

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26 APRIL

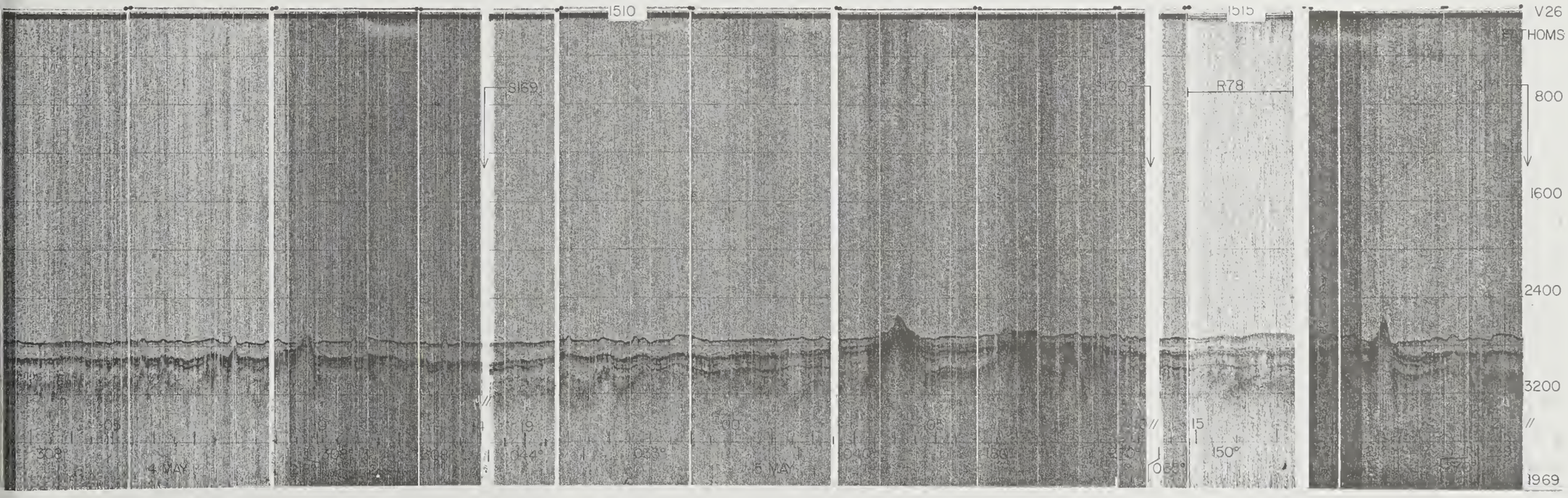

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1450
S157
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090°
25 APRIL

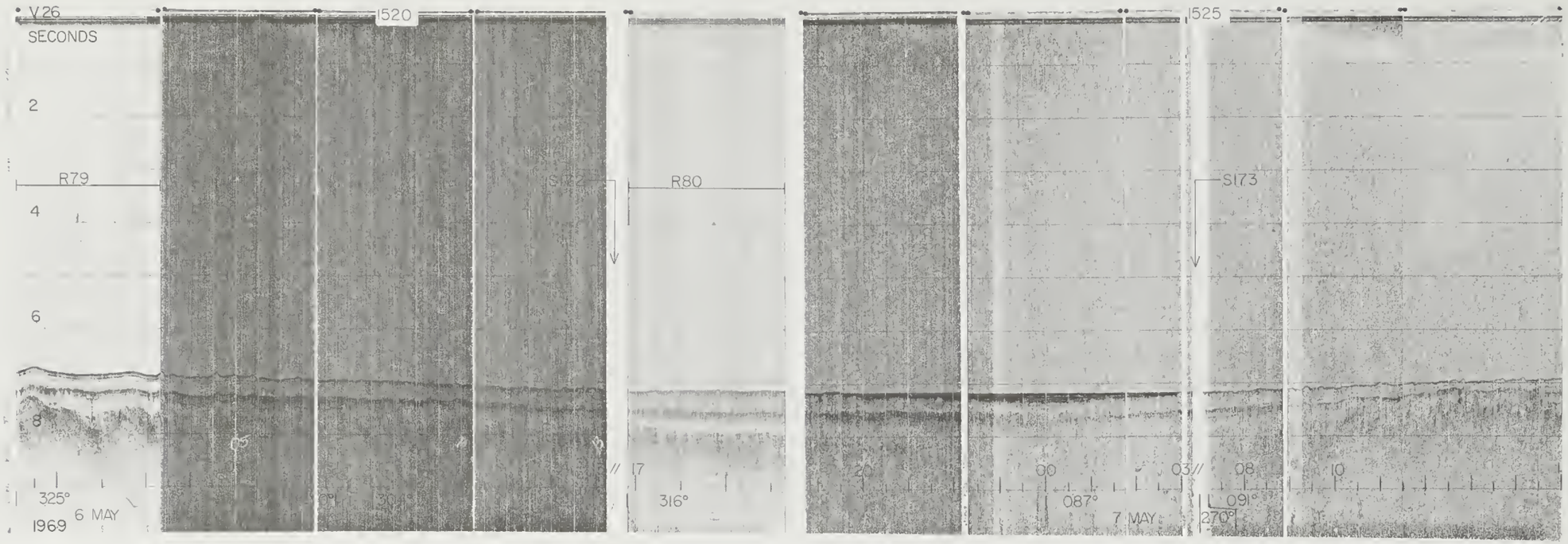

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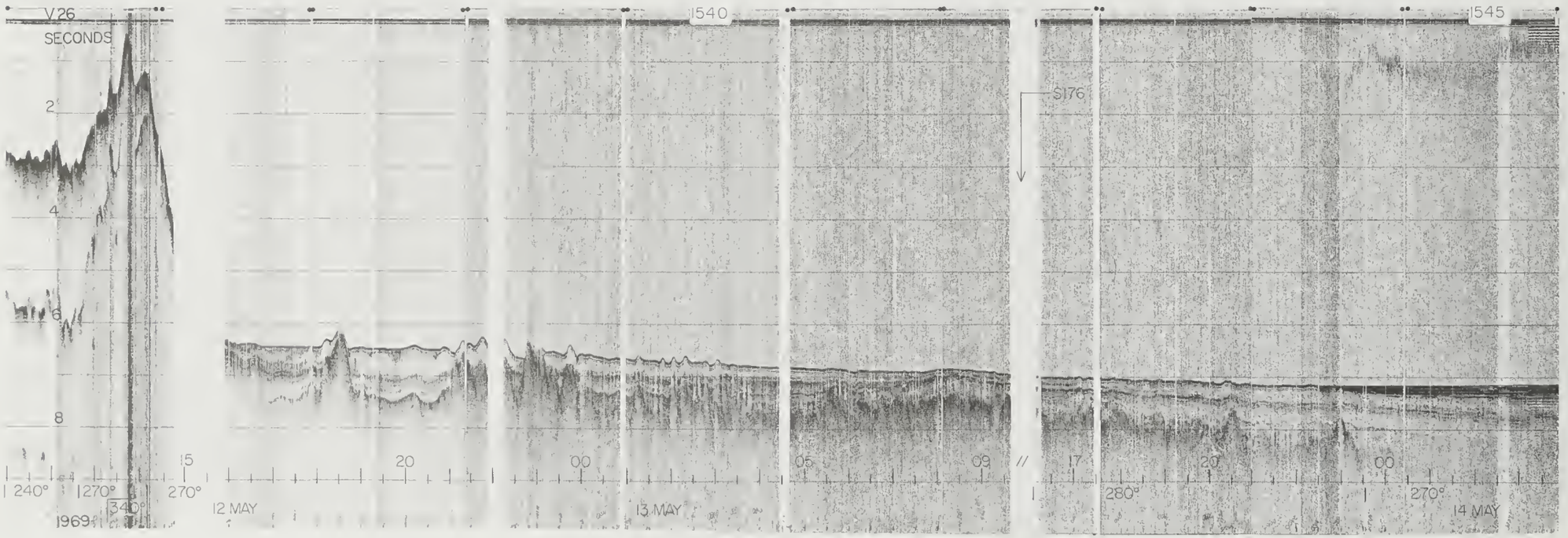

V-26
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213°
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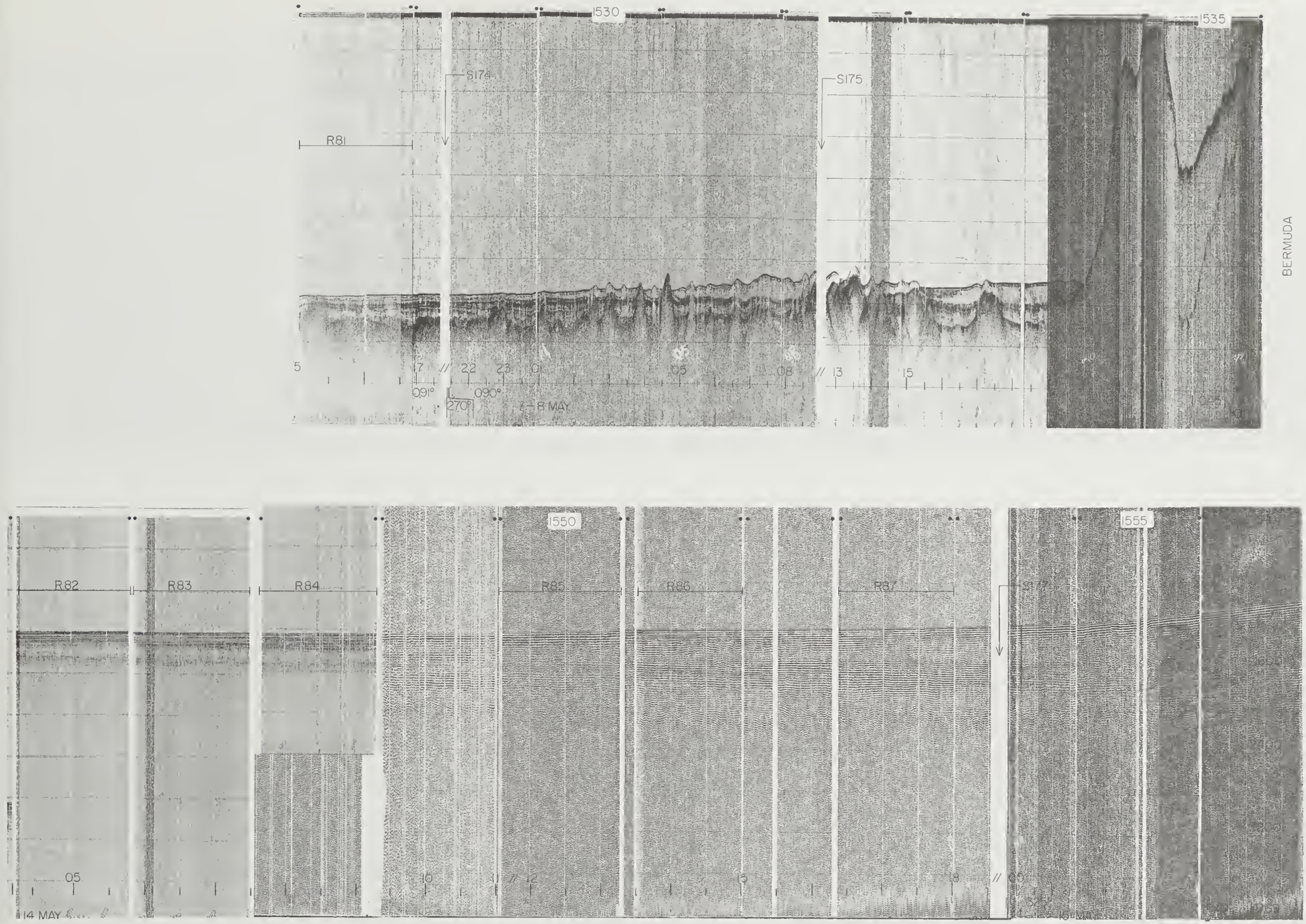

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1505
5168
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325°
308°
3 MAY

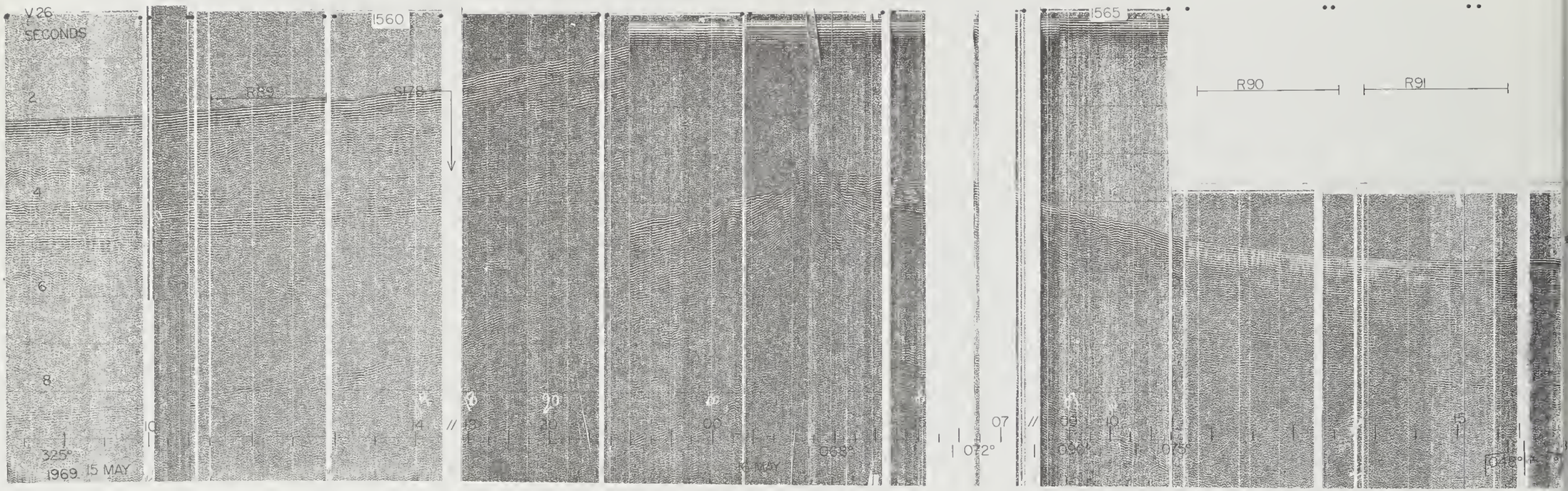

1490
1495
R77
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5 MAY
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800
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2400

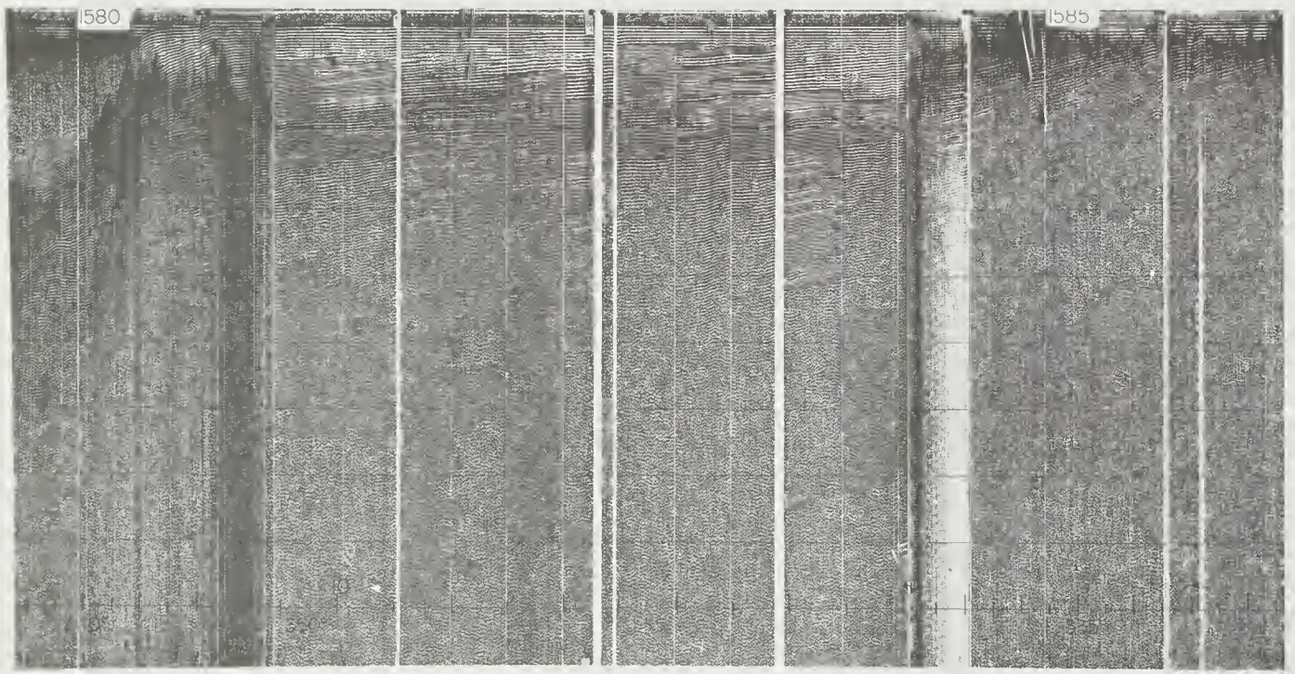

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3200
1969


V26
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R79
S172
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08
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7 MAY
091°
270°

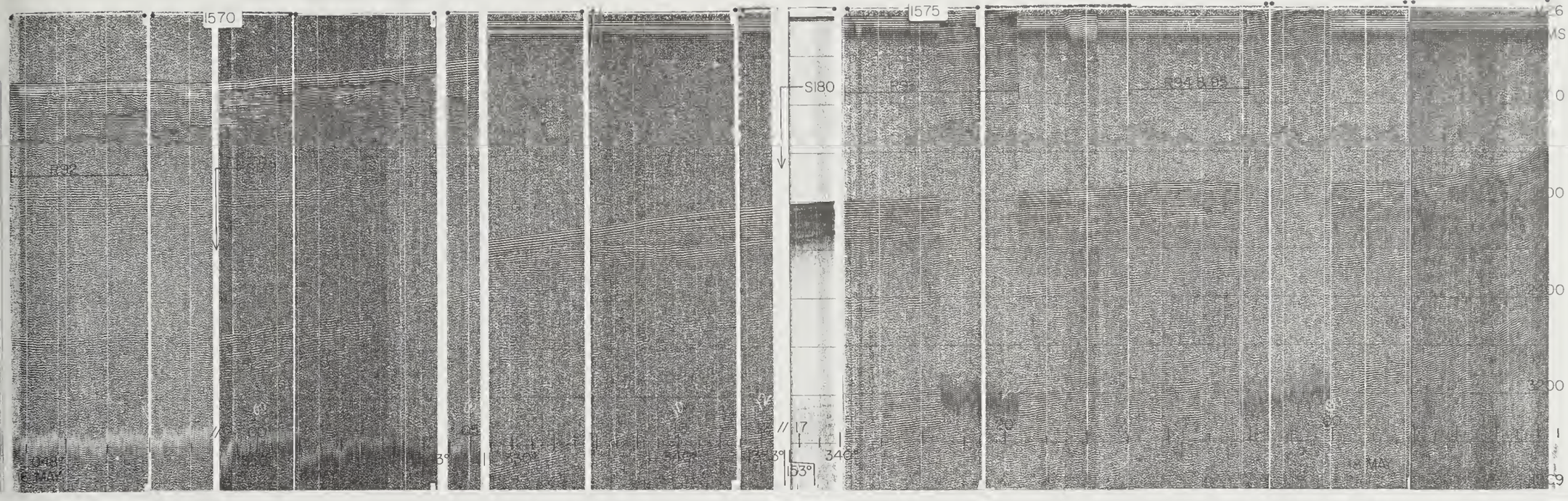

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13 MAY
17
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280°
270°
14 MAY


1530
1535
S174
S175
R81
R82
R83
R84
1550
R85
R86
R87
1555
S177
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090°
270°
8 MAY
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12
15
18
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14 MAY
BERMUDA


V 26
SECONDS
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1560
R89
S176
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R90
R91
325°
1969 15 MAY
15 MAY


1580
1585

NEW YORK


1570
S180
1575
R32
340°
153°

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North Atlantic
Navigation Chart

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Track charts for Lamont-Doherty Geological Observatory underway magnetic, gravity and depth data in the North Atlantic June 1961-January 1971 are given including the Norwegian Sea, Gulf of Mexico, Caribbean and Mediterranean Sea.

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LAMONT-DOHERTY SURVEY OF THE WORLD OCEAN

General Editor, Manik Talwani

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Underway Marine Geophysical Data in the North Atlantic June 1961 - January 1971

PART D: BATHYMETRIC, GEOMAGNETIC, AND GRAVITY PROFILES

VEMA 27 Legs 01,02,03,04,05,06,07,08,09,12,13 and 14
VEMA 28 Legs 01,02,03,04,05,06,07 and 08
CONRAD 8 Legs 01,07 and 12
CONRAD 9 Legs 01,02,03,B11,12 and 13
CONRAD 10 Legs 01,03 and 12
CONRAD 11 Legs 01 and 12
CONRAD 12 Leg 01
CONRAD 13 Legs 09,10,11 and 12

by

Manik Talwani, Dennis Hayes, Walter Pitman, and Thomas Aitken

April 1974

Technical Report No. 9-CU-9-74
ONR Contract N00014-67-A-0108-0004

and

Technical Report No. 3-CU-3-74
National Science Foundation Grant GA 27281

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General Editor, Manik Talwani

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INTRODUCTION

This six-part report describes the underway marine geophysical data acquired by the Lamont-Doherty Geological Observatory during the period 1961-1971 in the North Atlantic aboard the Research Vessels VEMA and ROBERT D. CONRAD. The development of the seismic reflection profiler, the surface ship gravimeter, and the proton precision magnetometer gave an enormous impetus to marine geophysical work. Under the vigorous leadership of Maurice Ewing, the past director of this observatory, these instruments, together with the precision depth recorder, were used nearly continuously on VEMA since 1961 and on ROBERT D. CONRAD since 1963 to help provide the framework for an understanding of the geophysics of the world oceans. The study of the data that were acquired played a basic role in the development of the theories of sea floor spreading, of plate tectonics, and of sediment accumulation and transport which have revolutionized geological thinking.

This report presents the data obtained along about 350,000 n. miles of track. Copies of the seismic reflection profiler records, digitized gravity values, total magnetic intensity values, and soundings are available from the Marine Geology and Geophysics Group, Environmental Data Service - NGSDC, Washington, D. C. 20235.

ACKNOWLEDGMENTS

In addition to contracts Nonr 266(48), Nonr 266(65), Nonr 266(79), NObsr 85077, N00014-67-A-0108-0004, N00024-67-C-1186 and N00024-69-C-1184 with the Office of Naval Research,

the acquisition of data described in this report was supported by grants GA 444, GA 550, GA 580, GA 728, GA 774, GA 1299, GA 1415, GA 1434, GA 1615, GA 10728, GA 17644, GA 17761, GA 19030, GA 27281, GP 4896, GP 5392 and GP 5536 with the National Science Foundation, and grant SSF-8 with the New York State Science and Technology Foundation.

CRUISE INDEX

VEMA

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
1712	Buenos Aires, Argentina	26 Jun 61	Dakar, Senegal	18 Jul 61	4247.1	M. Talwani
1713	Dakar, Senegal	19 Jul 61	Halifax, Nova Scotia	06 Aug 61	3168.4	M. Talwani
1714*	Halifax, Nova Scotia	11 Aug 61	Halifax, Nova Scotia	15 Aug 61	0593.5	C. Drake
1715*	Halifax, Nova Scotia	18 Aug 61	Argentia, Newfoundland	25 Aug 61	1157.9	C. Drake
1716*	Argentia, Newfoundland	25 Aug 61	Halifax, Nova Scotia	17 Sep 61	3819.3	C. Drake
1717	Halifax, Nova Scotia	23 Sep 61	New York, New York	29 Sep 61	1090.3	J. Worzel
1801*	New York, New York	01 Dec 61	St. George, Bermuda	05 Dec 61	0800.8	J. Ewing
1802	St. George, Bermuda	06 Dec 61	San Juan, Puerto Rico	24 Dec 61	3604.3	J. Ewing
1803	San Juan, Puerto Rico	27 Dec 61	Recife, Brazil	19 Jan 62	4018.7	M. Langseth
1817	Cristobal, Panama C.Z.	28 Oct 62	Nassau, Bahamas	11 Nov 62	3057.3	C. Drake
1818	Nassau, Bahamas	14 Nov 62	St. George, Bermuda	25 Nov 62	1963.5	C. Drake
1819	St. George, Bermuda	25 Nov 62	New York, New York	07 Dec 62	2213.6	C. Drake
1901* **	New York, New York	21 Feb 63	St. George, Bermuda	26 Feb 63	0778.7	G. Bryan
1902*	St. George, Bermuda	28 Feb 63	St. Thomas, Virgin Is.	13 Mar 63	2136.1	G. Bryan
1903	St. Thomas, Virgin Is.	15 Mar 63	Cristobal, Panama C.Z.	25 Mar 63	1965.4	M. Talwani
1912	Cape Town, S. Africa	20 Sep 63	Abidjan, Ivory Coast	24 Oct 63	5333.0	M. Ewing
1913	Abidjan, Ivory Coast	15 Nov 63	New York, New York	11 Dec 63	5226.9	C. Drake
2001*	New York, New York	13 Feb 64	San Juan, Puerto Rico	24 Feb 63	2324.8	C. Windisch
2002	San Juan, Puerto Rico	02 Mar 64	Cristobal, Panama C.Z.	16 Mar 64	2960.0	M. Talwani
2012	Recife, Brazil	11 Nov 64	St. George, Bermuda	03 Dec 64	4126.3	C. Drake
2013	St. George, Bermuda	05 Dec 64	New York, New York	10 Dec 64	0841.2	C. Drake
2101	New York, New York	11 Feb 65	Miami, Florida	25 Feb 65	2303.2	J. Worzel
2103	Miami, Florida	28 Feb 65	Cristobal, Panama C.Z.	12 Mar 65	2290.3	J. Worzel
2114	Cristobal, Panama C.Z.	14 Nov 65	New York, New York	10 Dec 65	5005.7	J. Ewing
2201	New York, New York	10 Jan 66	San Juan, Puerto Rico	27 Jan 66	3044.3	C. Windisch
2202	San Juan, Puerto Rico	30 Jan 66	Recife, Brazil	16 Feb 66	3600.4	M. Talwani
2206	Cape Town, S. Africa	26 Apr 66	Dakar, Senegal	23 May 66	4922.1	M. Ewing
2207	Dakar, Senegal	25 May 66	New York, New York	13 Jun 66	3865.7	T. Aitken
2301	New York, New York	27 Jul 66	Halifax, Nova Scotia	05 Aug 66	1711.2	C. Windisch
2302	Halifax, Nova Scotia	08 Aug 66	Reykjavik, Iceland	25 Aug 66	3520.5	C. Windisch
2303	Reykjavik, Iceland	27 Aug 66	Reykjavik, Iceland	15 Sep 66	4212.0	M. Talwani
2304	Reykjavik, Iceland	17 Sep 66	Glasgow, Scotland	11 Oct 66	5180.7	C. Windisch
2305	Glasgow, Scotland	15 Oct 66	Las Palmas, Canary Is.	03 Nov 66	3963.5	T. Aitken
2306	Las Palmas, Canary Is.	06 Nov 66	St. George, Bermuda	05 Dec 66	5711.7	J. Ewing
2307	St. George, Bermuda	08 Dec 66	New York, New York	15 Dec 66	1326.9	J. Ewing
2401	New York, New York	16 Jan 67	Miami, Florida	30 Jan 67	2717.4	J. Worzel
2402	Miami, Florida	31 Jan 67	Cristobal, Panama C.Z.	19 Feb 67	3904.2	J. Worzel
2413	Rio De Janeiro, Brazil	17 Nov 67	Miami, Florida	15 Dec 67	5664.9	R. Gerard
2501	Miami, Florida	05 Jan 68	Bridgetown, Barbados	05 Feb 68	5569.6	M. Langseth

* No Gravity
** No Magnetics

CRUISE INDEX (Continued)

VEMA (Continued)

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
2502	Bridgetown, Barbados	08 Feb 68	Paramaribo, Surinam	08 Mar 68	5197.9	D. Hayes
2503	Paramaribo, Surinam	11 Mar 68	New York, New York	02 Apr 68	3963.6	W. Pitman
2504	New York, New York	05 Apr 68	New York, New York	10 Apr 68	0977.5	S. Eittreim
2601*	New York, New York	24 Jul 68	St. George, Bermuda	16 Aug 68	4747.3	D. Epp
2602*	St. George, Bermuda	24 Aug 68	St. George, Bermuda	21 Sep 68	5559.3	T. Aitken
2603*	St. George, Bermuda	26 Sep 68	Dakar, Senegal	21 Oct 68	4799.6	T. Aitken
2604	Dakar, Senegal	26 Oct 68	Rio De Janeiro, Brazil	25 Nov 68	6237.3	M. Talwani
2607	Recife, Brazil	03 Feb 69	San Juan, Puerto Rico	28 Feb 69	5285.1	D. Hayes
2608	San Juan, Puerto Rico	05 Mar 69	Miami, Florida	05 Apr 69	5914.1	J. Worzel
2609	Miami, Florida	11 Apr 69	St. George, Bermuda	09 May 69	5209.6	T. Aitken
2610	St. George, Bermuda	12 May 69	Staten Island, N.Y.	18 May 69	1085.8	J. Ewing
2701	New York, New York	29 May 69	Halifax, Nova Scotia	15 Jun 69	2923.1	T. Aitken
2702	Halifax, Nova Scotia	20 Jun 69	Reykjavik, Iceland	16 Jul 69	4503.2	P. Rabinowitz
2703	Reykjavik, Iceland	Đ Jul 69	Tromsø, Norway	06 Aug 69	3355.1	P. Rabinowitz
2704	Tromsø, Norway	10 Aug 69	Bergen, Norway	08 Sep 69	5436.0	M. Talwani
2705	Bergen, Norway	12 Sep 69	Bergen, Norway	19 Sep 69	1440.1	M. Talwani
2706	Bergen, Norway	20 Sep 69	Brest, France	16 Oct 69	4397.9	H. Poppe
2707	Brest, France	19 Oct 69	Lisbon, Portugal	18 Nov 69	5146.2	J. Worzel
2708	Lisbon, Portugal	21 Nov 69	Funchal, Madeira	02 Dec 69	1825.0	P. Fox
2709	Funchal, Madeira	03 Dec 69	Recife, Brazil	30 Dec 69	5180.3	J. Bonnin
2712**	Cape Town, S. Africa	13 Feb 70	Abidjan, Ivory Coast	12 Mar 70	5172.2	G. Bryan
2713	Abidjan, Ivory Coast	15 Mar 70	St. Vincent, C.Verde Is.	10 Apr 70	5211.5	W. Pitman
2714	St. Vincent, C.Verde Is.	13 Apr 70	New York, New York	10 May 70	5573.4	W. Pitman
2801	New York, New York	25 Jun 70	Reykjavik, Iceland	16 Jul 70	3825.2	C. Windisch
2802	Reykjavik, Iceland	18 Jul 70	Aalesund, Norway	03 Aug 70	2985.6	C. Windisch
2803	Aalesund, Norway	06 Aug 70	Trondheim, Norway	04 Sep 70	5760.6	M. Talwani
2804	Trondheim, Norway	10 Sep 70	Cork, Ireland	08 Oct 70	5114.7	J. Jones
2805	Cork, Ireland	11 Oct 70	St. George, Bermuda	02 Nov 70	4240.0	K. Hunkins
2806	St. George, Bermuda	06 Nov 70	St. George, Bermuda	21 Nov 70	2406.4	S. Lieber
2807	St. George, Bermuda	24 Nov 70	Kingston, Jamaica	23 Dec 70	5227.8	V. Renard
2808	Kingston, Jamaica	28 Dec 70	Cristobal, Panama C.Z.	08 Jan 71	1596.9	T. Aitken & M. Trucha

* No Gravity
** No Magnetics

CRUISE INDEX (Continued)

ROBERT D. CONRAD

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
0801	San Juan, Puerto Rico	26 Nov 63	Cape Town, S. Africa	29 Dec 63	6569.7	R. Wall
0807	Cristobal, Panama C.Z.	21 Apr 64	San Juan, Puerto Rico	02 May 64	1974.1	J. Ewing
0812	San Juan, Puerto Rico	05 Aug 64	New York, New York	22 Aug 64	2964.9	C. Fray
0901	New York, New York	17 Oct 64	Galveston, Texas	10 Nov 64	4379.8	J. Heirtzler
0902	Galveston, Texas	12 Nov 64	Kingston, Jamaica	08 Dec 64	5348.1	M. Ewing
0903	Kingston, Jamaica	10 Dec 64	Colon, Panama C.Z.	16 Jan 65	6762.6	M. Talwani
9B11	Port Said, Egypt	14 Jul 65	Naples, Italy	26 Jul 65	2302.9	M. Ewing
0912	Naples, Italy	29 Jul 65	Plymouth, England	23 Aug 65	4749.8	M. Ewing
0913	Plymouth, England	27 Aug 65	New York, New York	21 Sep 65	5514.8	R. Houtz
1001	New York, New York	01 Dec 65	Kingston, Jamaica	24 Dec 65	4196.9	J. Heirtzler
1003	Kingston, Jamaica	28 Dec 65	Cristobal, Panama C.Z.	25 Jan 66	5707.1	R. Wall
1012	Cristobal, Panama C.Z.	13 Sep 66	New York, New York	15 Oct 66	6329.4	R. Leyden
1101*	New York, New York	01 Dec 66	Recife, Brazil	22 Dec 66	4257.3	D. Hayes
1112	Cristobal, Panama C.Z.	21 Oct 67	New York, New York	12 Nov 67	3543.1	S. Eittreim & W. Ryan
1201	New York, New York	03 Jan 68	Cristobal, Panama C.Z.	04 Feb 68	5534.6	C. Windisch
1309	Cristobal, Panama C.Z.	20 Jun 70	Cartagena, Colombia	23 Jun 70	0417.1	W. Ludwig
1310	Cartagena, Colombia	26 Jun 70	Port-of-Spain, Trinidad	26 Jul 70	4546.3	W. Ludwig
1311	Port-of-Spain, Trinidad	31 Jul 70	Abidjan, Ivory Coast	31 Aug 70	5461.6	R. Markl
1312	Abidjan, Ivory Coast	02 Sep 70	Mossamedes, Angola	01 Oct 70	5131.5	R. Leyden

* No Gravity

DESCRIPTION OF GEOPHYSICAL DATA PROFILES

The geophysical data profiles of the underway data are displayed in computer plots. In addition, these plots indicate ship's position, speed, course, cruise station numbers, etc. All data are plotted against distance in nautical miles along track, indicated by the bottom scale.

The three scales along the sides at the beginning and end of the plot, labeled D (for depth), G (for gravity), and M (for magnetics), indicate the respective scales for depth in uncorrected fathoms (assuming a speed of sound in water of 800 fathoms per second), free-air gravity anomalies in milligals, and residual magnetic intensity in gammas (using the reference field described by Cain et al., 1964). These profile traces are plotted at constant scales although the zero lines for magnetics and gravity traces are shifted up or down from leg to leg in order to minimize interference between traces. (Note that for a very few legs the magnetics scale has been contracted by a factor of two in order to fit the extremes of the values on the plot.)

Depth, gravity and magnetics are sampled at different intervals and therefore, at any one time there may be only one or two data values. Some plots indicate individual measurements by a cross.

The bathymetric profile is plotted with the lightest line and starts at the top of the plot. The free-air gravity profile is plotted with a medium line and is usually the middle trace of the three. The residual magnetic profile is plotted with the heaviest line

and is usually the bottom trace. For each profile trace, registration ticks on the horizontal grid lines are made in the same pen weight during the plotting of the profile. These ticks should ideally fall exactly on the printed grid and any deviation indicates the extent to which the profile is not justified with the grid.

The scales above the profiles are concerned with time and position of the ship. The top annotation gives the day, month and year. Directly under this is a scale showing interpolated whole hour marks with 4-hour intervals annotated below. The next two lines of annotation indicate respectively the points at which exact degrees of latitude and longitude are crossed. The cruise station numbers are annotated just below the top line of the grid and have a black line indicating their duration.

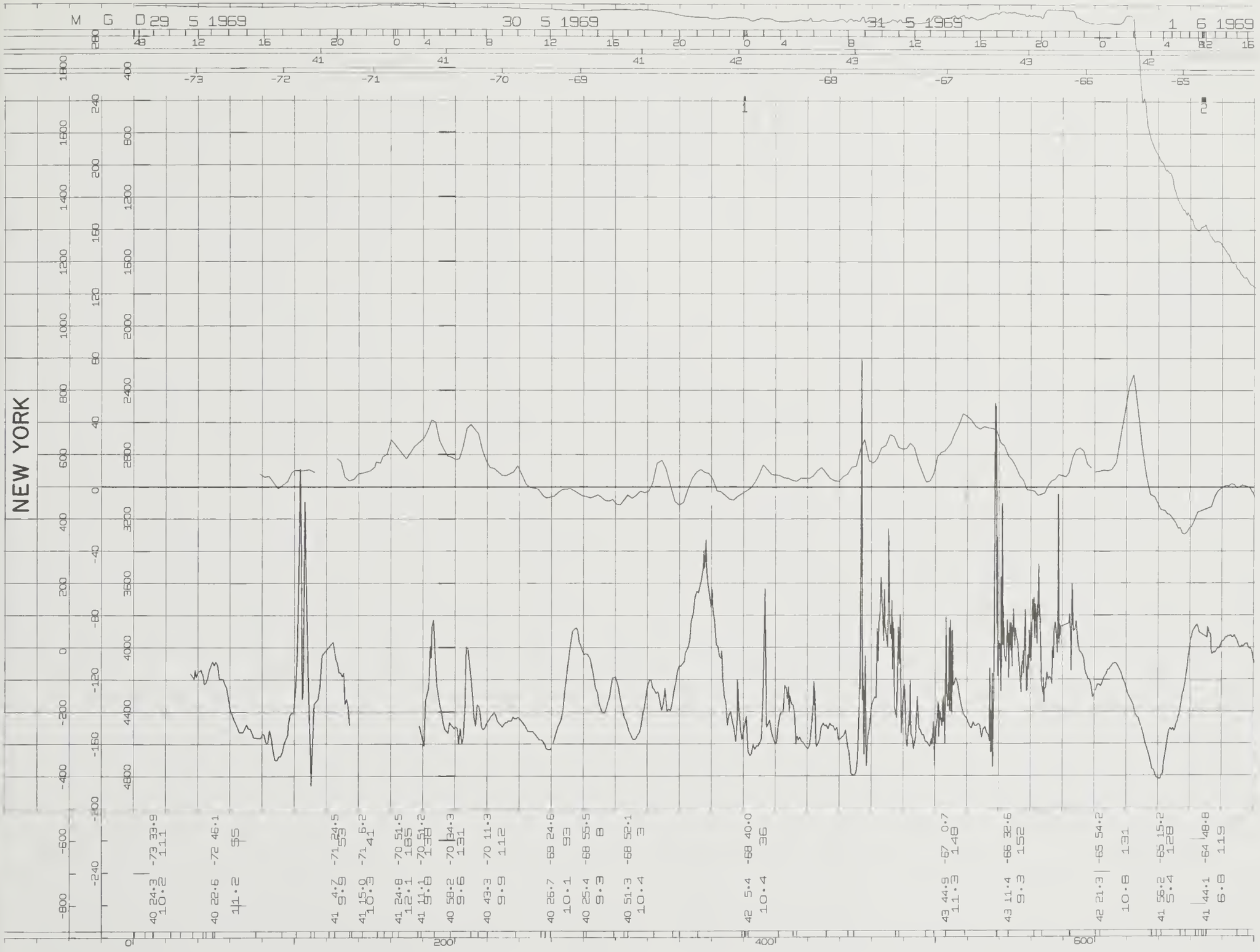
The scales along the bottom part of the plot contain the positions, courses, and speeds of each navigation point. In some cases the navigation points became too numerous to annotate clearly and therefore only major navigation points were included. The criteria used to decide which points to omit vary from leg to leg. We have generally, but not always, annotated all major change of control and/or speed. It is best to refer to the navigation listings in Part A of this report for exact positions. Below these annotations is a distance scale with annotations every 200 nautical miles.

The computer programs used in making these plots have been described by Talwani (1969).

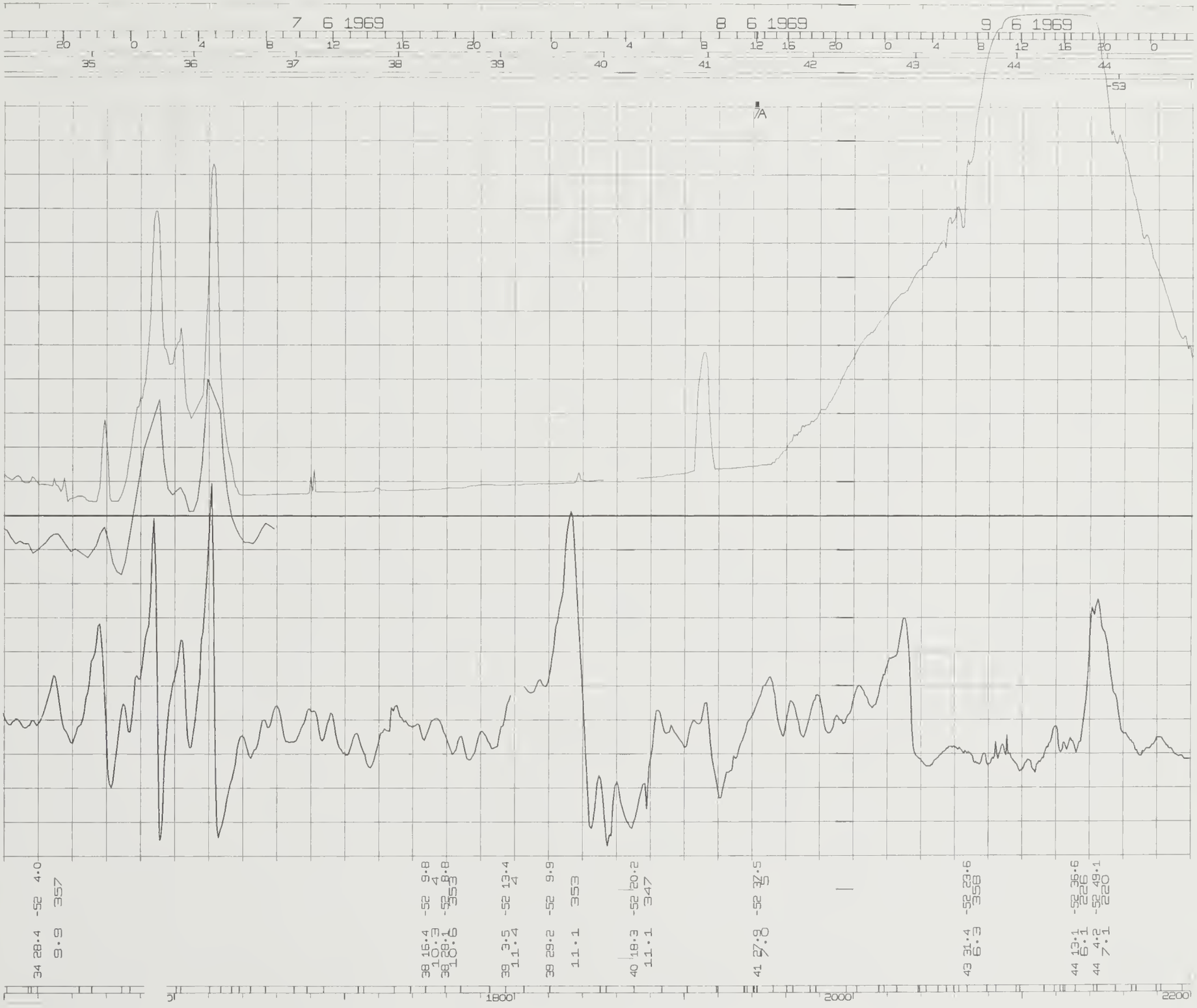
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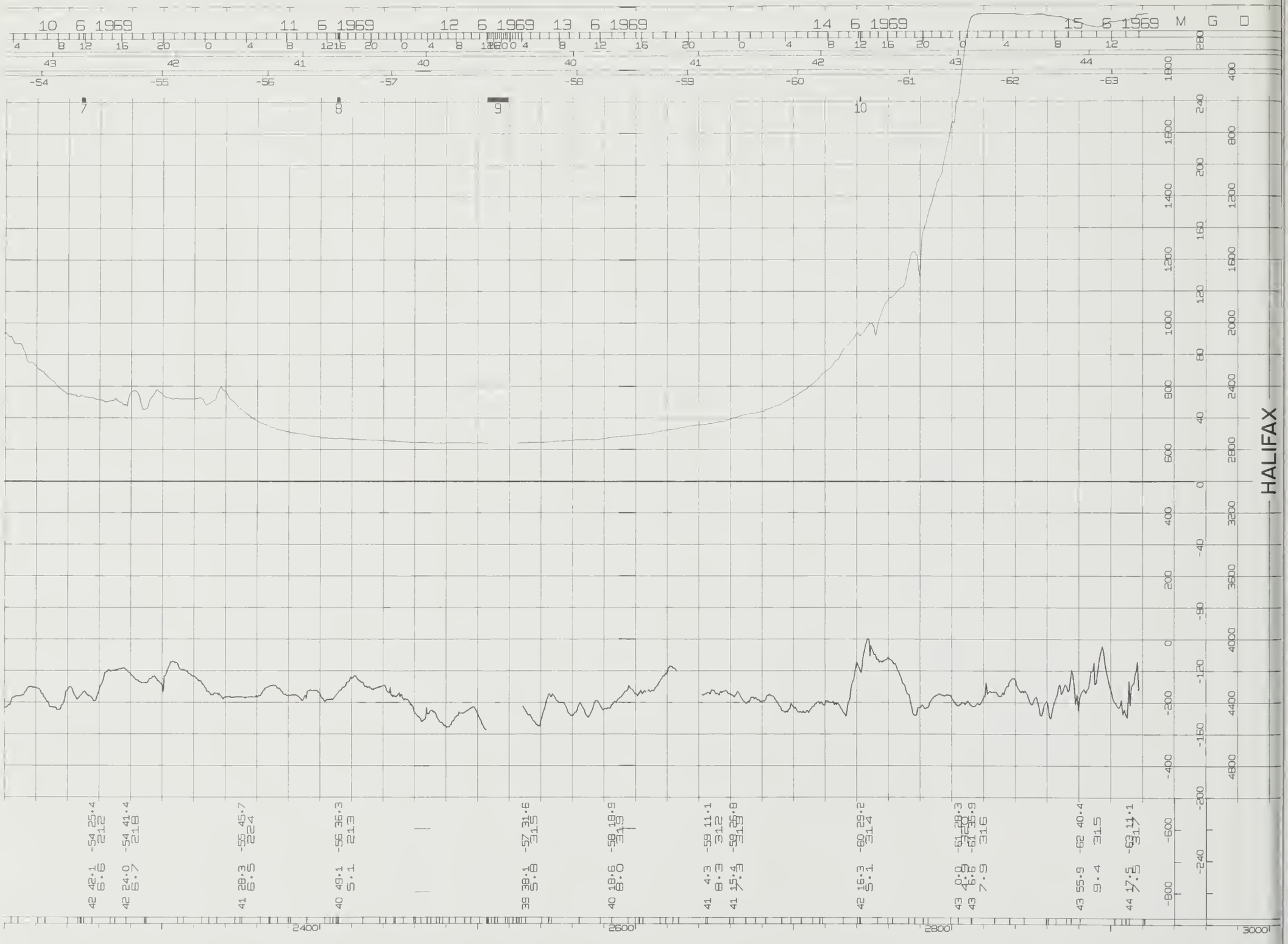
Cain, J. C., W. E. Daniels, S. J. Hendricks, and D. C. Jensen (1964) NASA Report X-612-65-72.

Talwani, M. (1969) A computer system for the reduction, storage and display of underway data acquired at sea; Technical Report No. CU-1-69 N00014-67-A-0108-0004, p. 1-348.

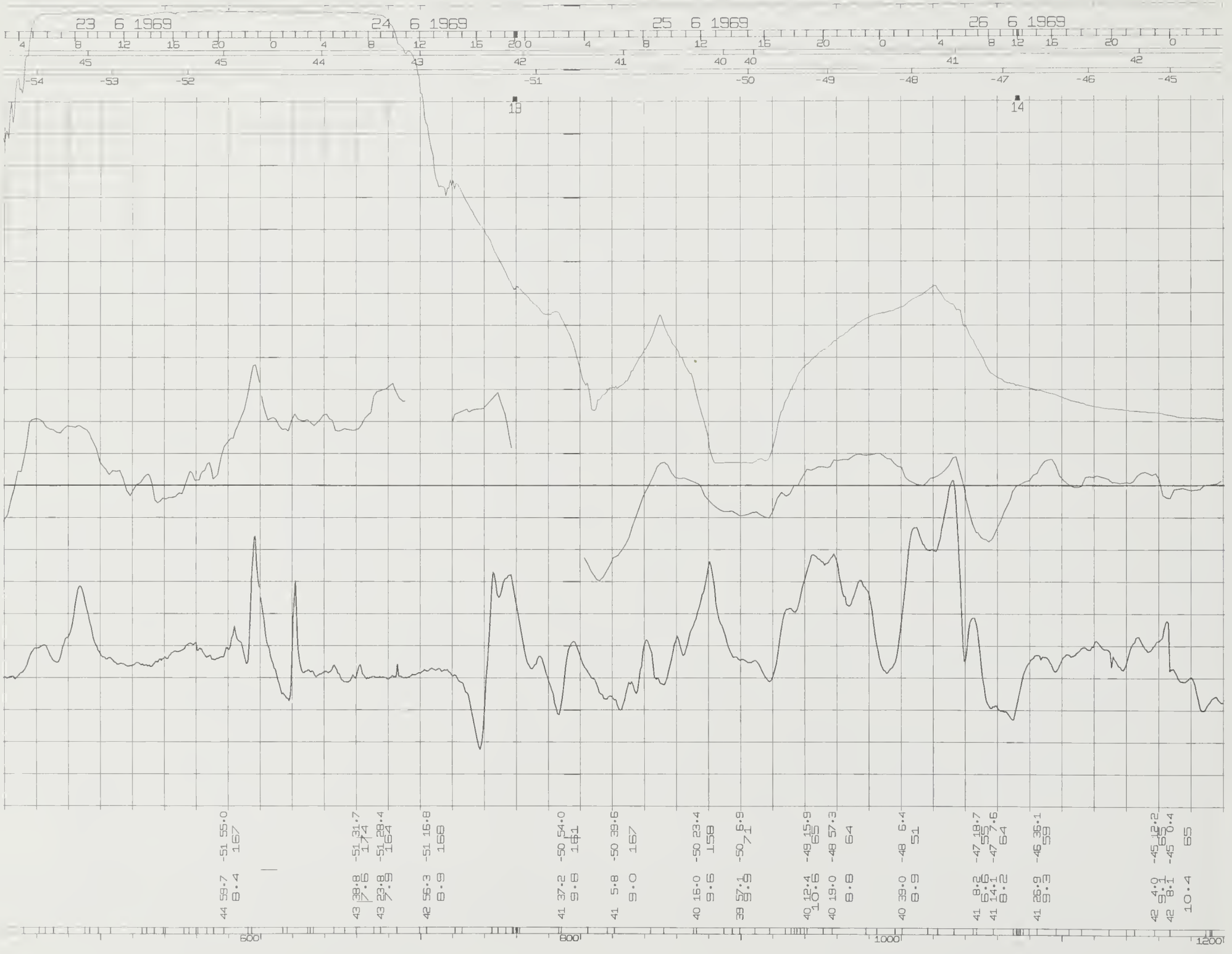

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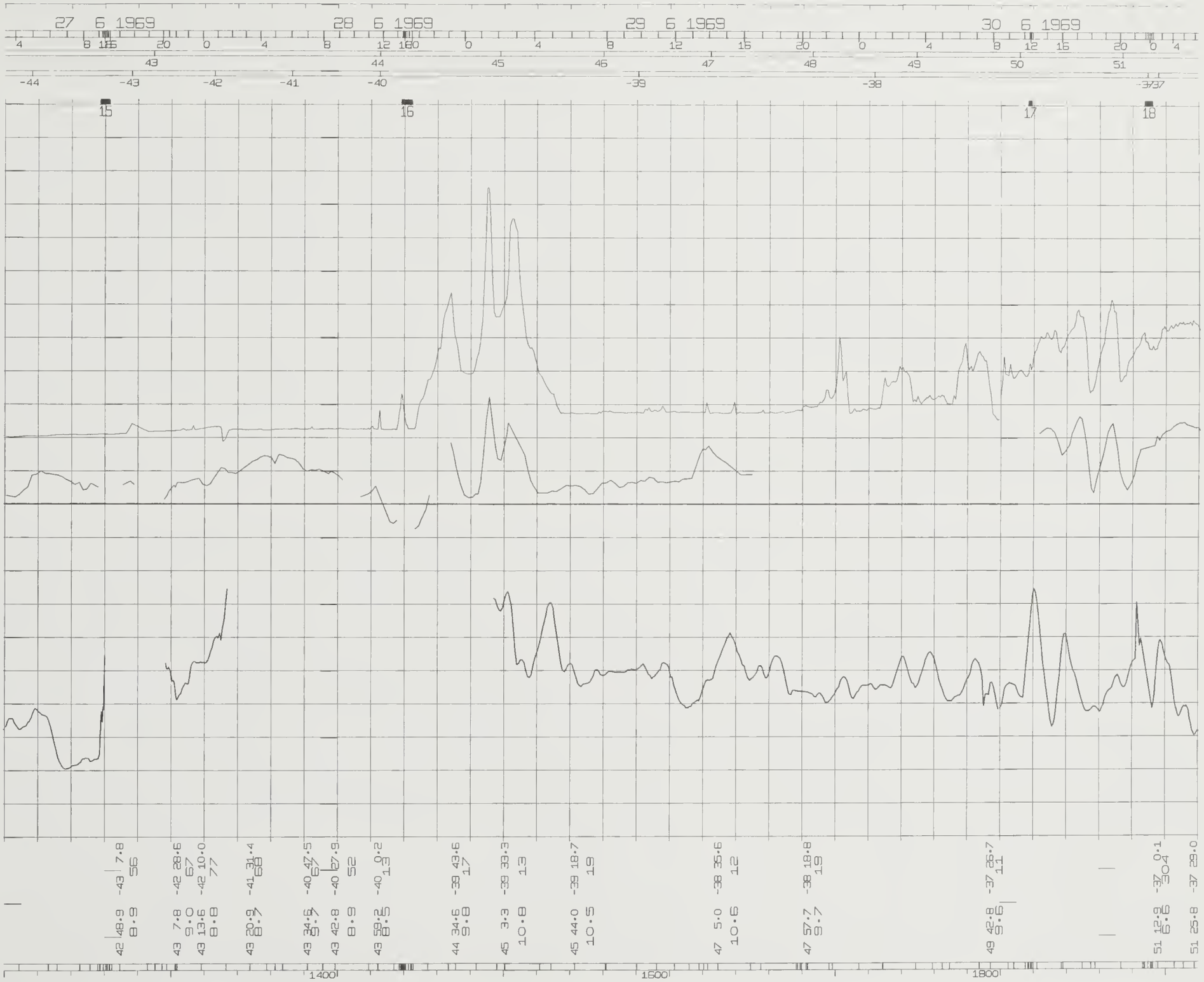

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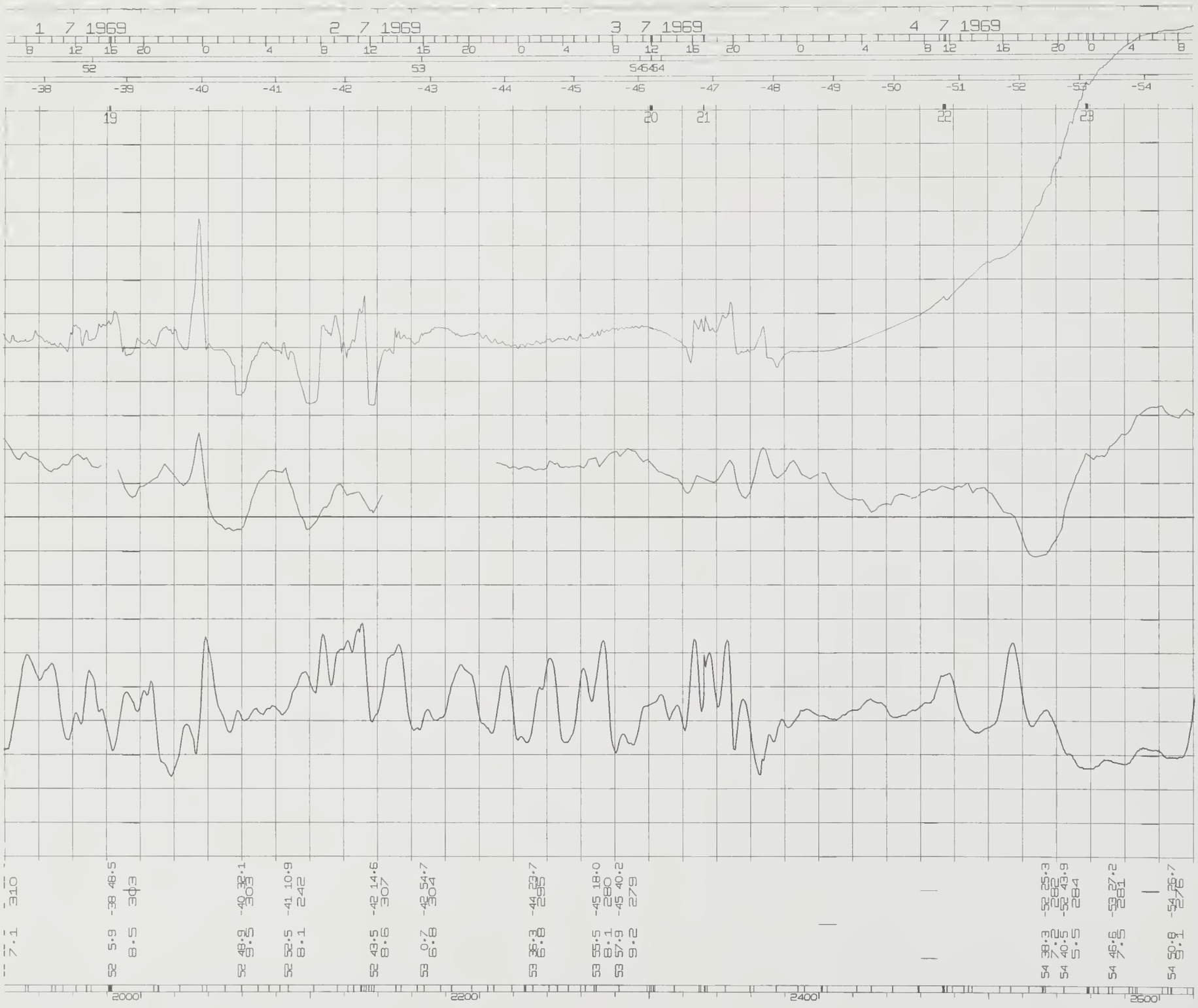

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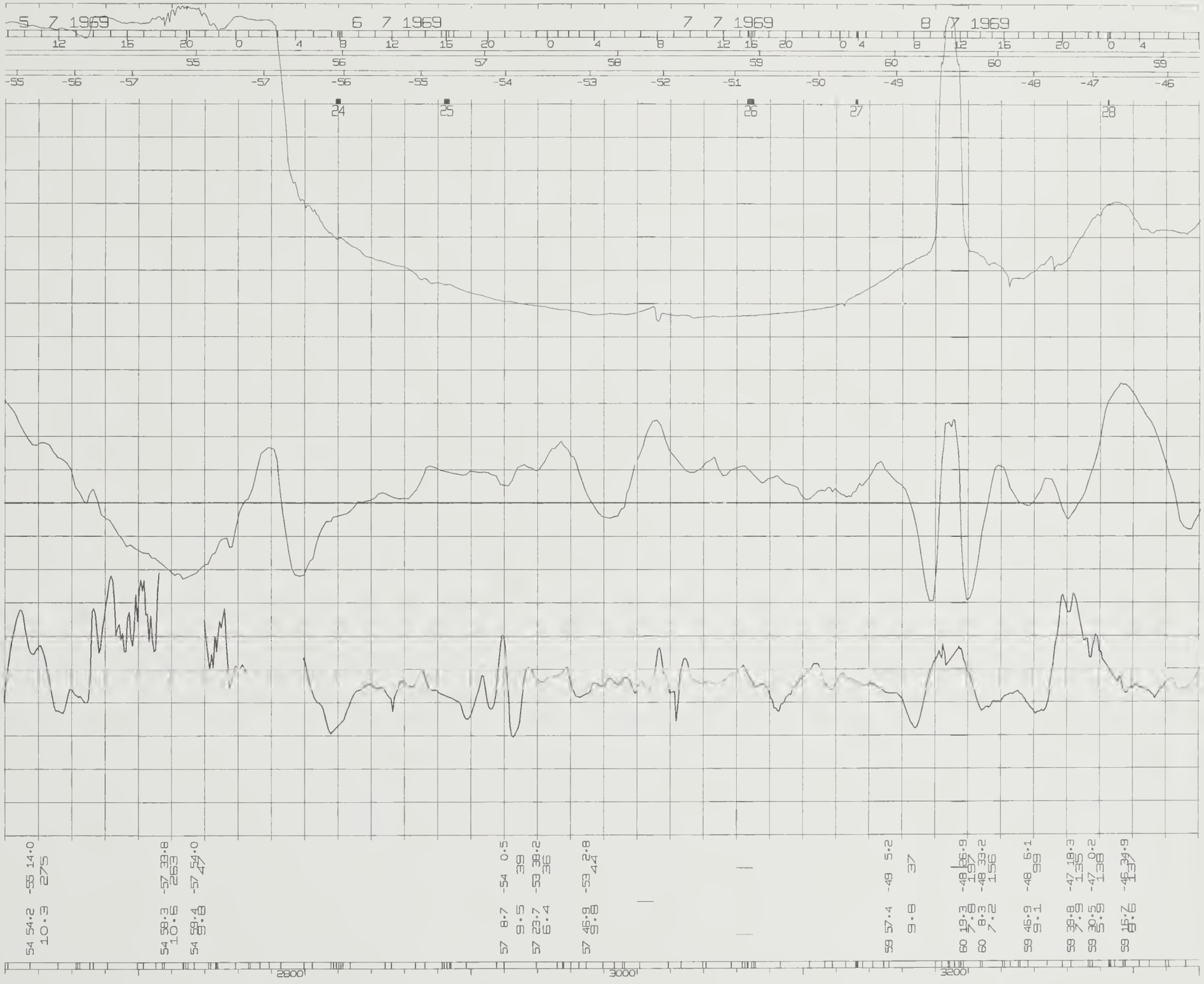

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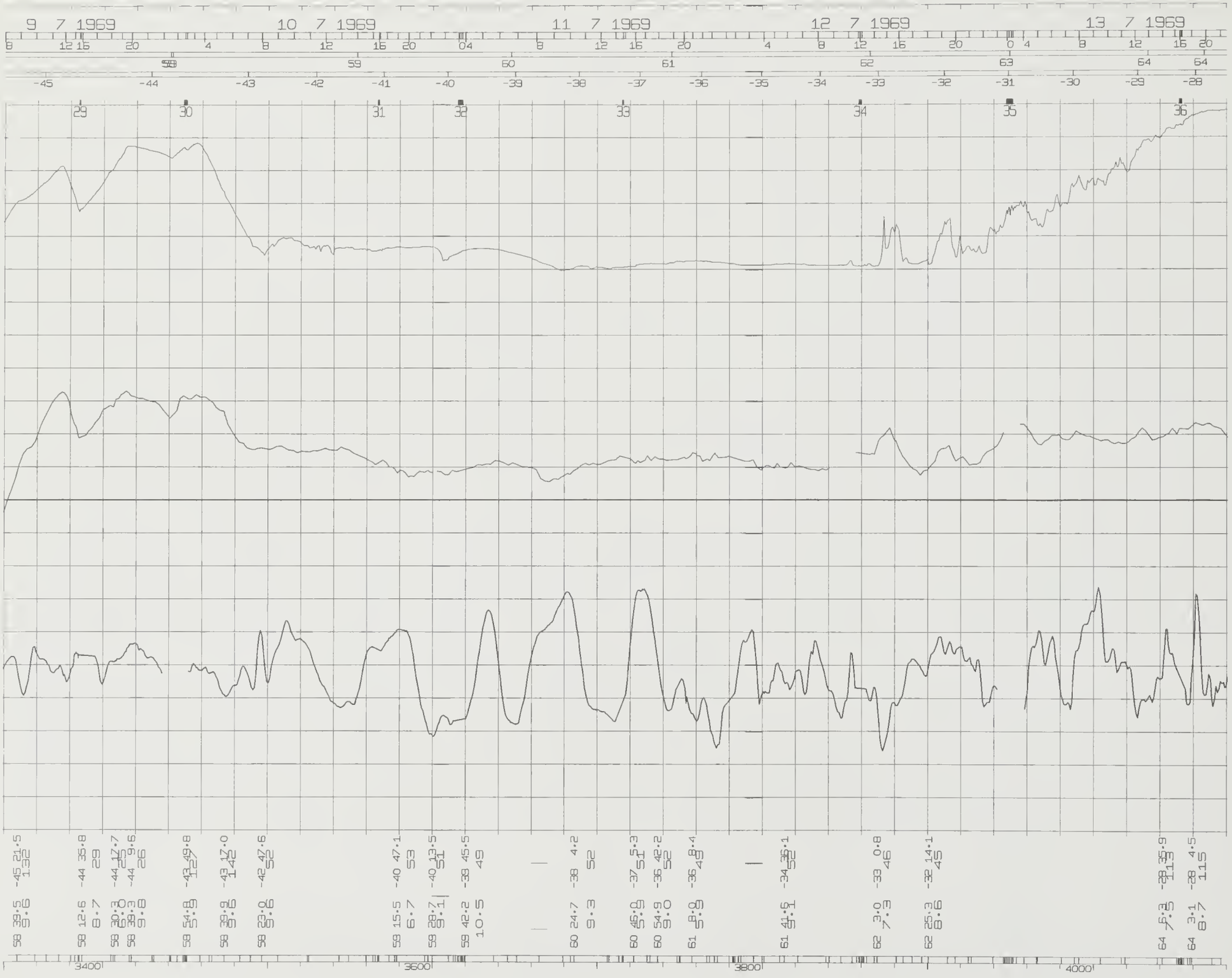
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18
14
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800
1000
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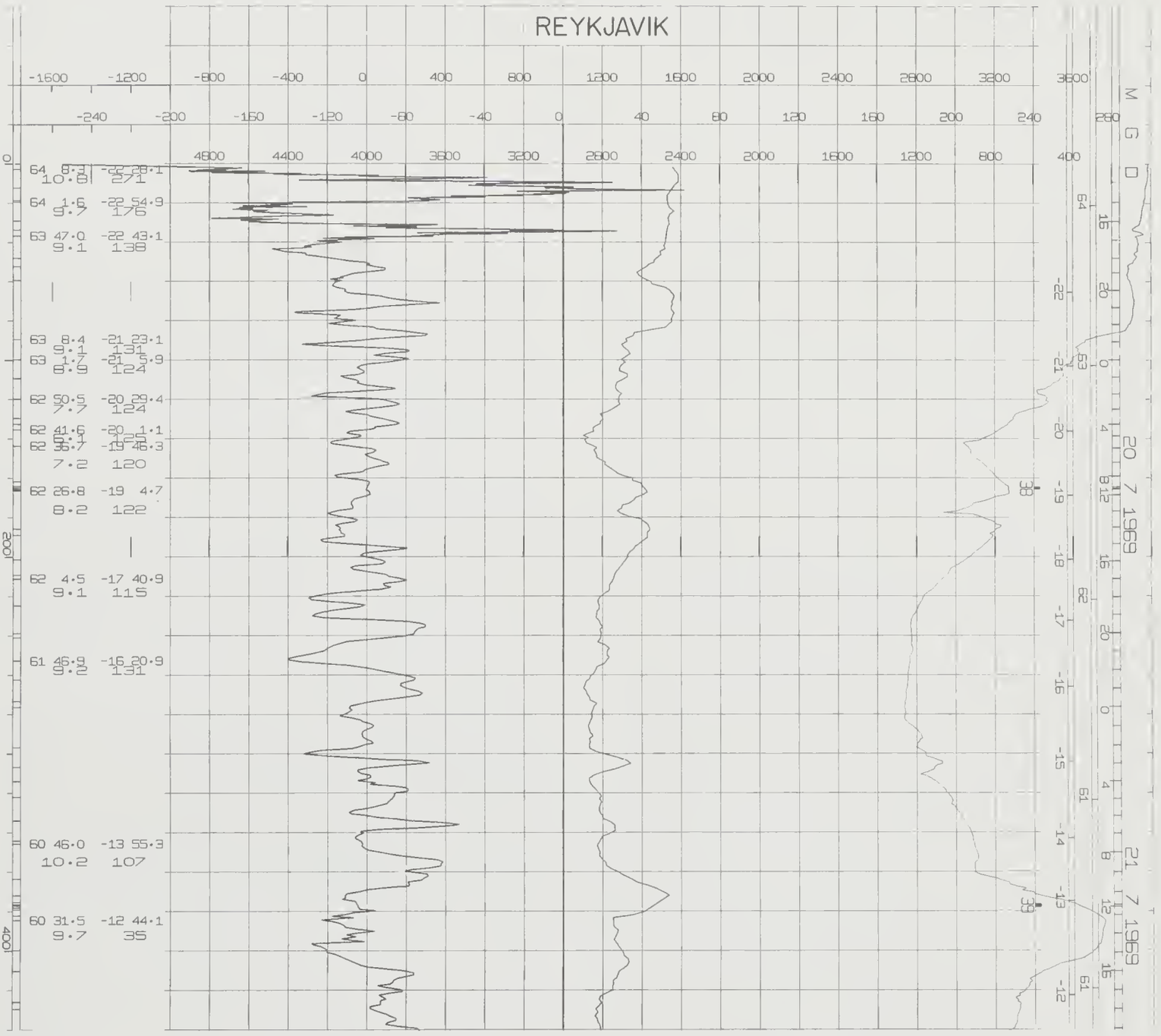

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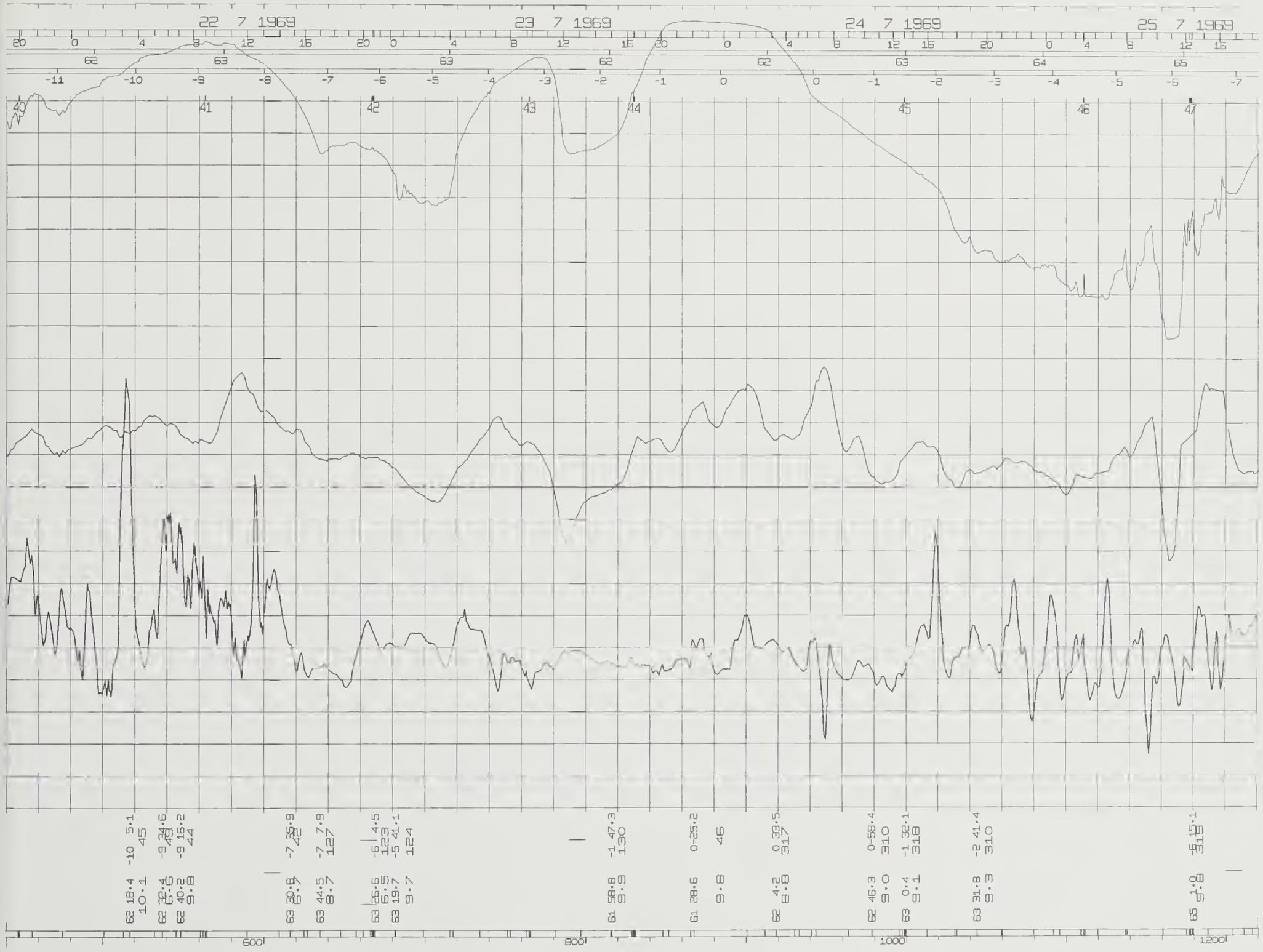

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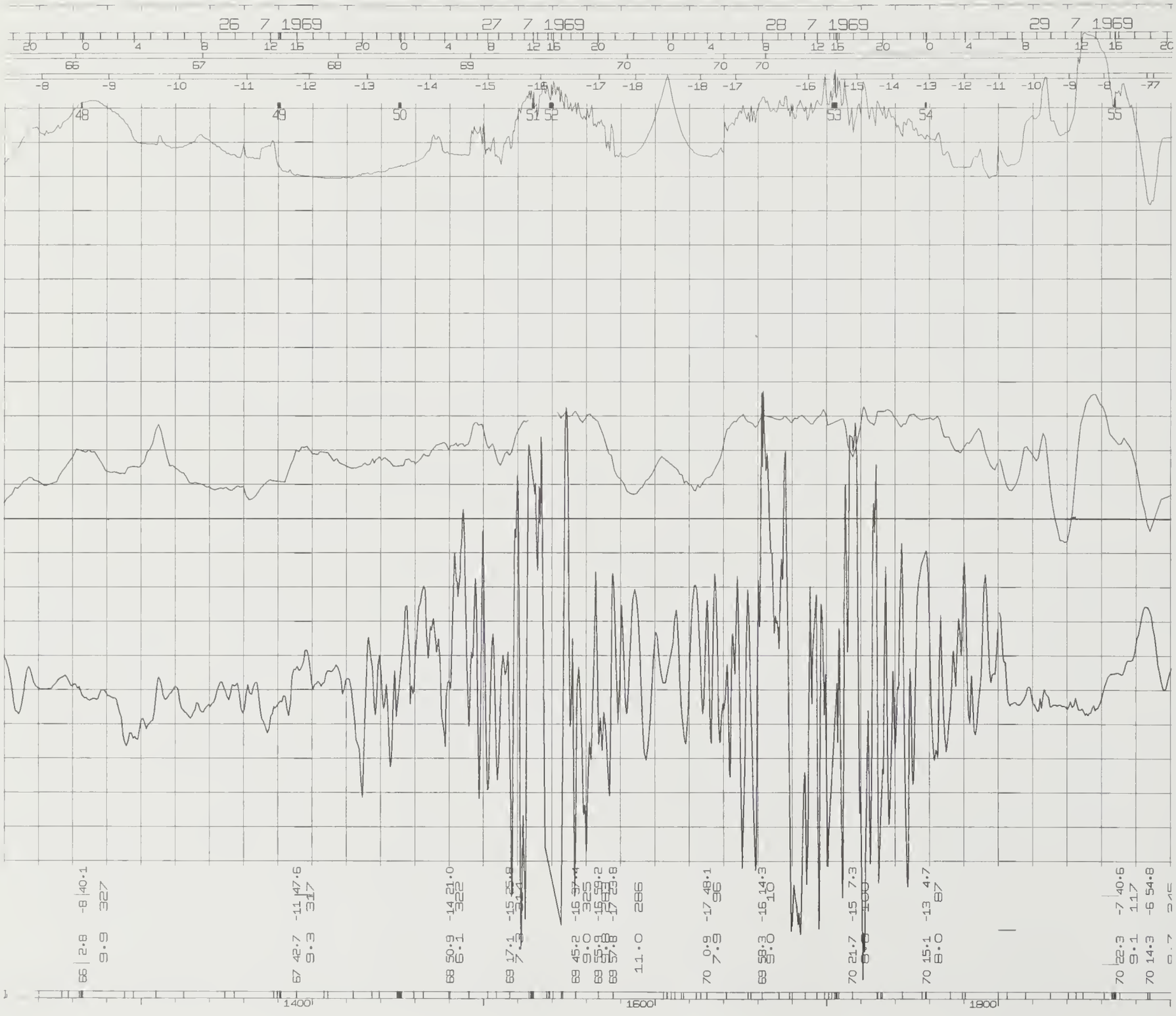

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54 58.3 -57 33.8 263
10.6
54 59.8 -57 54.0 47
57 8.7 -54 0.5 39
9.5
57 23.7 -53 38.2 36
6.4
57 46.9 -53 2.8 44
9.8
59 57.4 -49 5.2 37
9.8
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7.8
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7.2
59 46.9 -48 6.1 99
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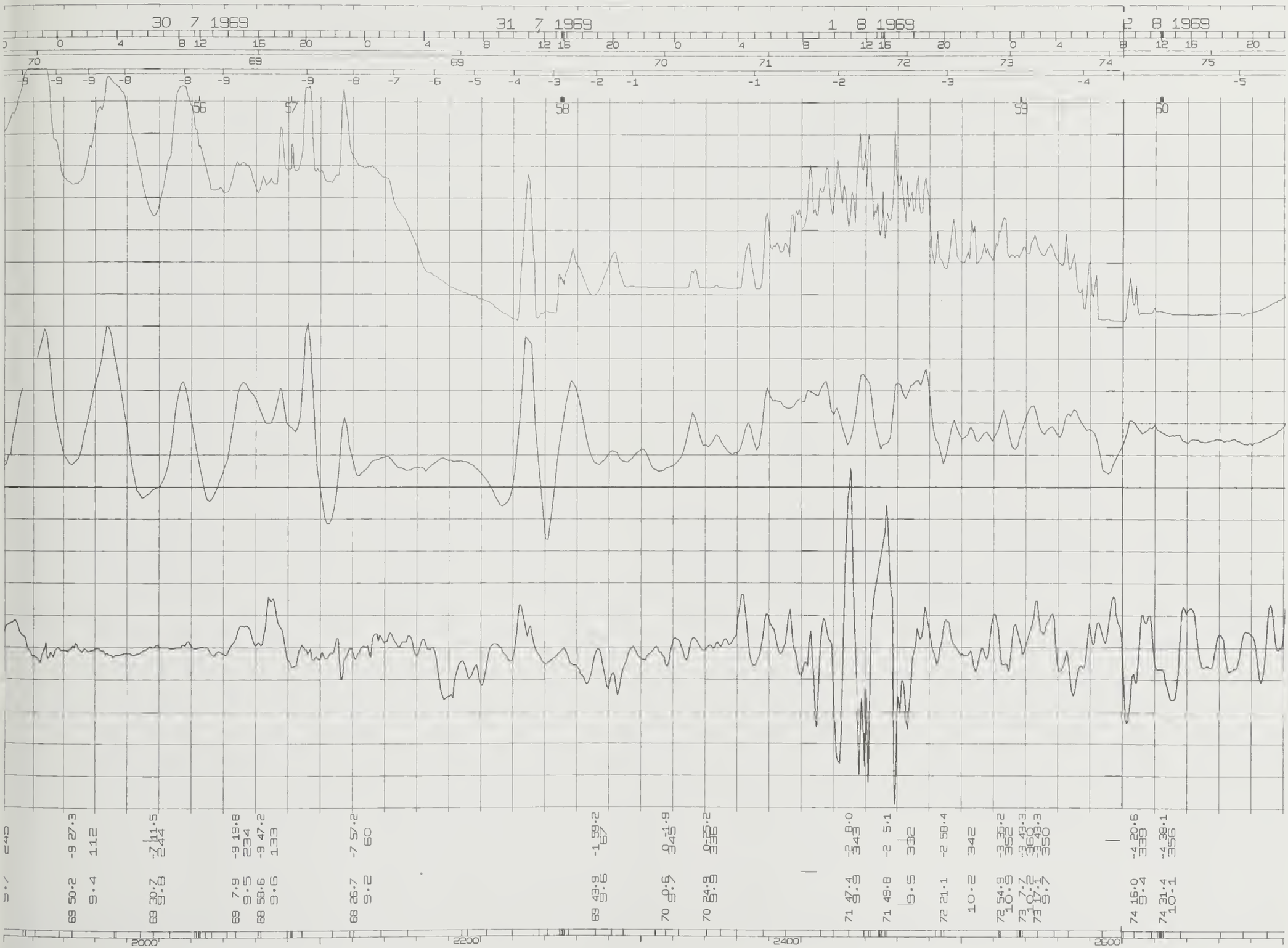

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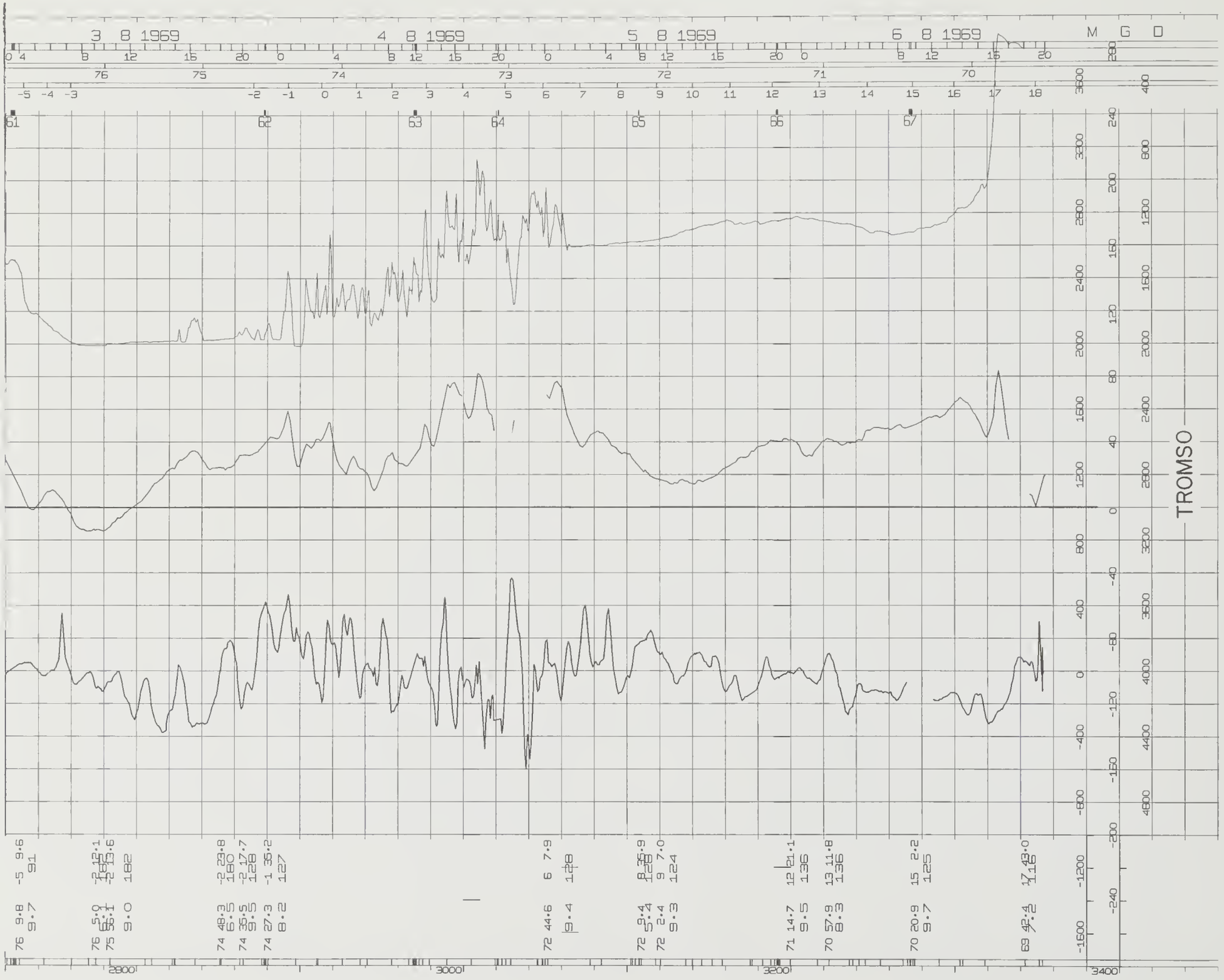
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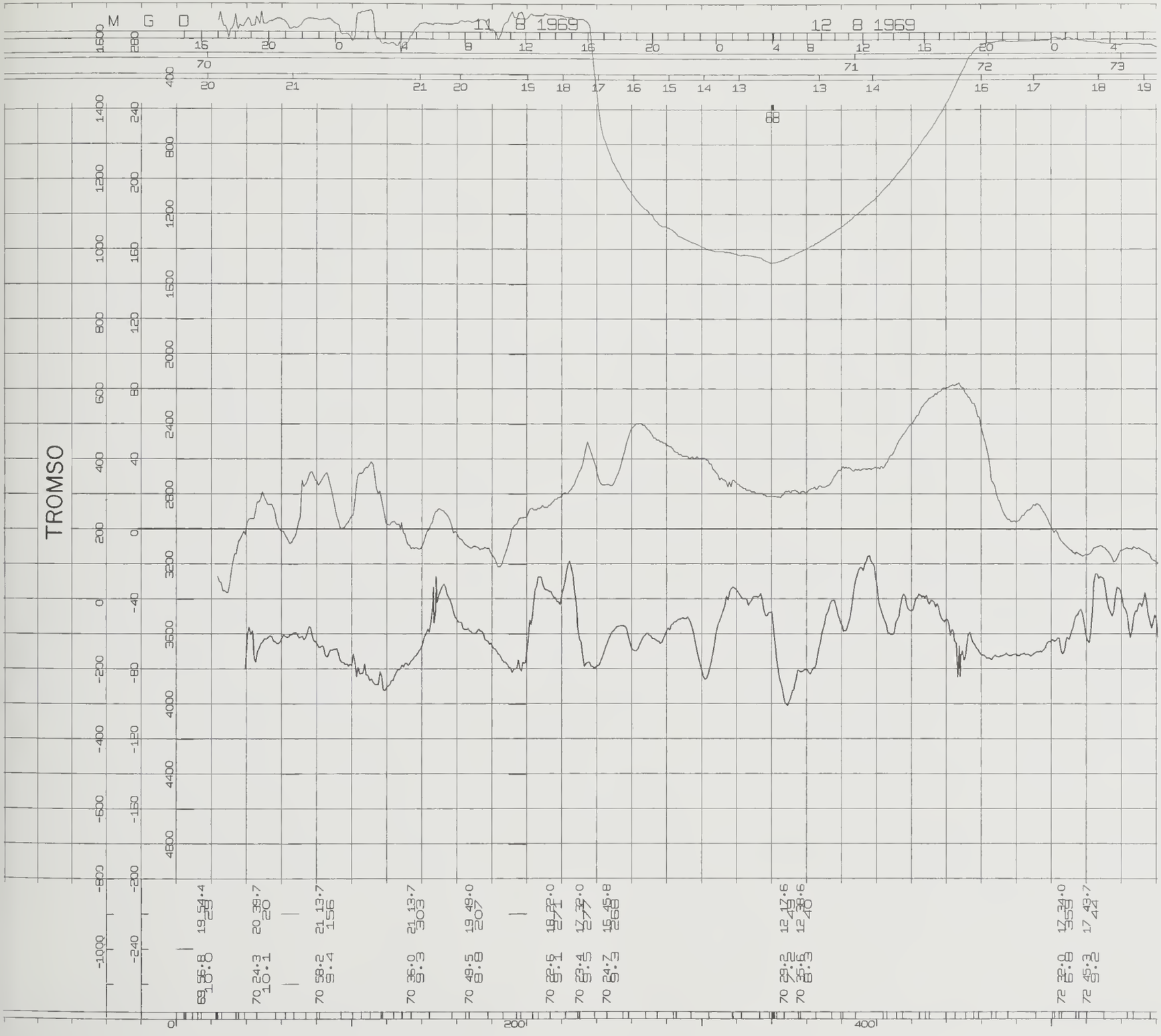

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M G D
64 8.3 -22 28.1
10.8 271
64 1.6 -22 54.9
9.7 176
63 47.0 -22 43.1
9.1 138
63 8.4 -21 23.1
9.1 131
63 1.7 -21 5.9
8.9 124
62 50.5 -20 29.4
7.7 124
62 41.6 -20 1.1
9.1 120
62 35.7 -19 46.3
7.2 120
62 26.8 -19 4.7
8.2 122
62 4.5 -17 40.9
9.1 115
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9.2 131
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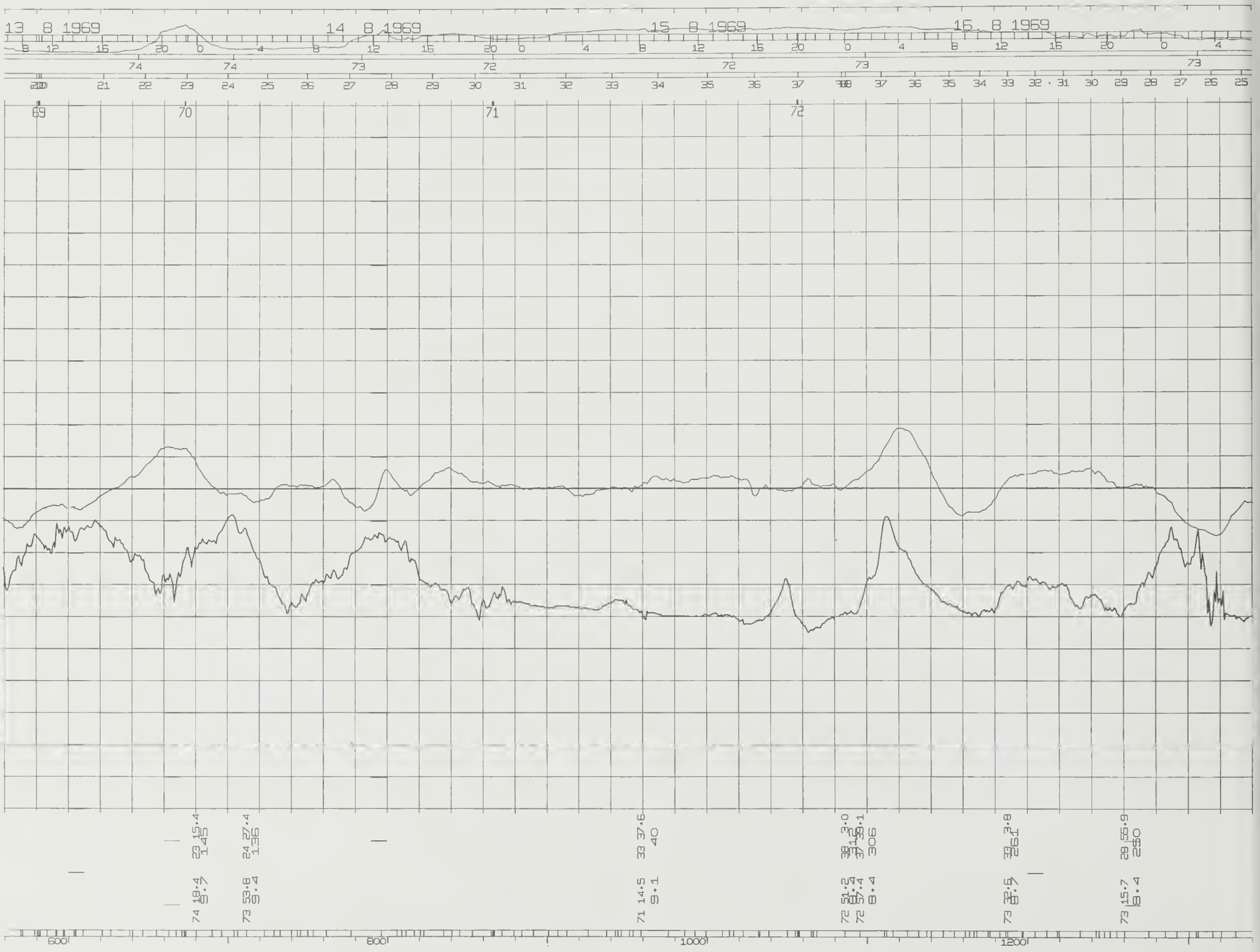

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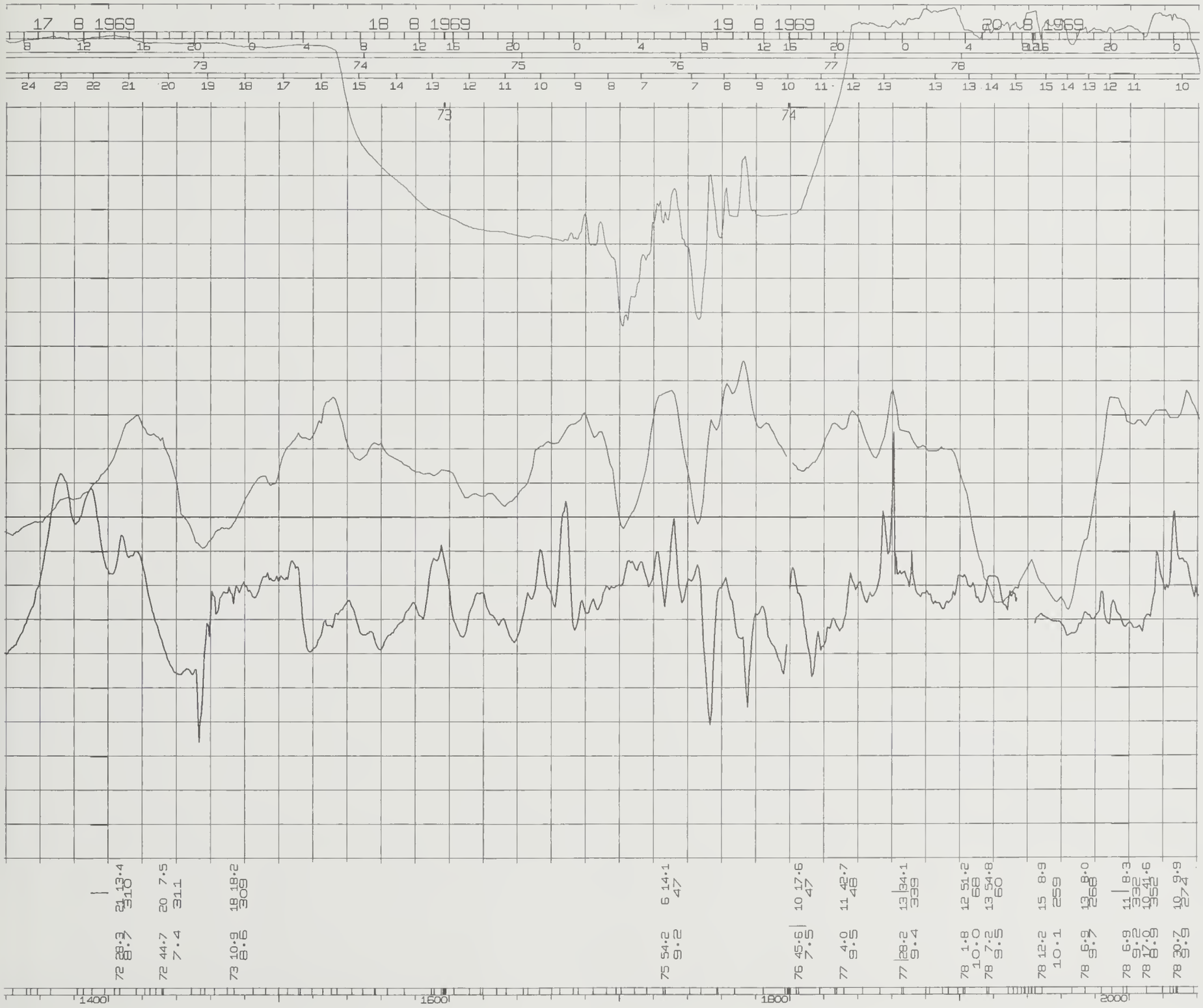

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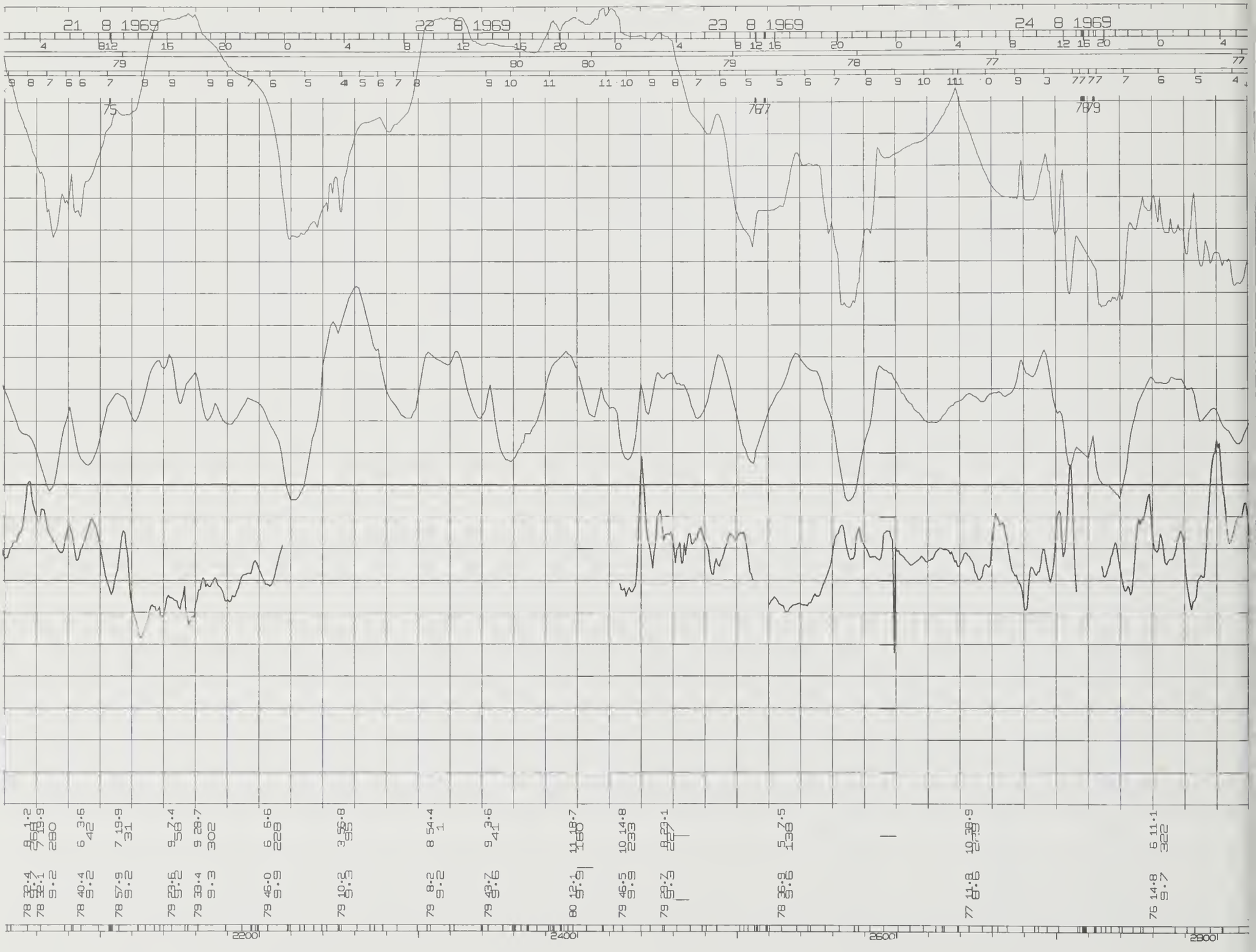

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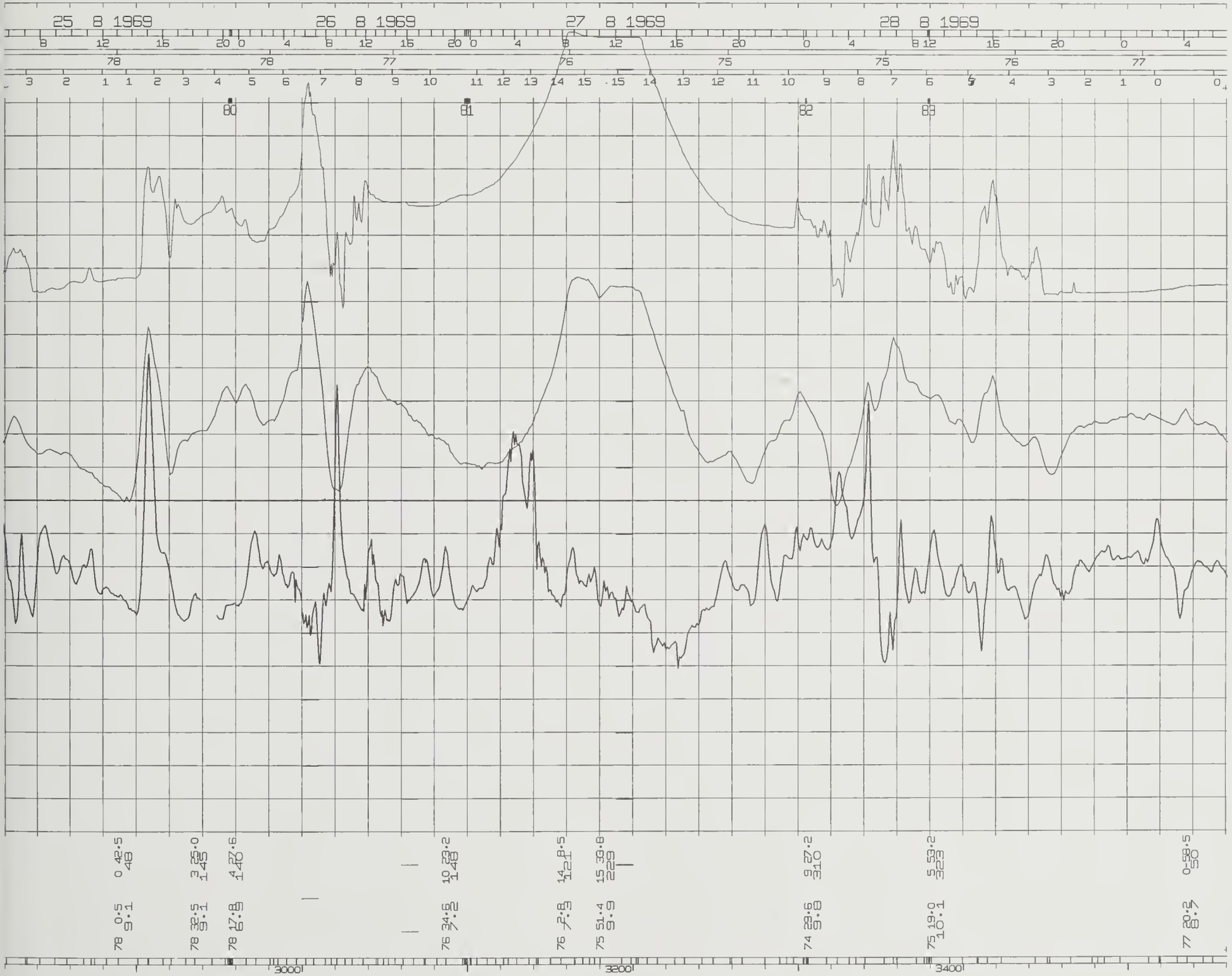

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M G D
TROMSO

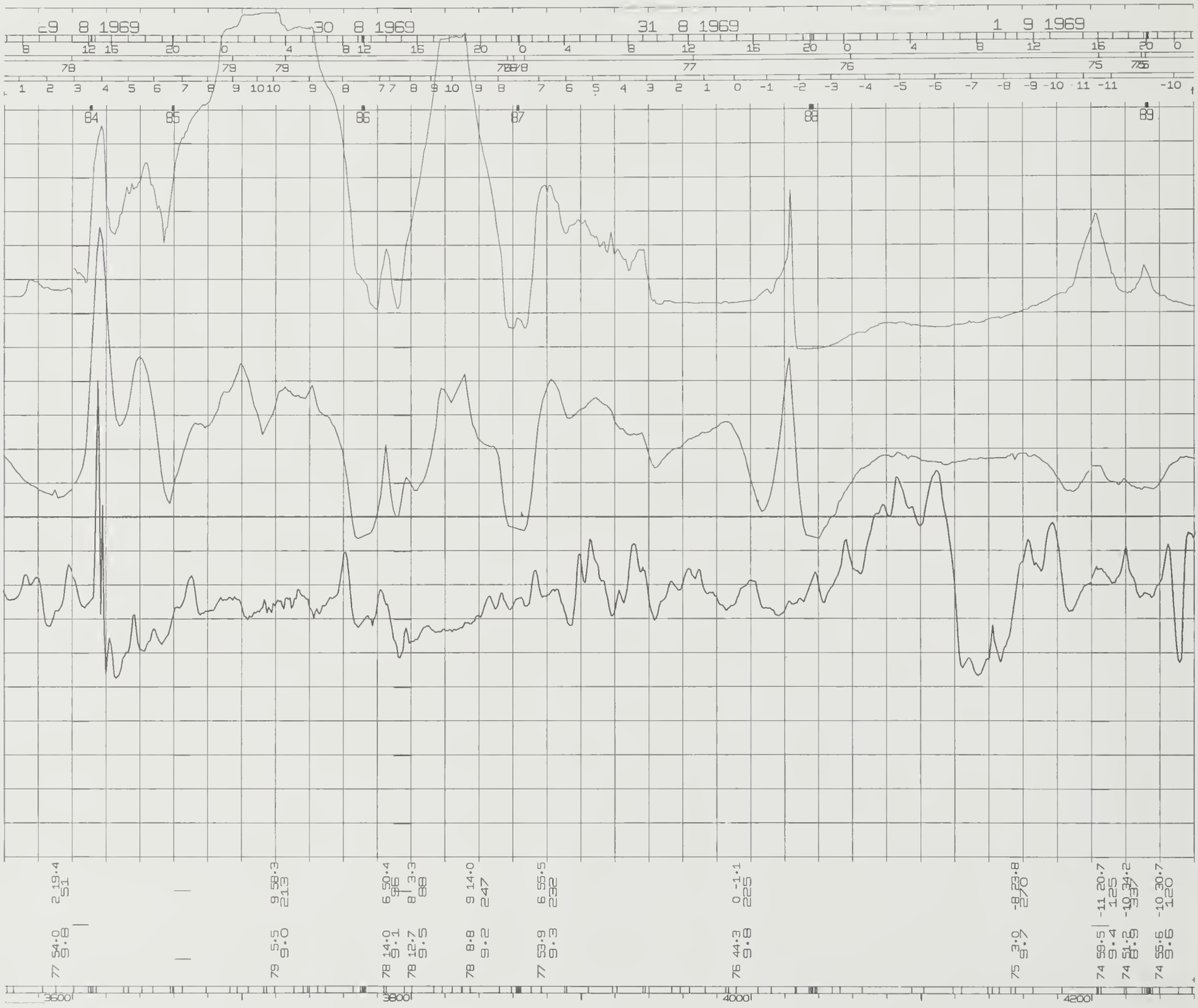

M G D
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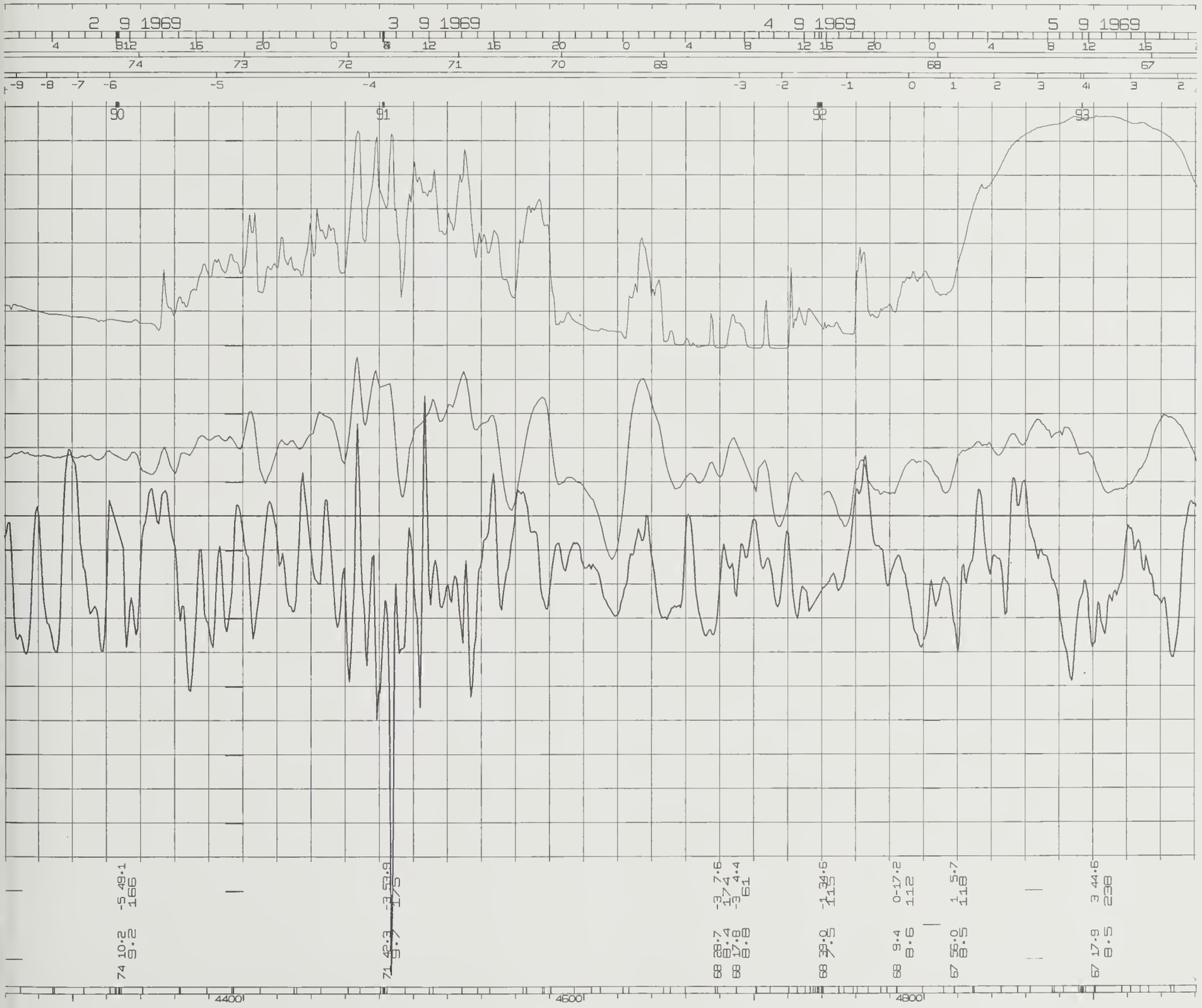

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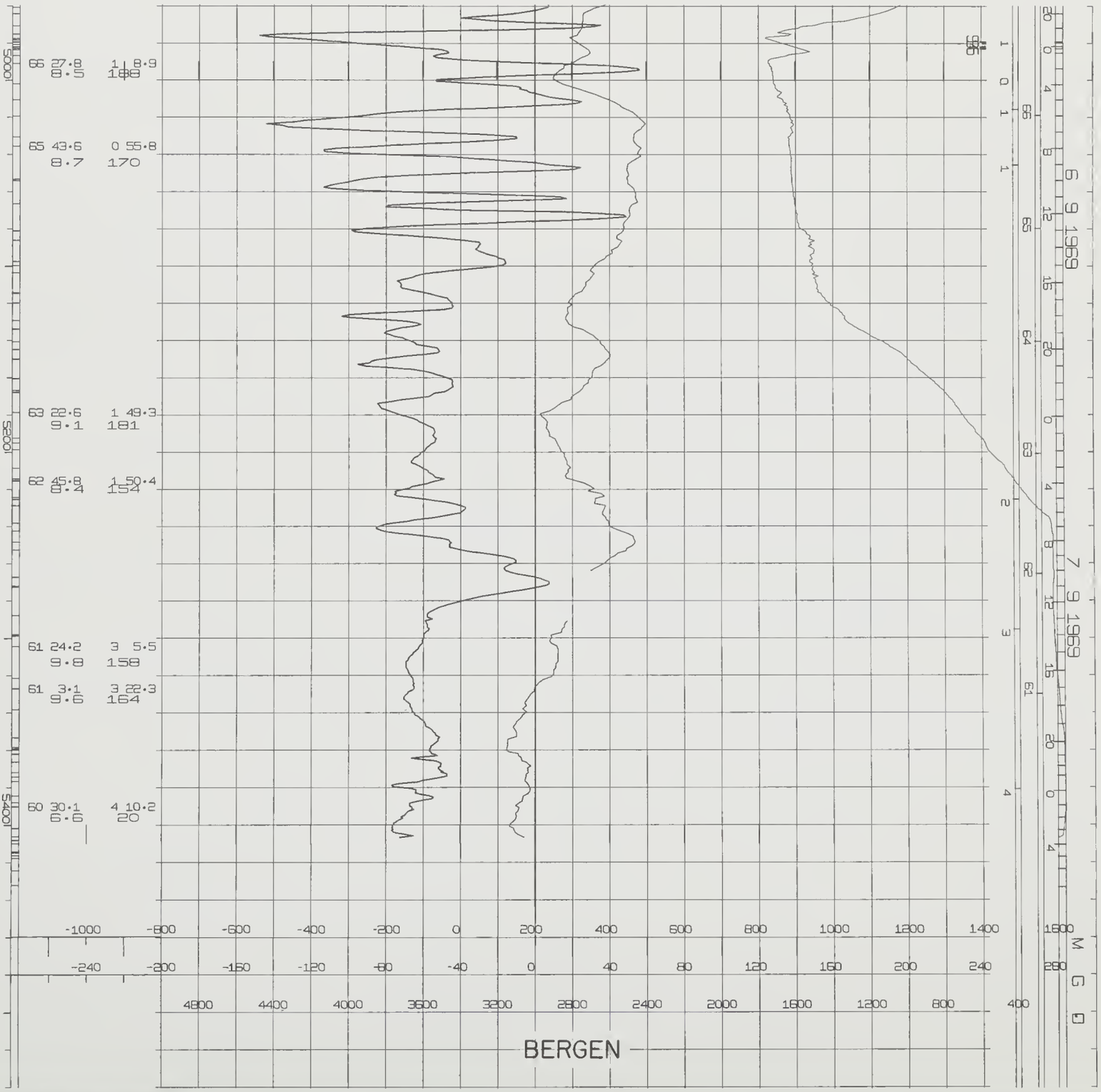

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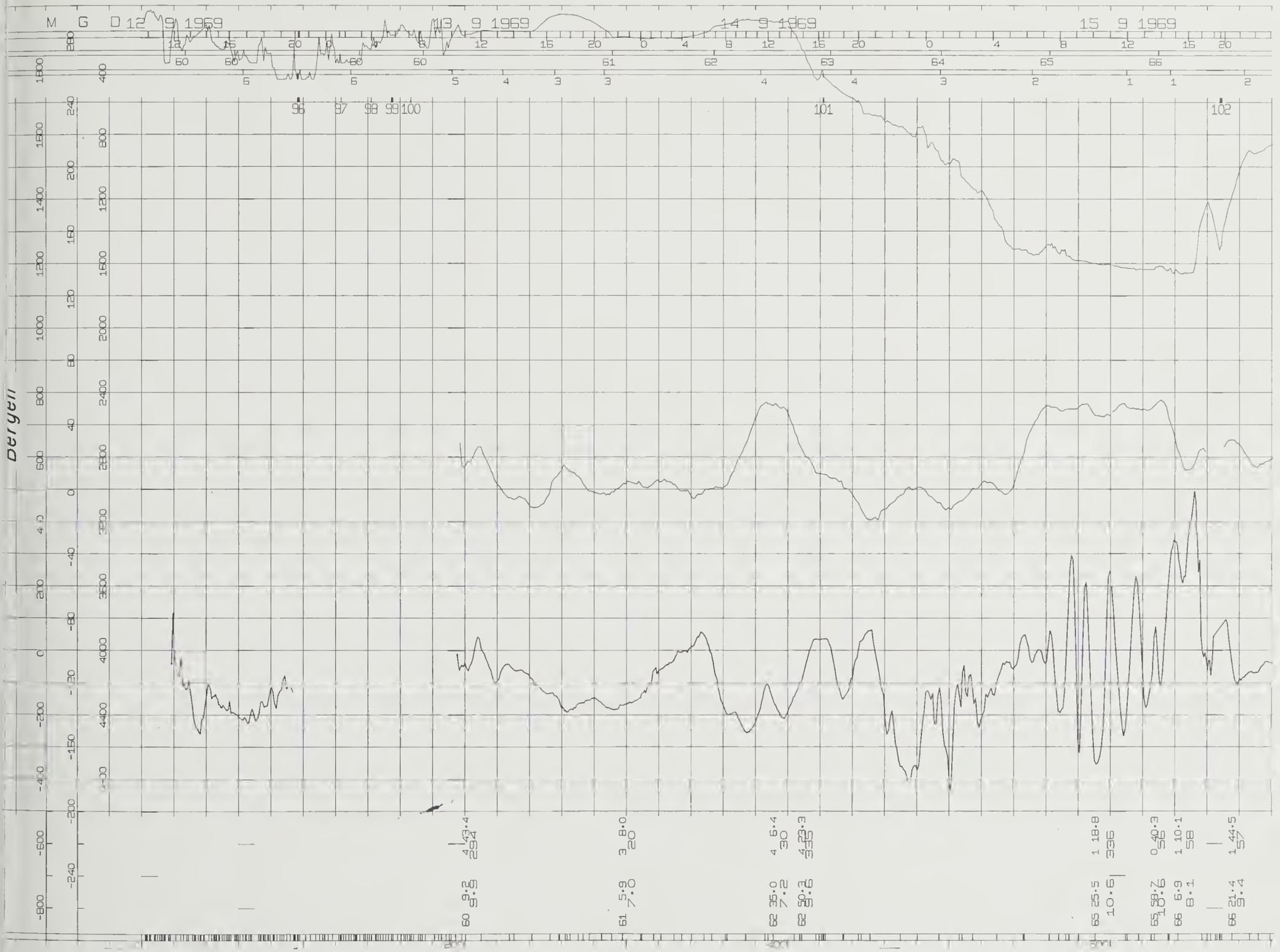

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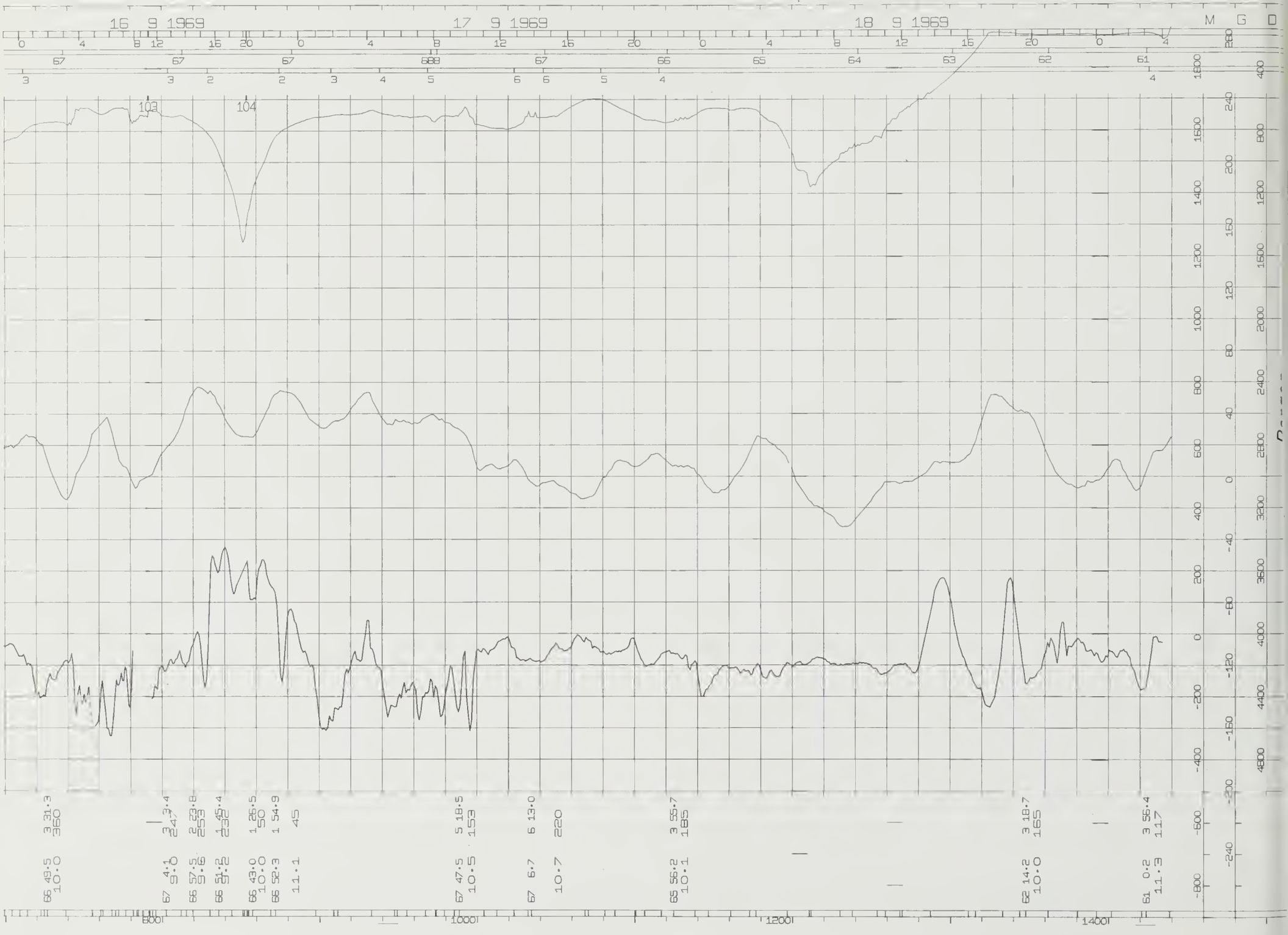

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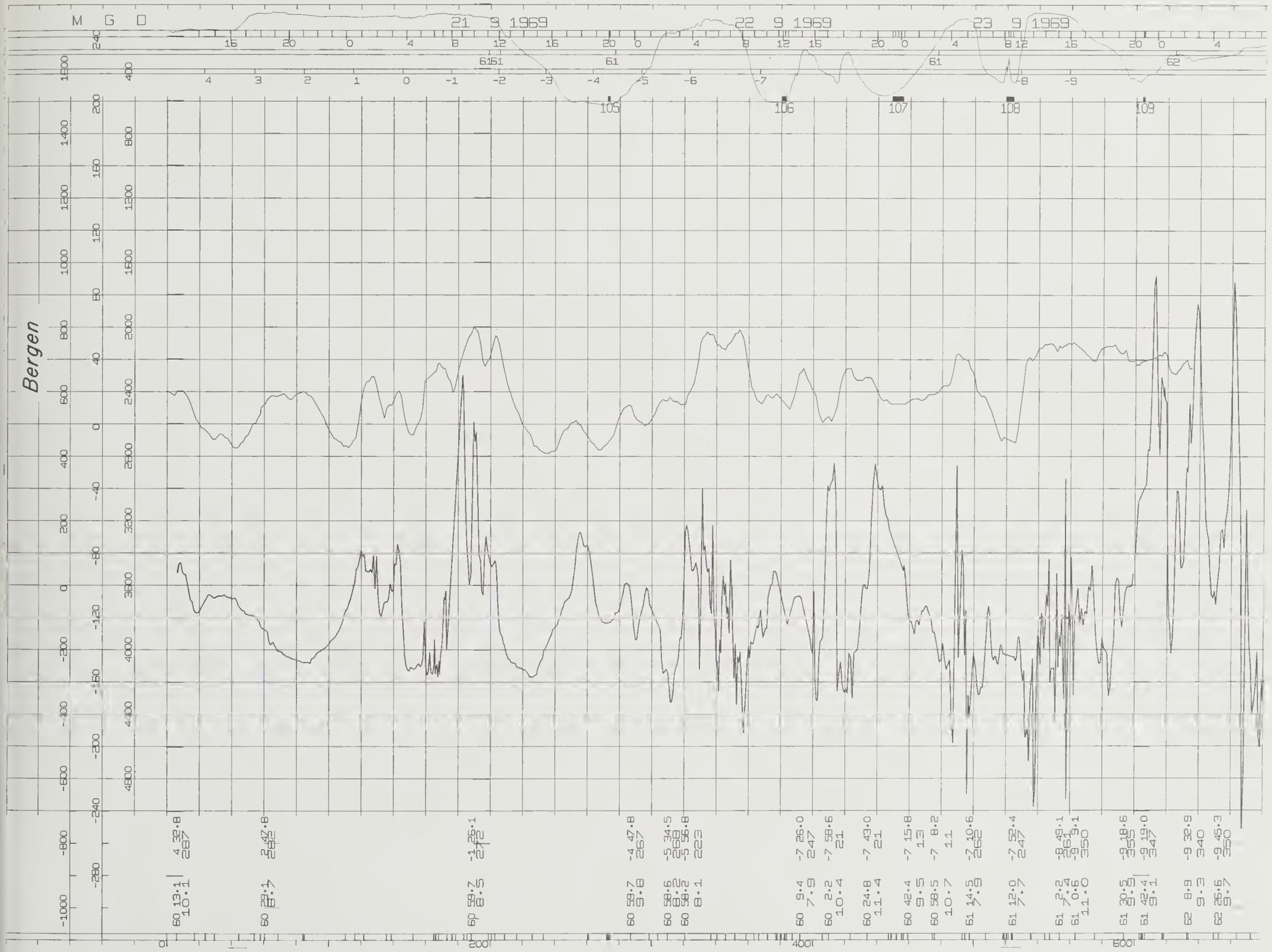

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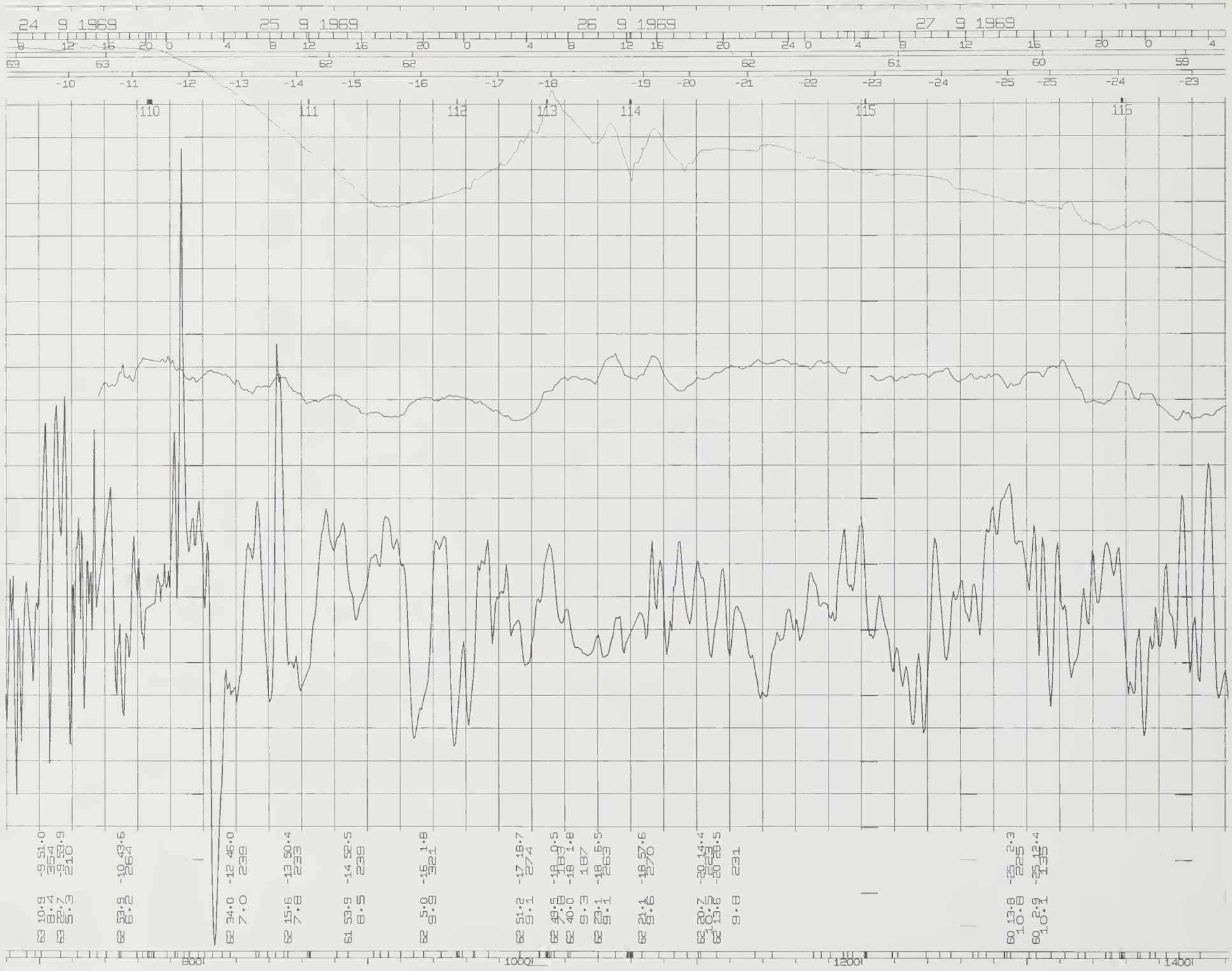

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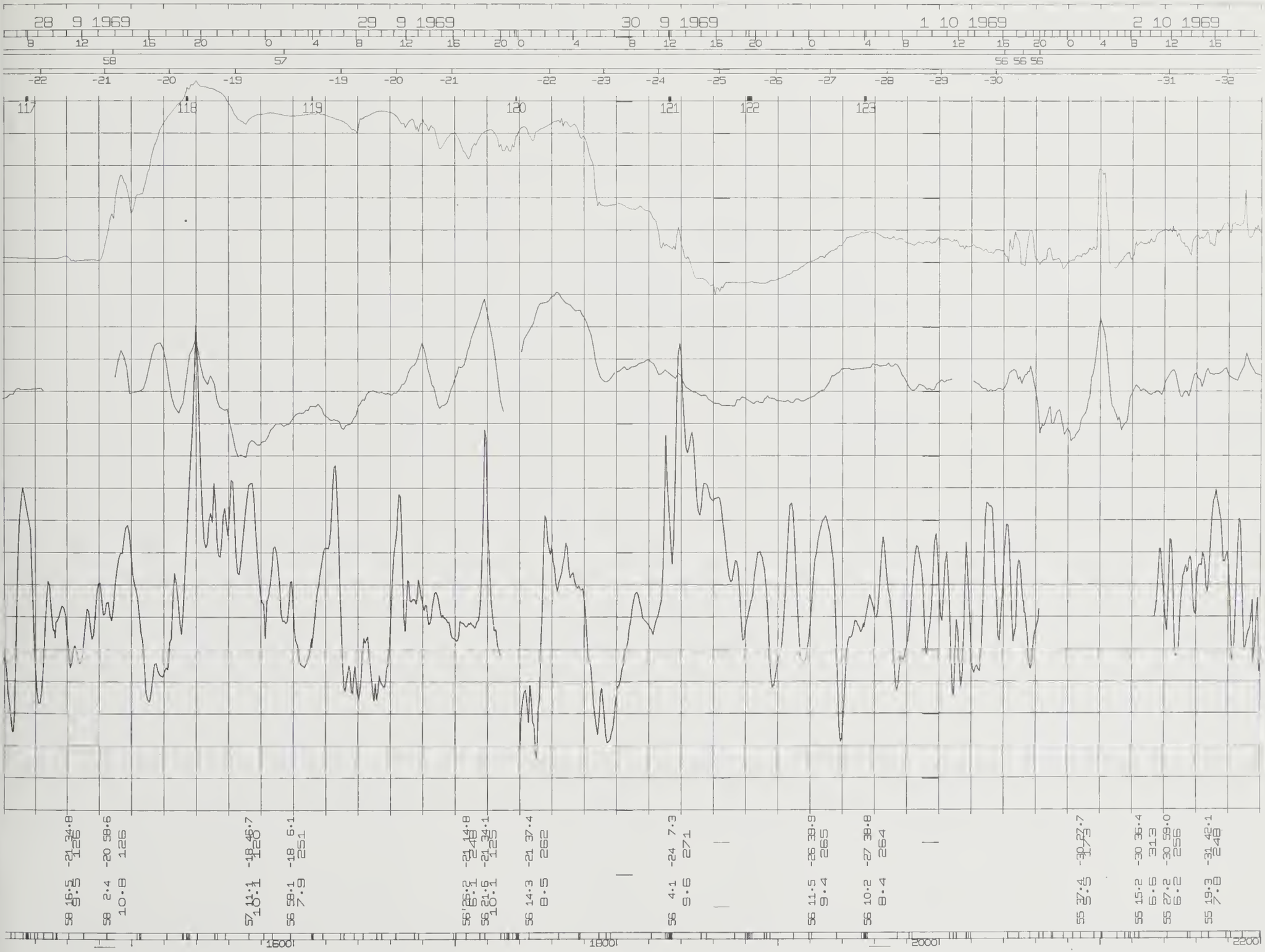

BERGEN
6 9 1969
7 9 1969
MGD

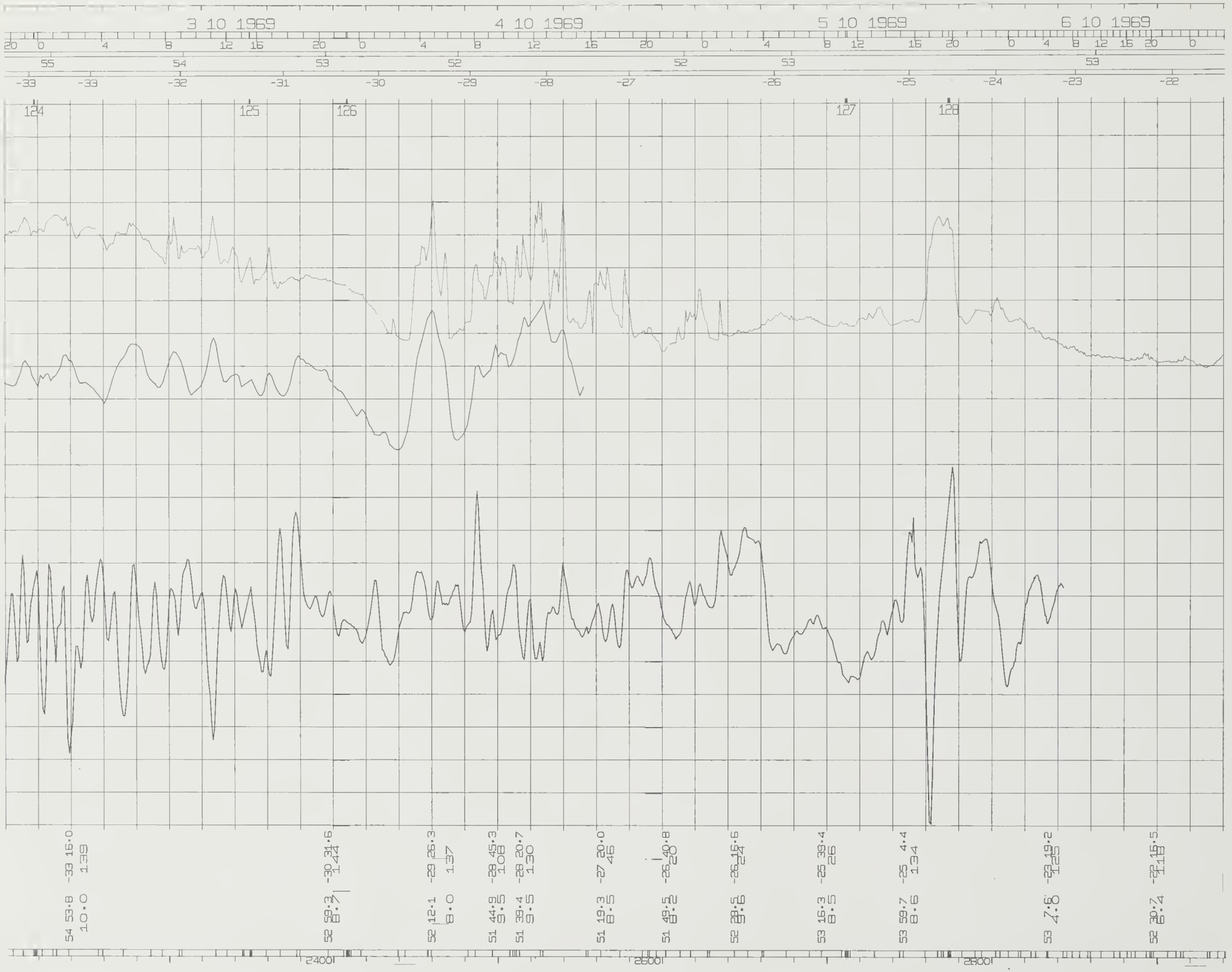

M G D 12 9 1969
13 9 1969
14 9 1969
15 9 1969
96 97 98 99 100
101
102
Bergen

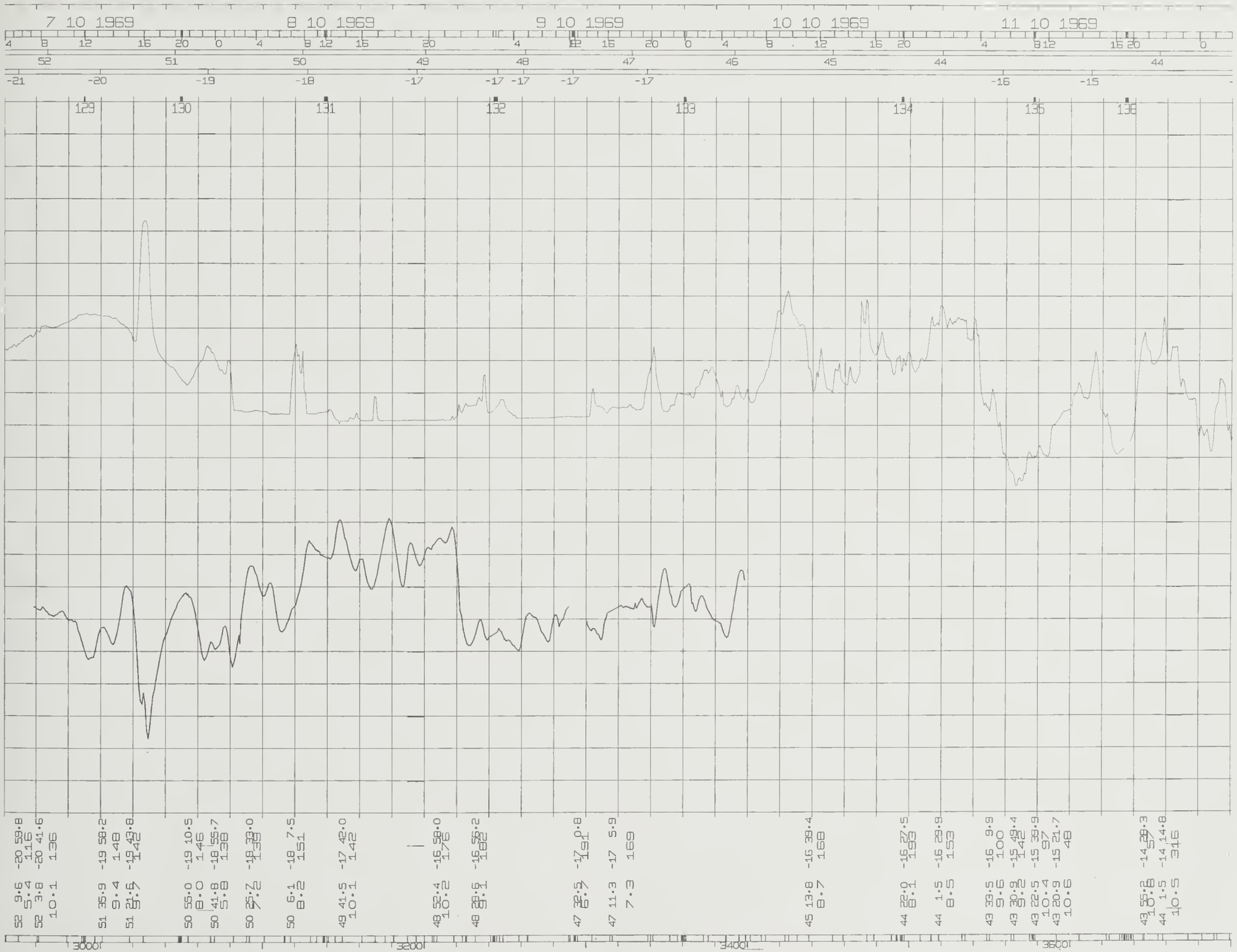

16 9 1969
17 9 1969
18 9 1969
M G D
10a
10a
104


M G D
21 9 1969
22 9 1969
23 9 1969
Bergen


24 9 1969
25 9 1969
26 9 1969
27 9 1969
110
111
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113
114
115
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800
1000
1200
1400

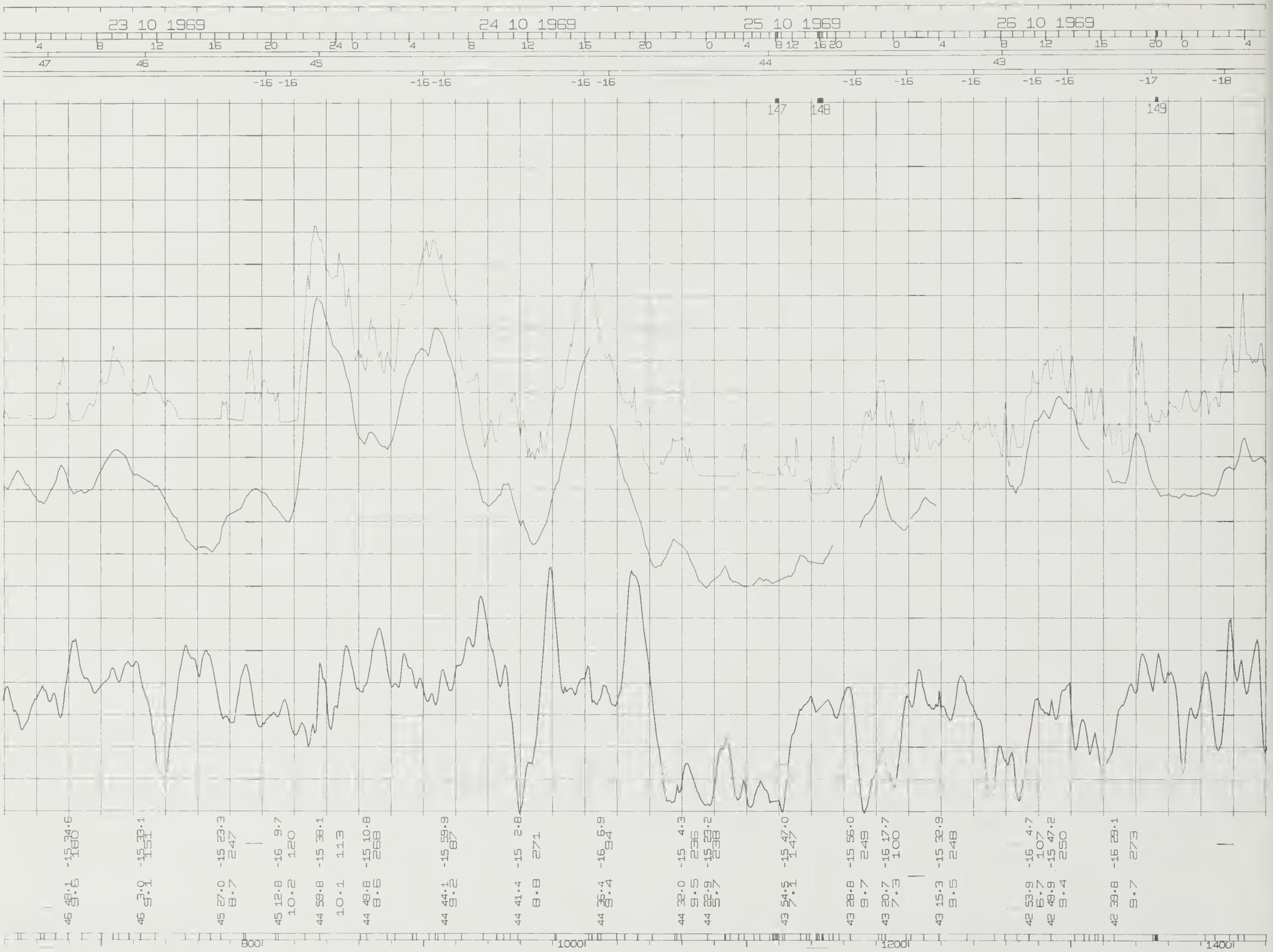

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1 10 1969
2 10 1969
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1800
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2200

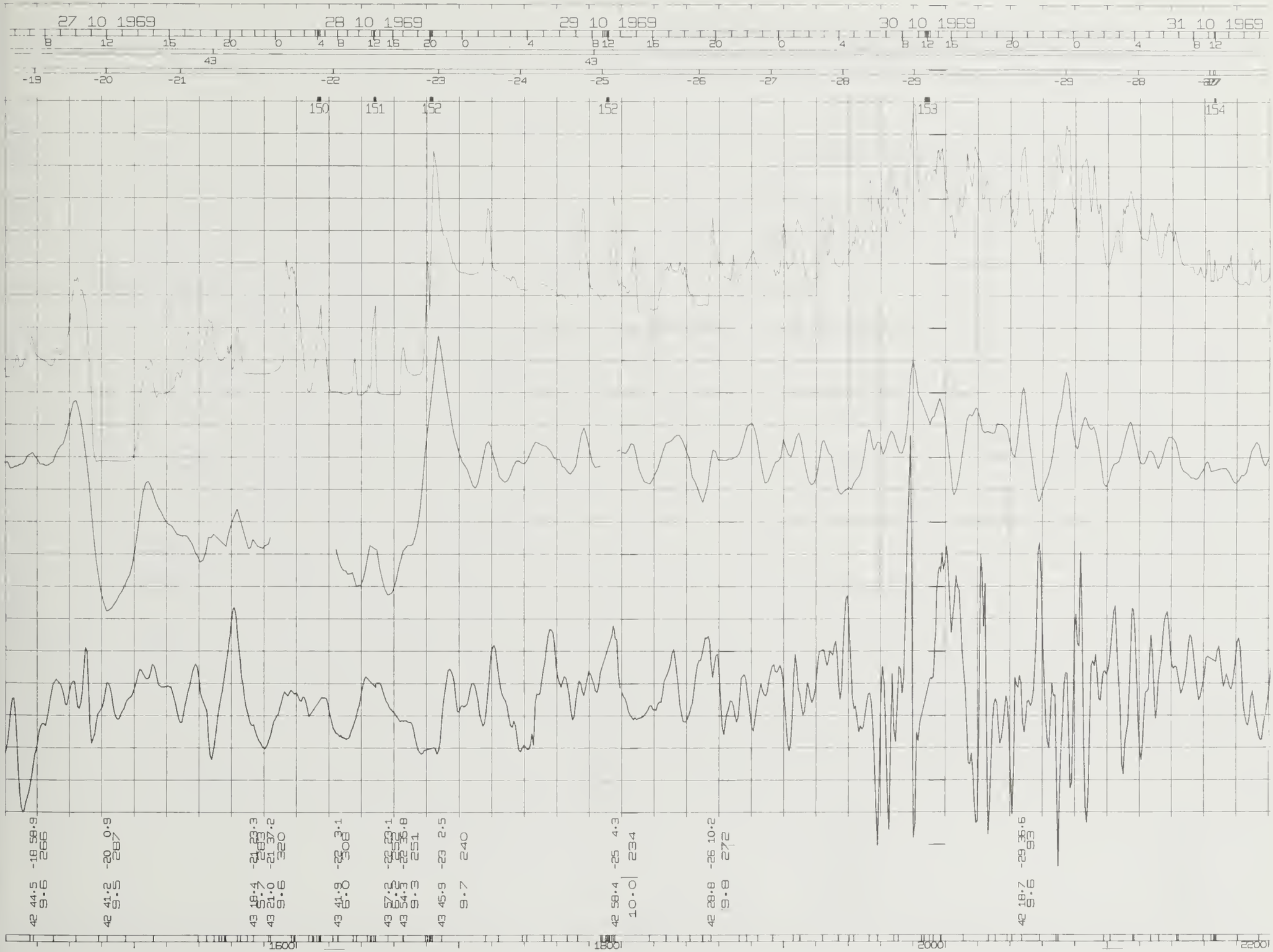

3 10 1969
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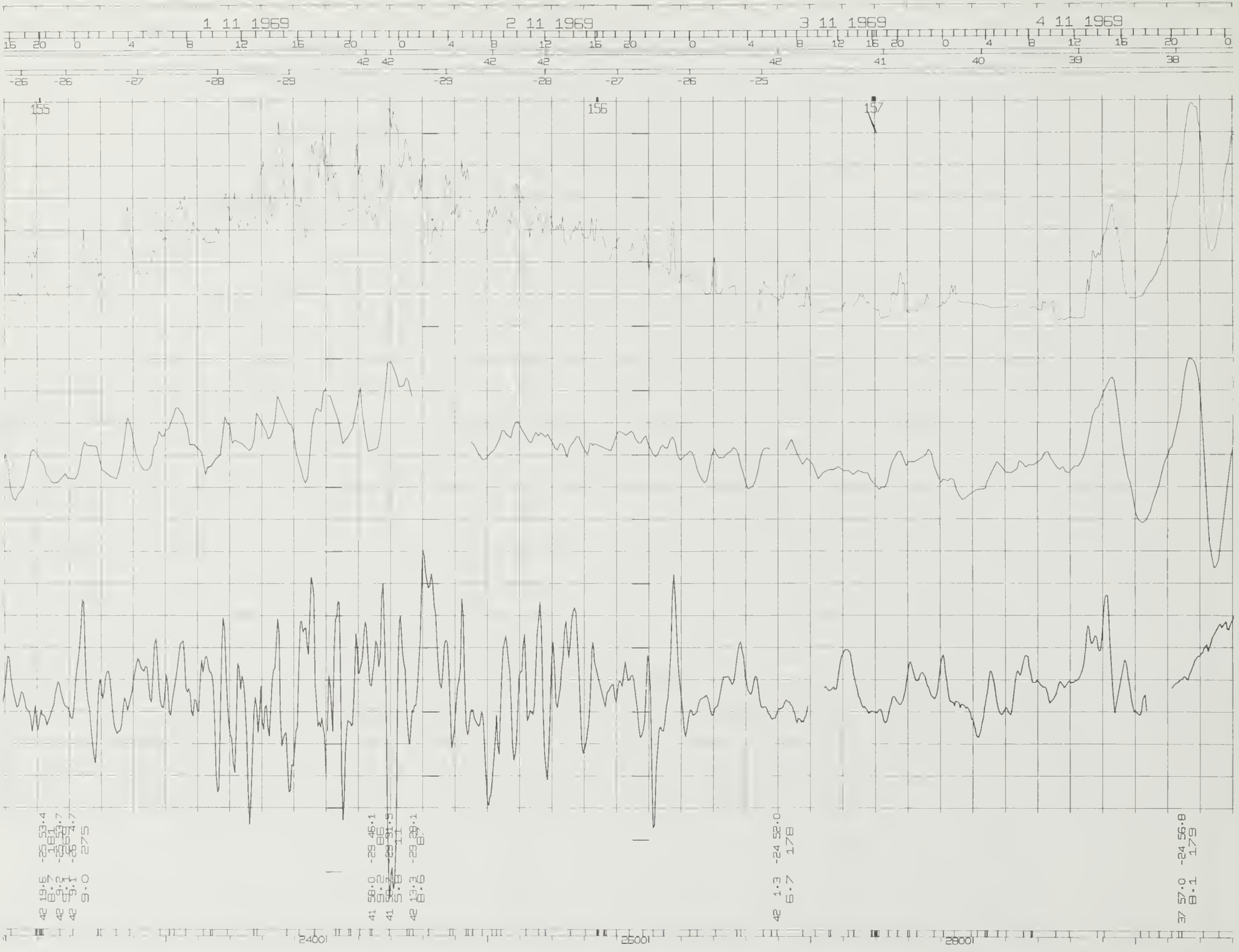

7 10 1969
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3000
3200
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3600

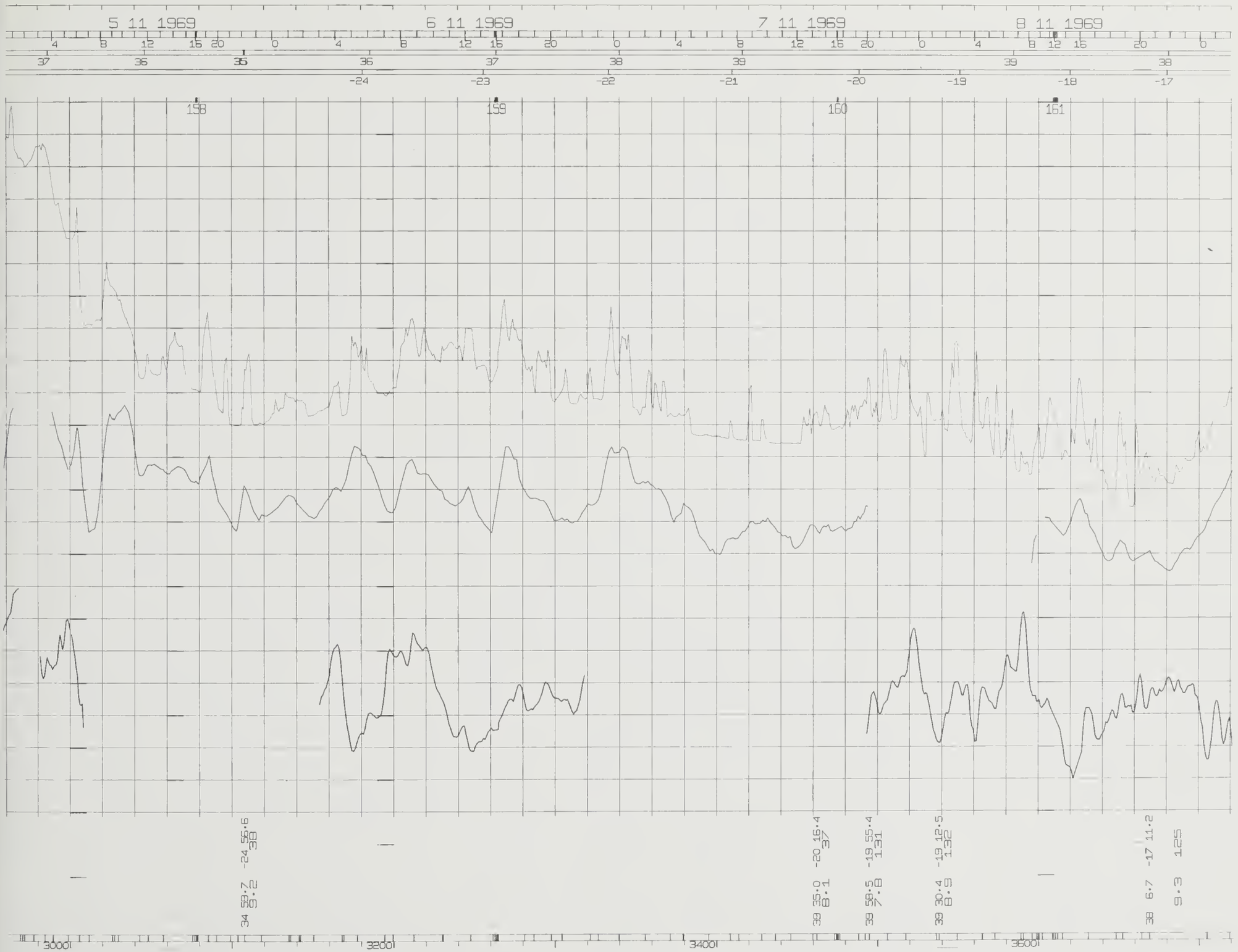

12 10 1969
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15 10 1969
M G D
Brest

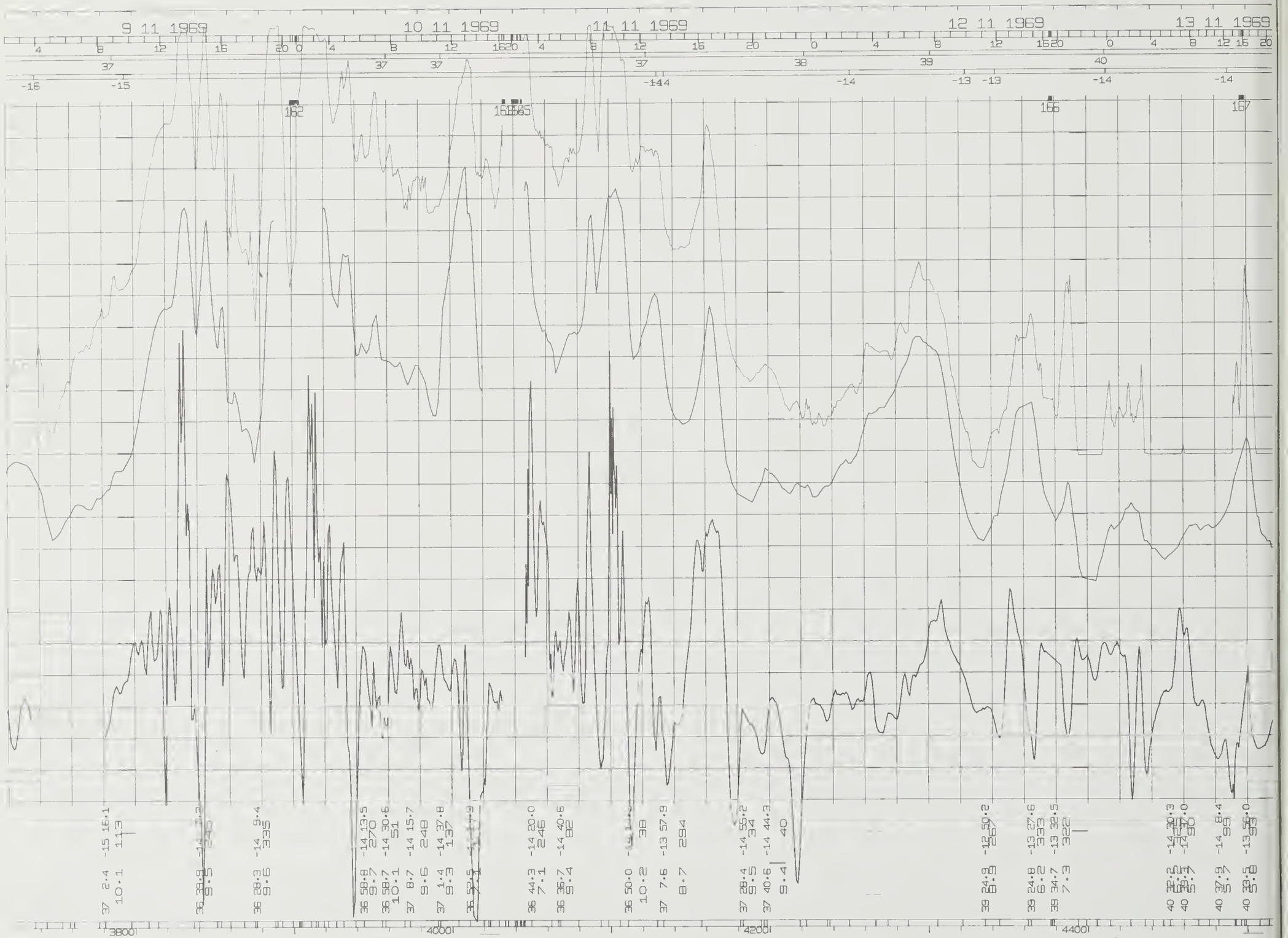

M G D 19 10 1969
20 10 1969
21 10 1969
22 10 1969
Brest

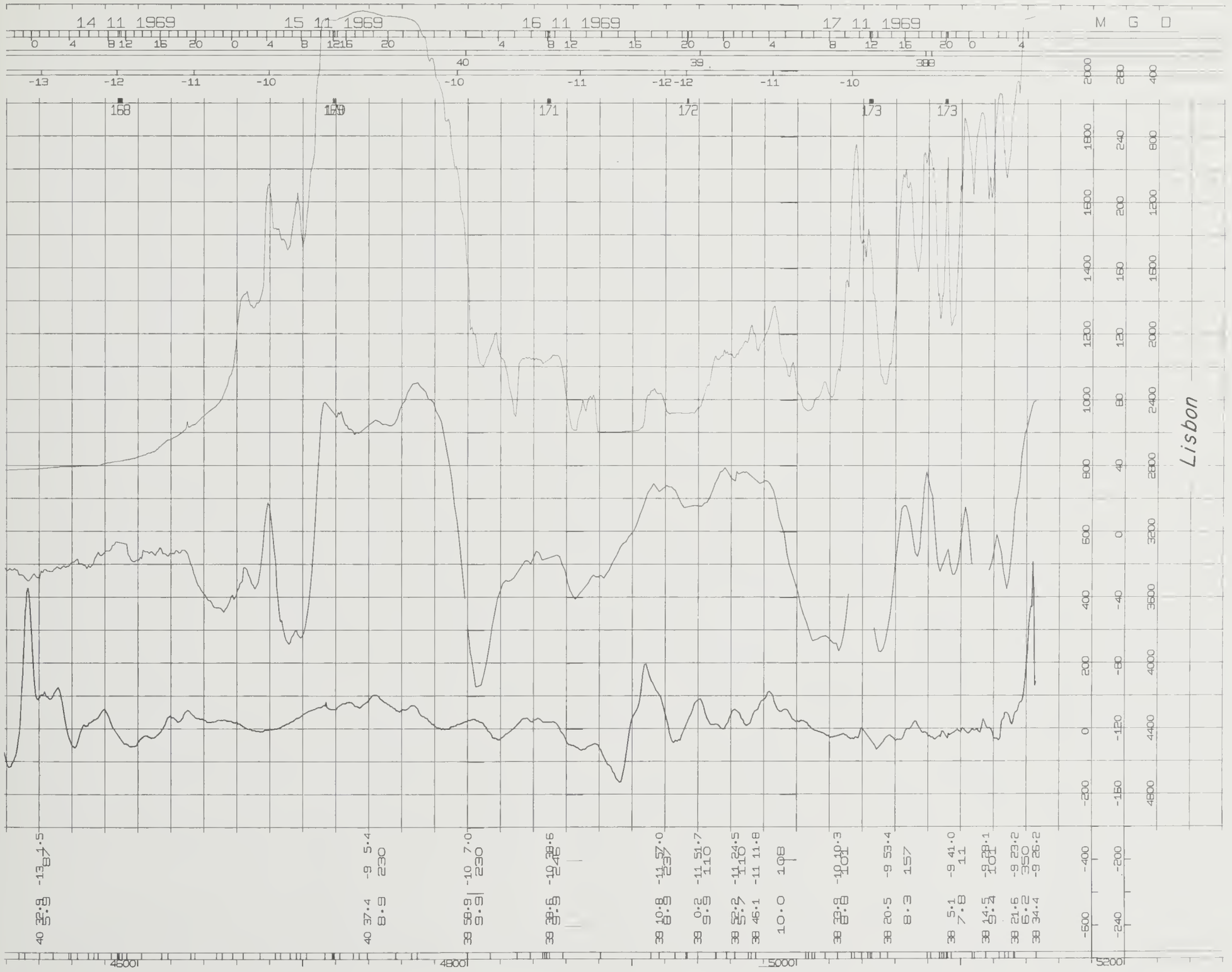

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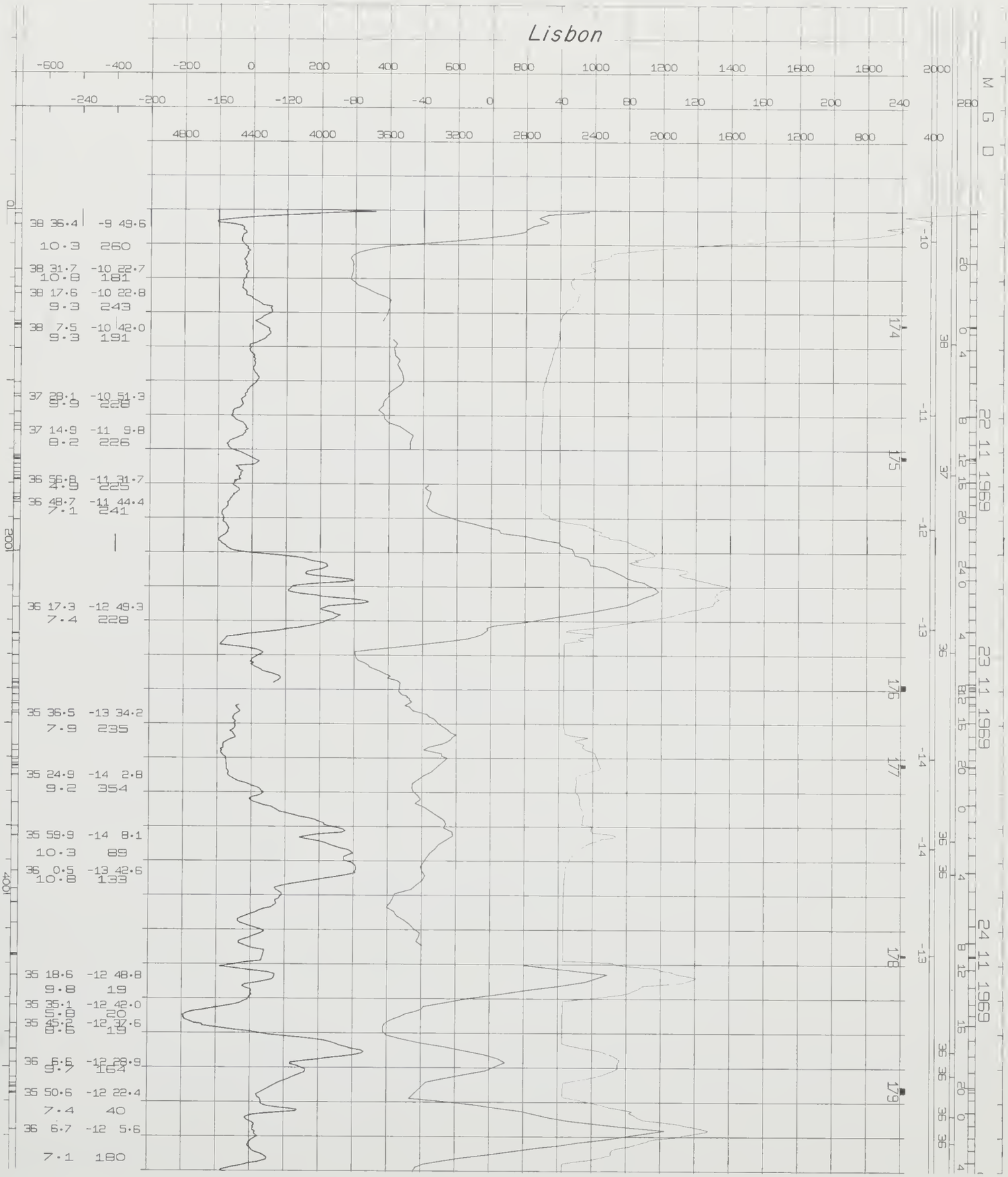

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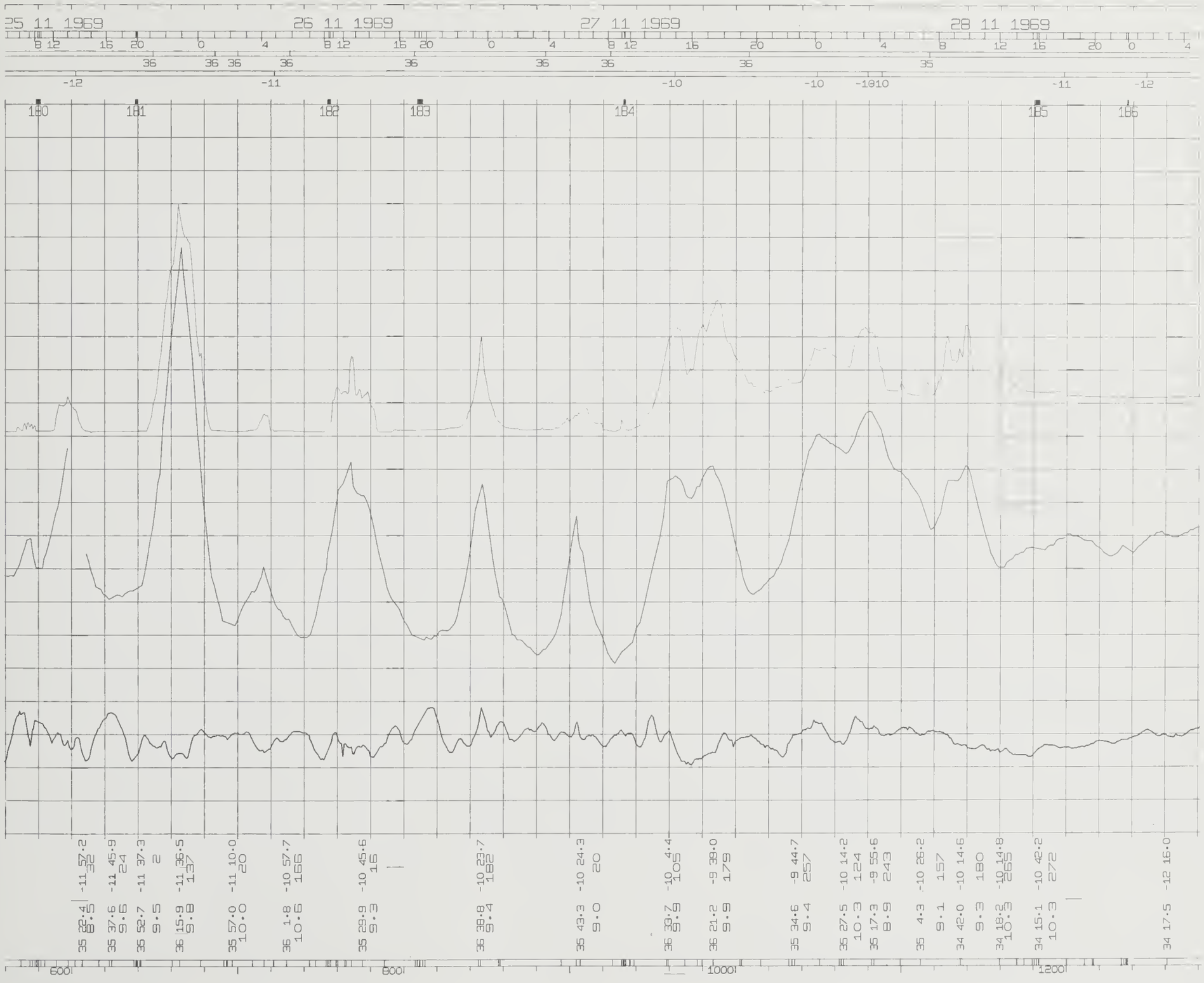

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2 11 1969
3 11 1969
4 11 1969
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2500
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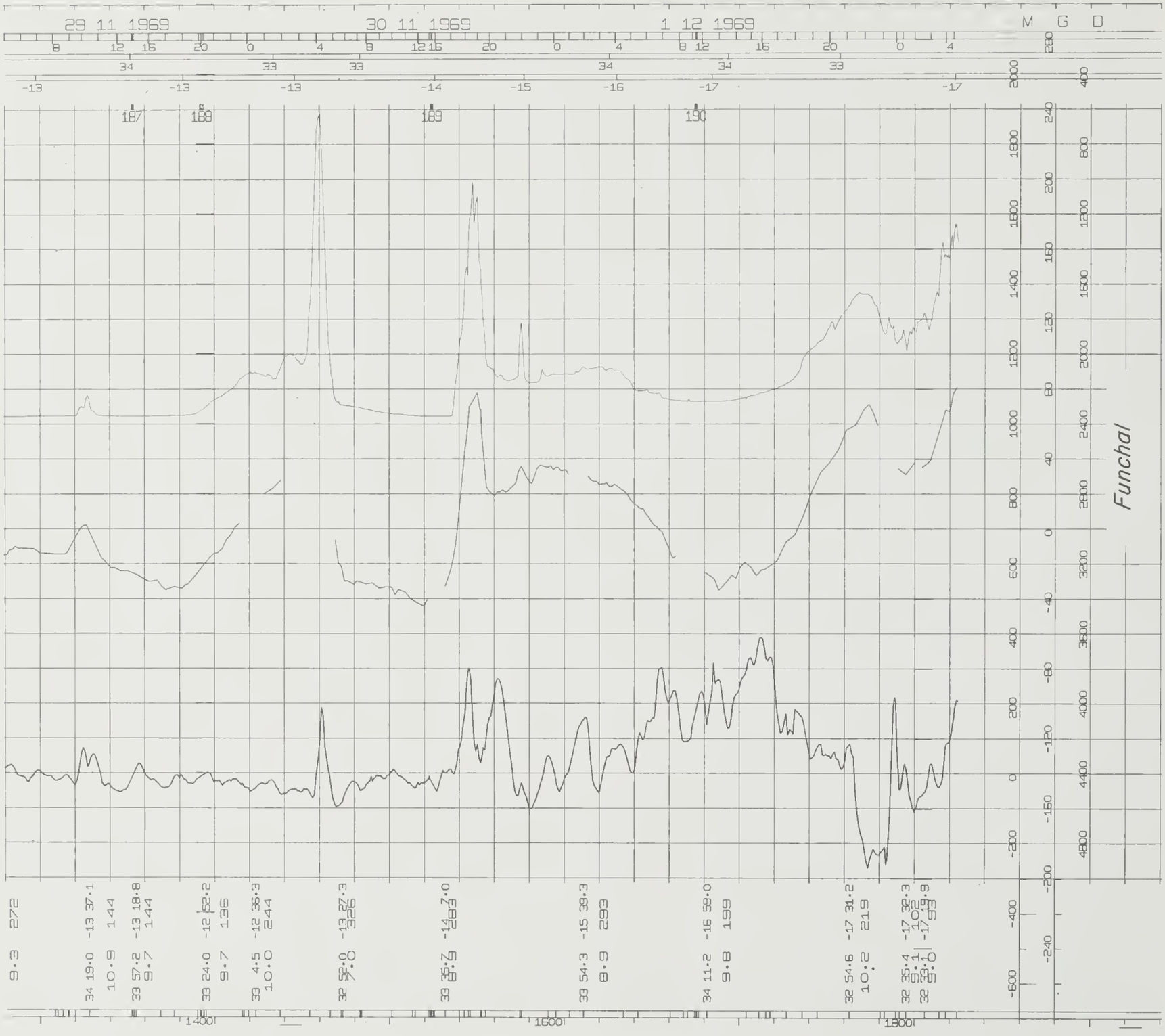

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8 11 1969
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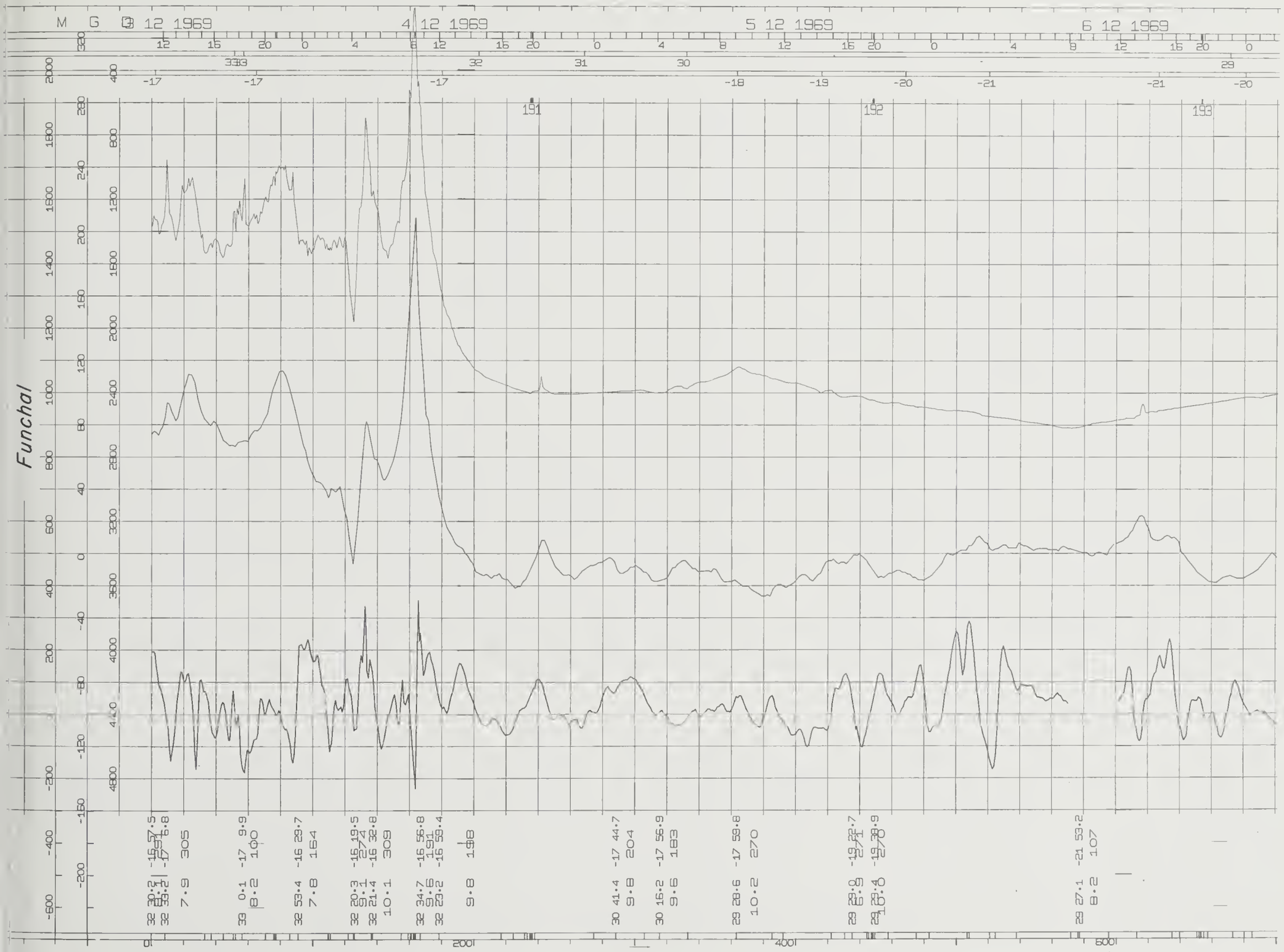

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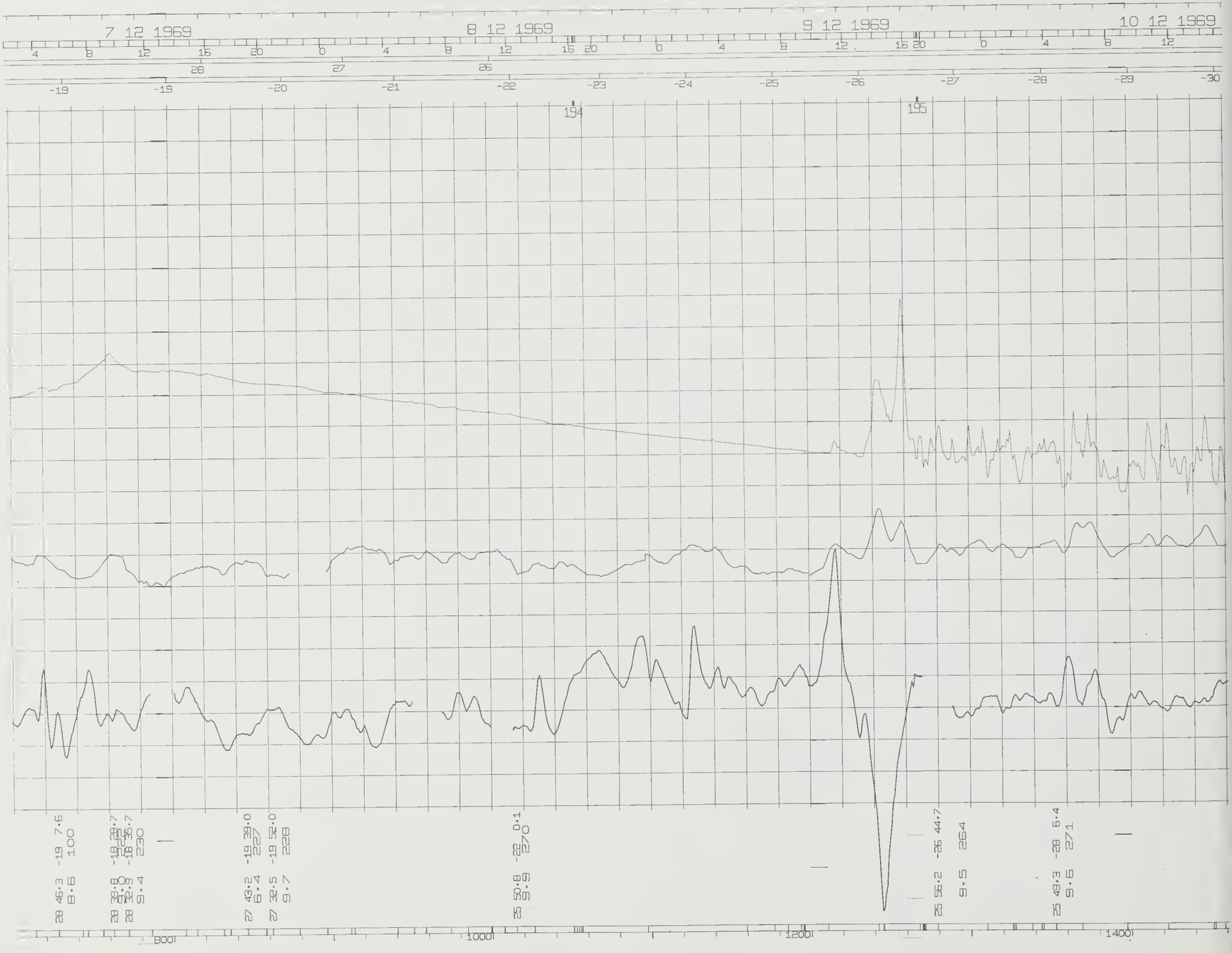

14 11 1969
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16 11 1969
17 11 1969
M G D
Lisbon

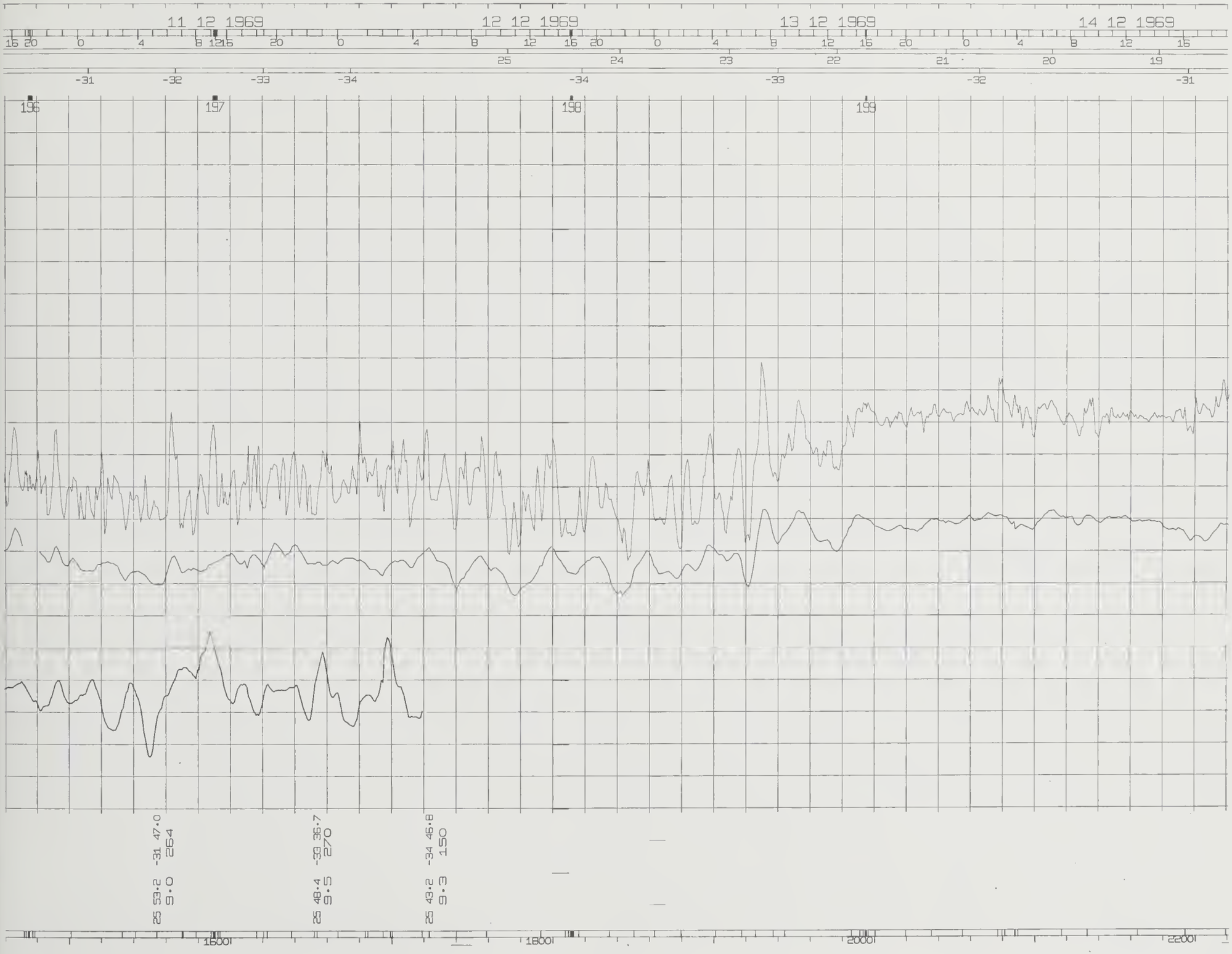

Lisbon
M G D
22 11 1969
23 11 1969
24 11 1969
38 36.4 -9 49.6
10.3 260
38 31.7 -10 22.7
10.8 181
38 17.6 -10 22.8
9.3 243
38 7.5 -10 42.0
9.3 191
37 28.1 -10 51.3
9.9 228
37 14.9 -11 9.8
8.2 226
36 56.8 -11 31.7
4.9 225
36 48.7 -11 44.4
7.1 241
36 17.3 -12 49.3
7.4 228
35 36.5 -13 34.2
7.9 235
35 24.9 -14 2.8
9.2 354
35 59.9 -14 8.1
10.3 89
36 0.5 -13 42.6
10.8 133
35 18.6 -12 48.8
9.8 19
35 35.1 -12 42.0
5.8 20
35 45.2 -12 37.6
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7.4 40
36 6.7 -12 5.6
7.1 180

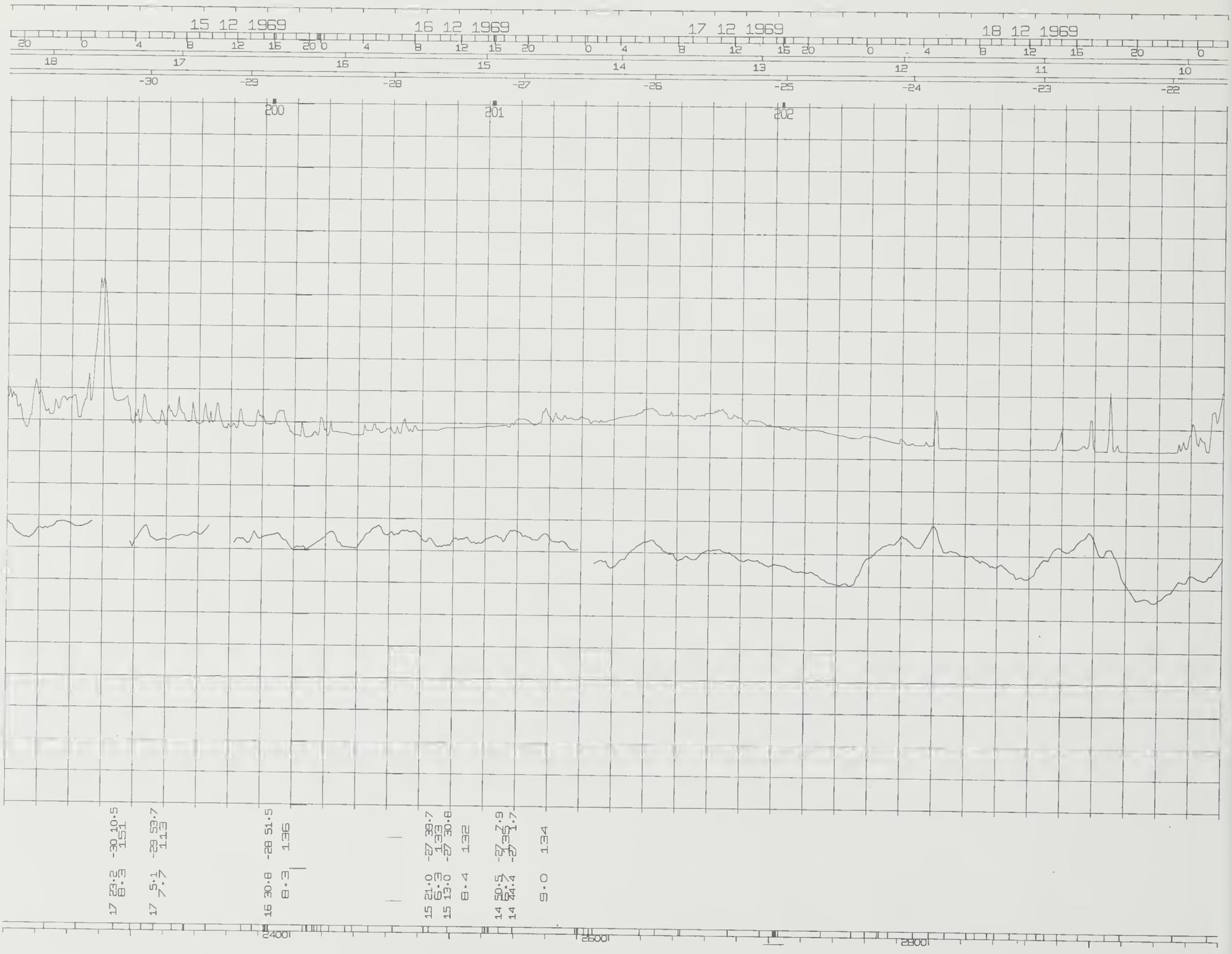

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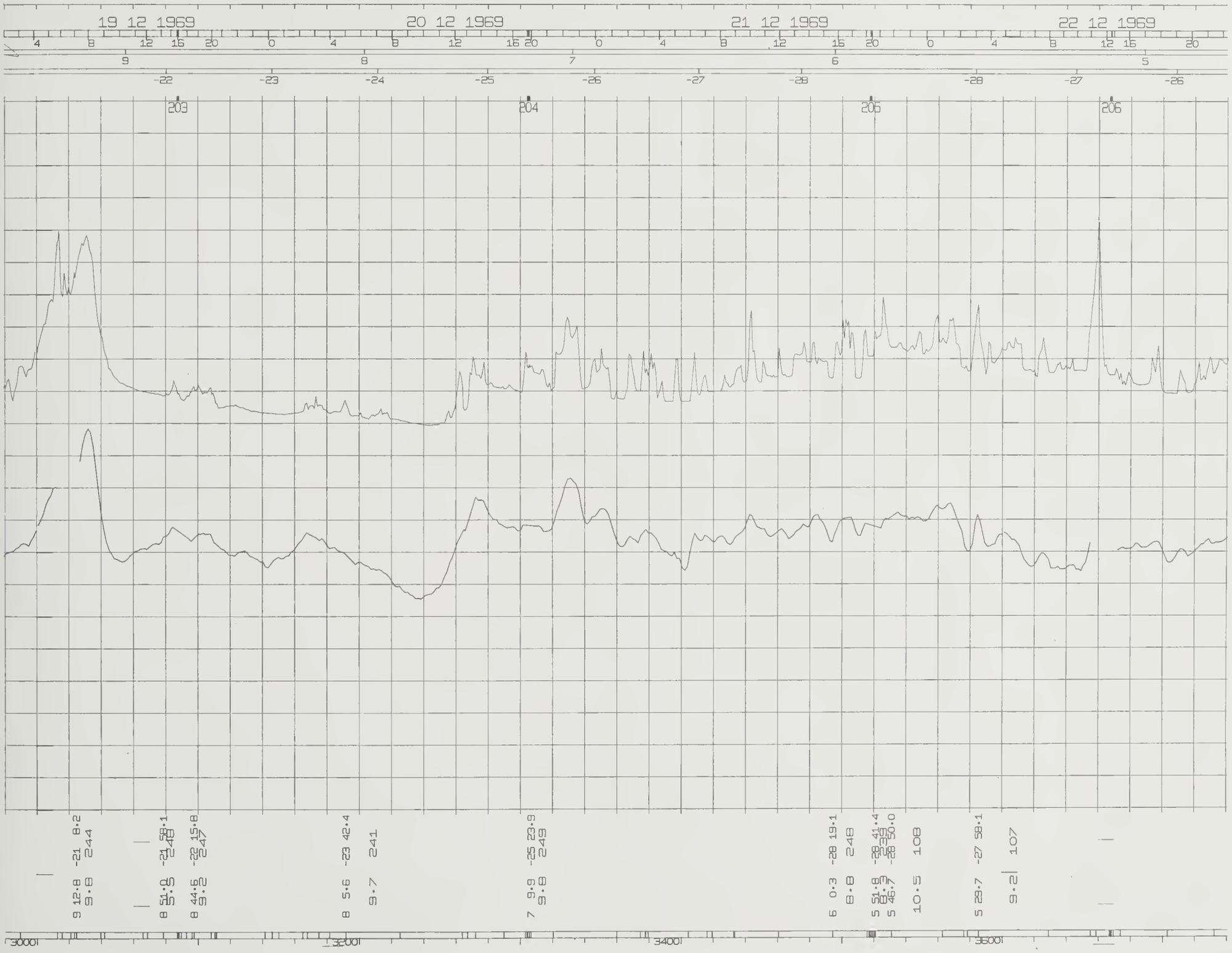

29 11 1969
30 11 1969
1 12 1969
M G D
187
188
189
190
Funchal

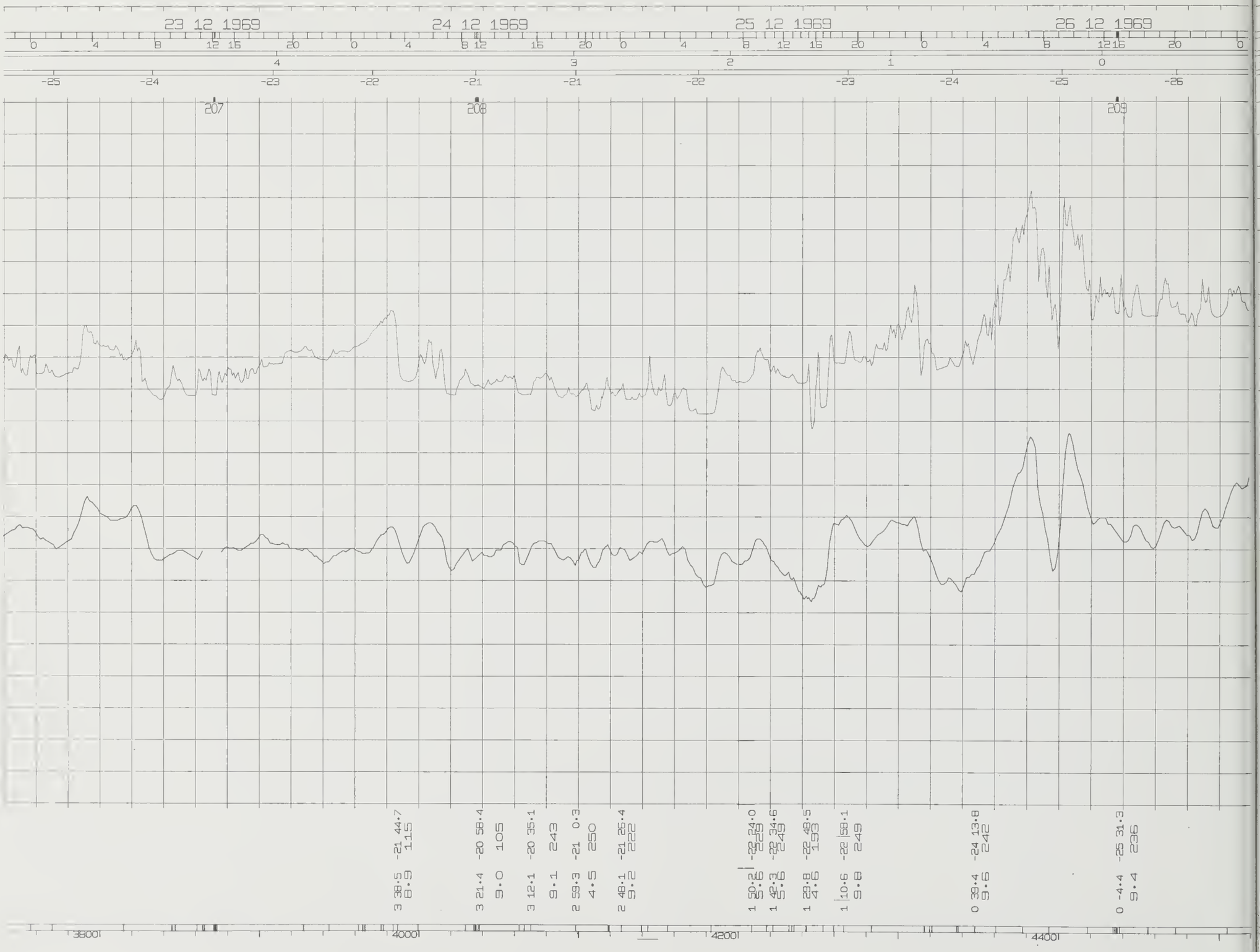

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4 12 1969
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6 12 1969
Funchal
191
192
193

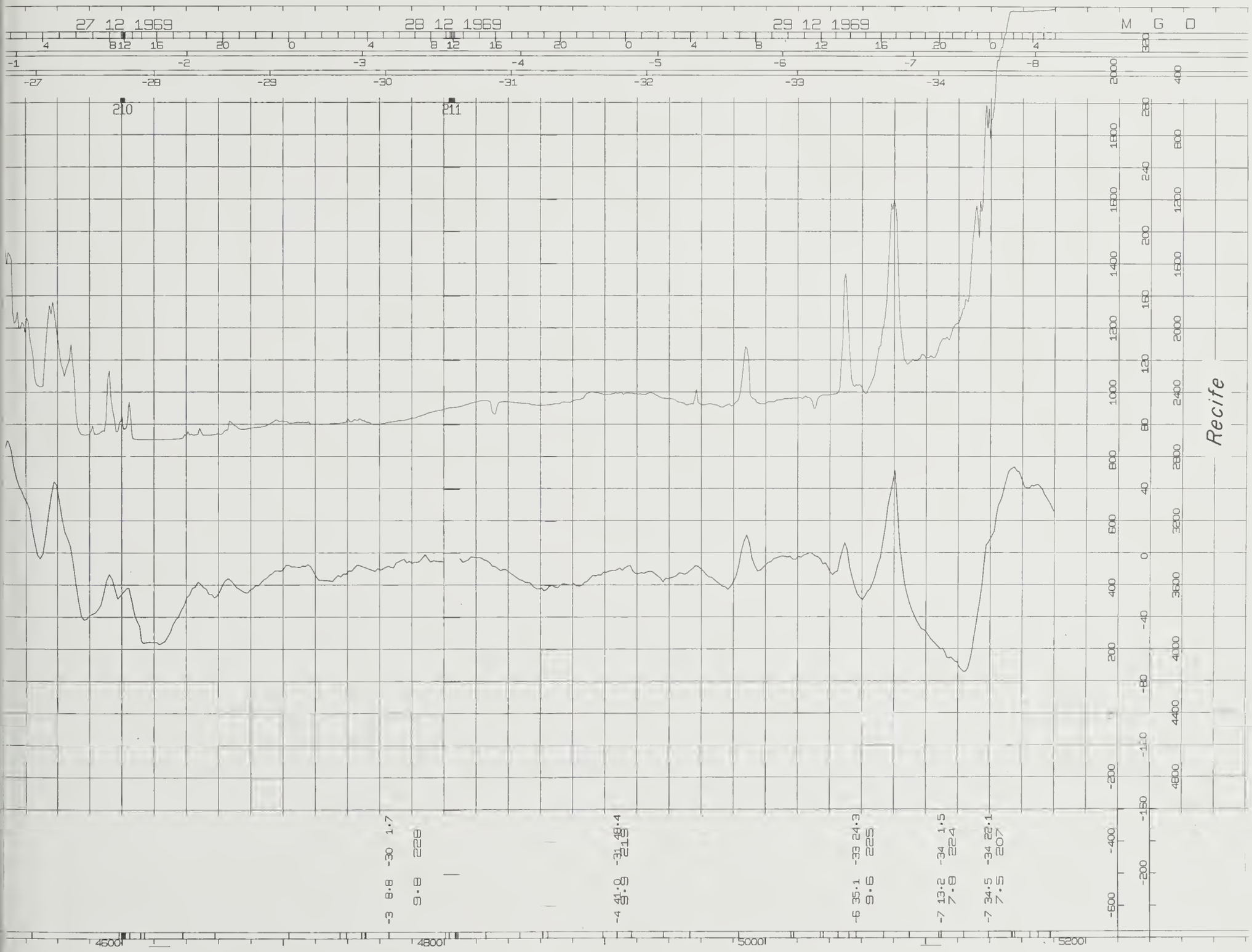

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9 12 1969
10 12 1969
194
195
28 46·3 -19 7·6 100 8·6
28 30·8 -19 28·7 -19 35·7 230 9·4
27 43·2 -19 39·0 227 6·4
27 32·5 -19 52·0 228 9·7
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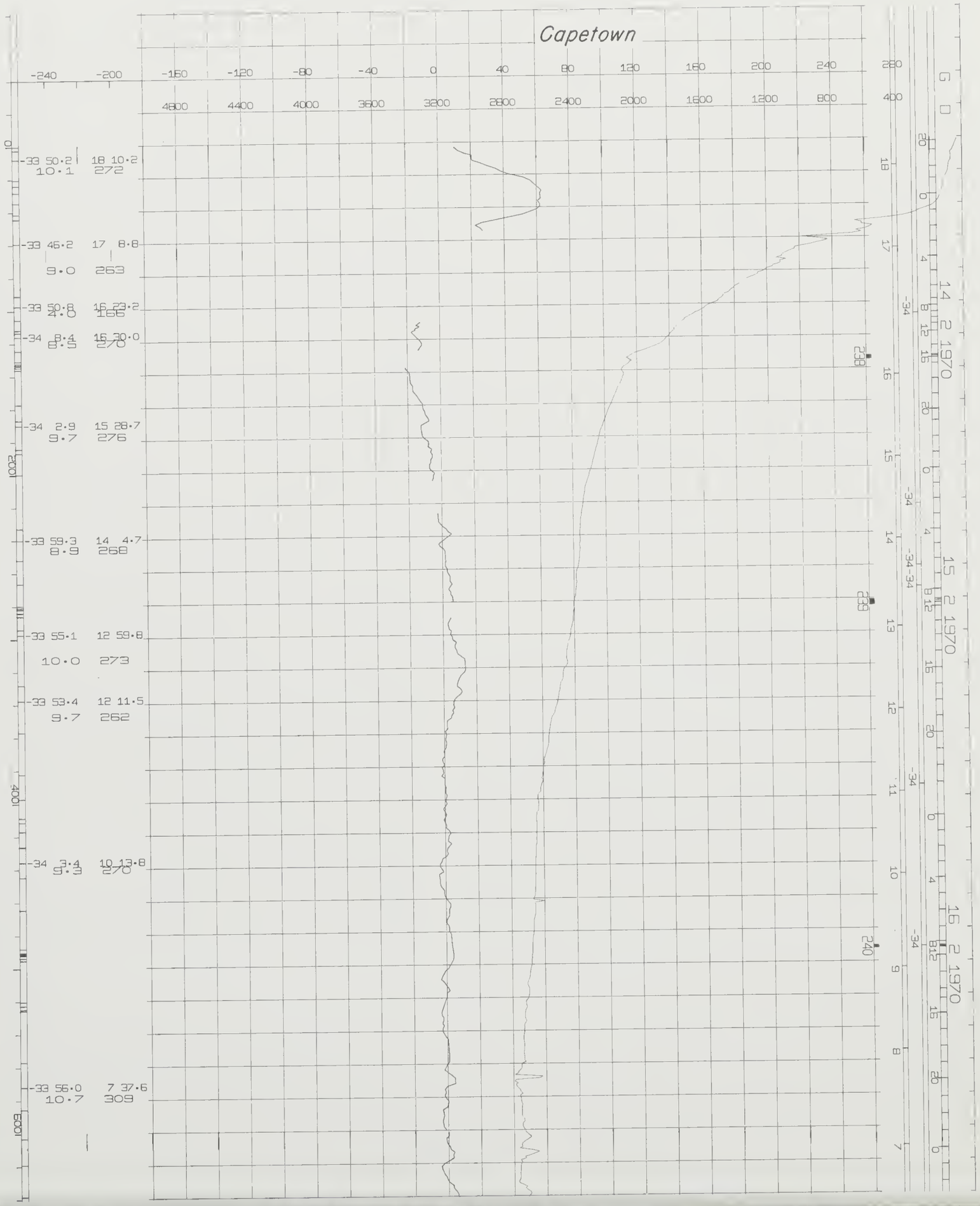

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13 12 1969
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199
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25 48·4 -33 35·7
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25 43·2 -34 46·8
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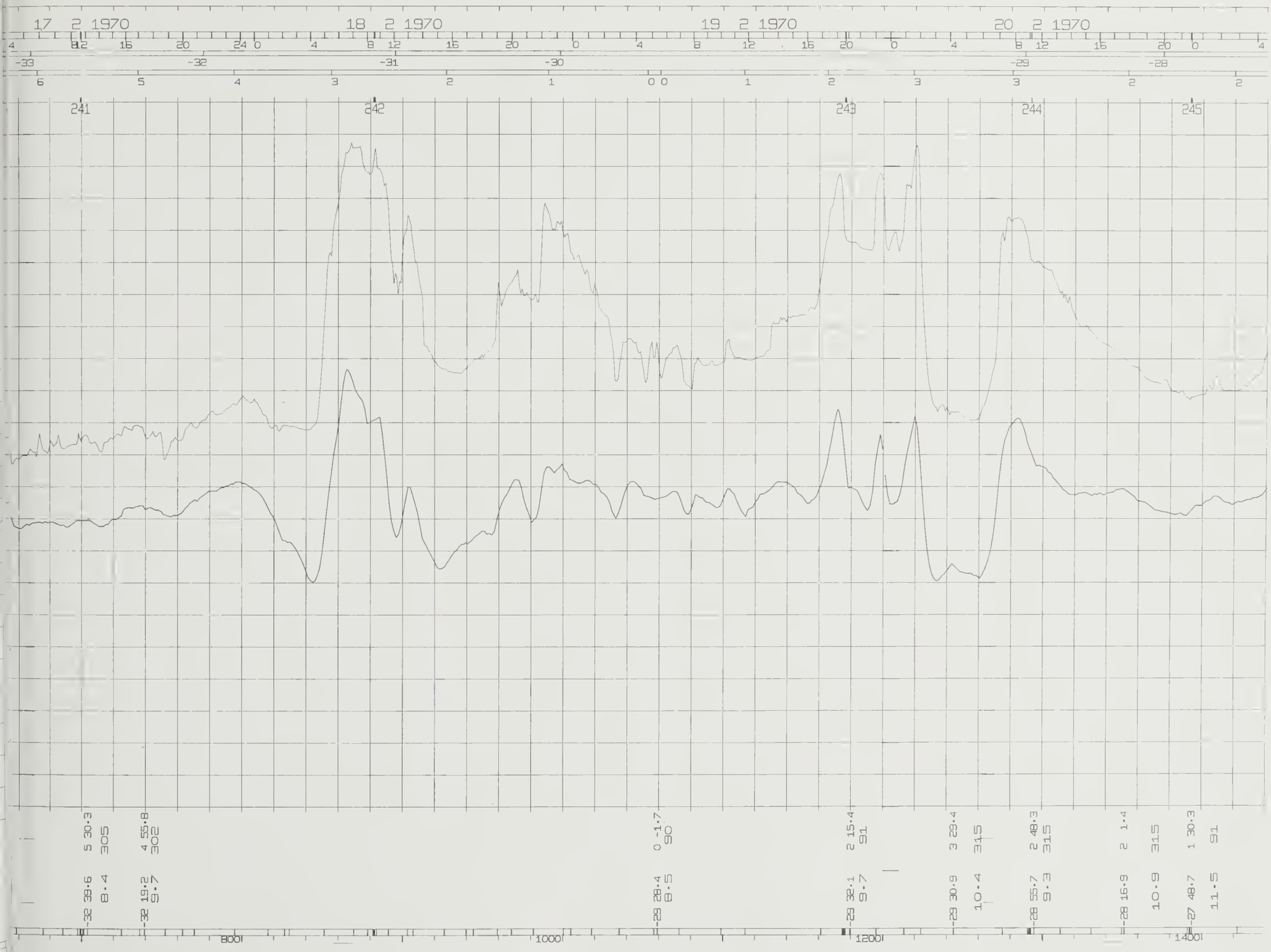

15 12 1969
16 12 1969
17 12 1969
18 12 1969
200
201
202
17 23·2 -30 10·5 151
8·3
17 5·1 -29 53·7 113
7·7
16 30·8 -28 51·5 136
8·3
15 21·0 -27 38·7 133
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2400
2500
2600

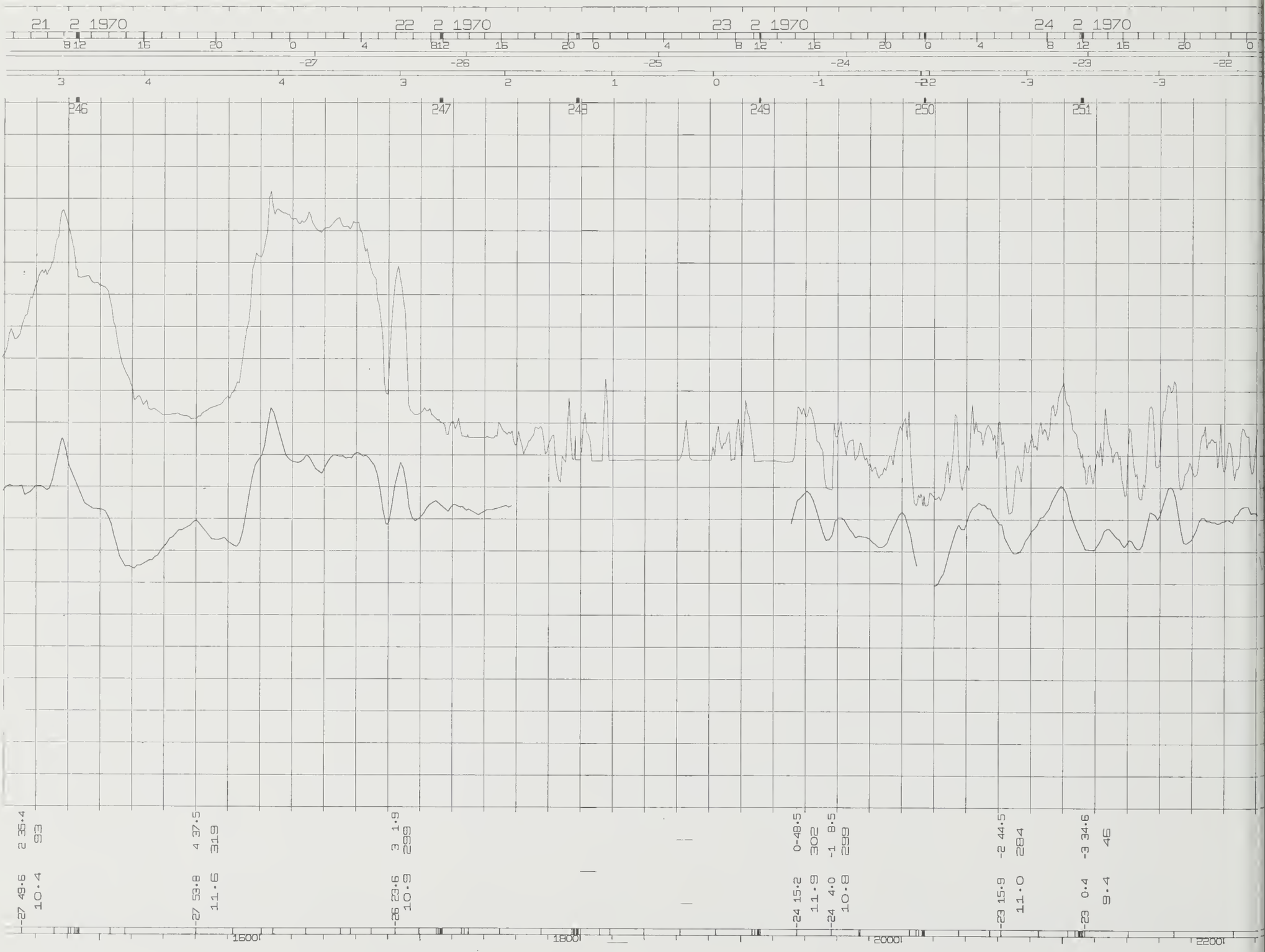

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22 12 1969
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3600

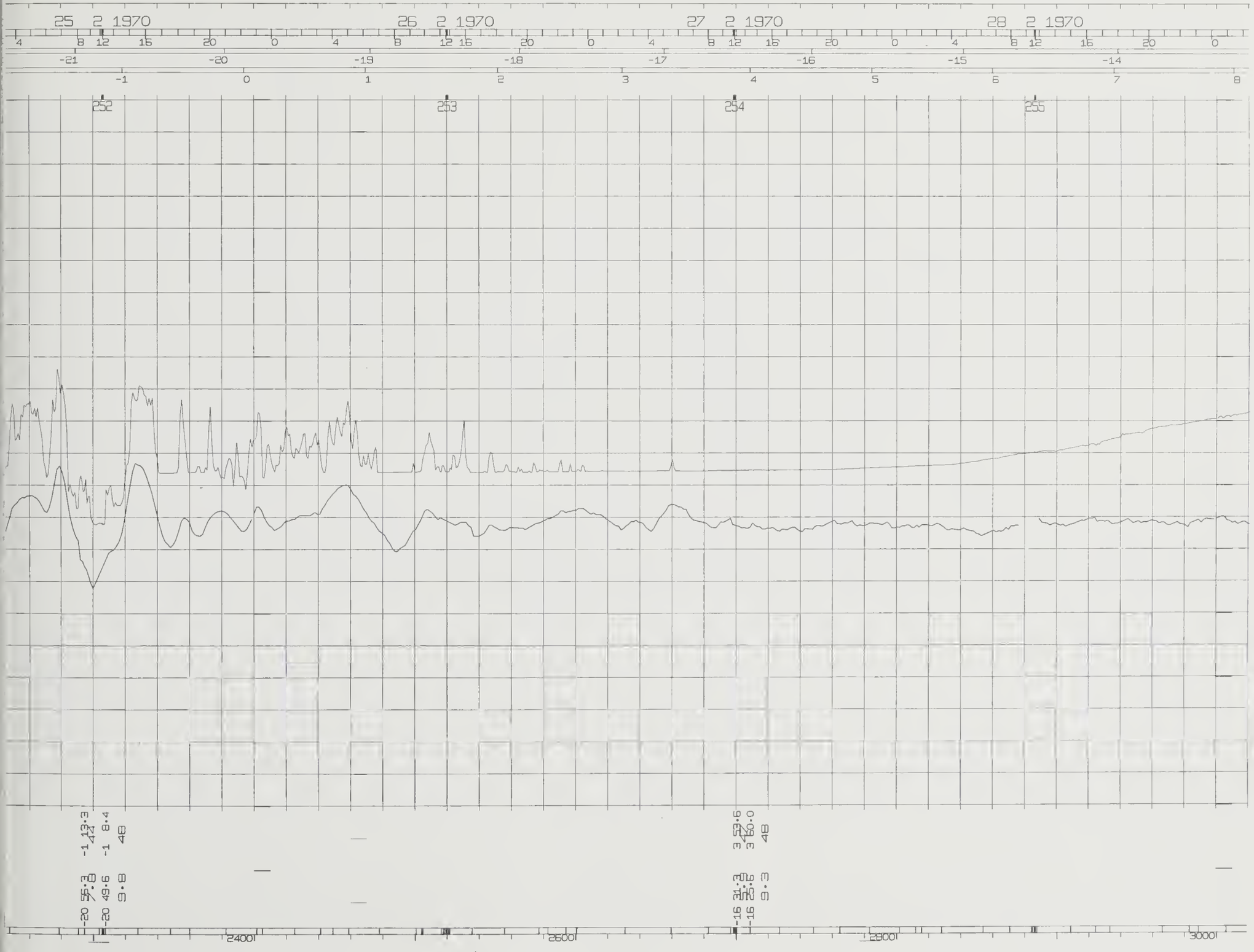

23 12 1969
24 12 1969
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26 12 1969
207
208
209
3 38·5 -21 44·7
8·9 115
3 21·4 -20 58·4
9·0 105
3 12·1 -20 35·1
9·1 243
2 59·3 -21 0·3
4·5 250
2 48·1 -21 25·4
9·2 222
1 50·2 -22 24·0
5·6 229
1 42·3 -22 34·6
5·6 249
1 28·8 -22 48·5
4·6 193
1 10·6 -22 58·1
9·8 249
0 39·4 -24 13·8
9·6 242
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9·4 236
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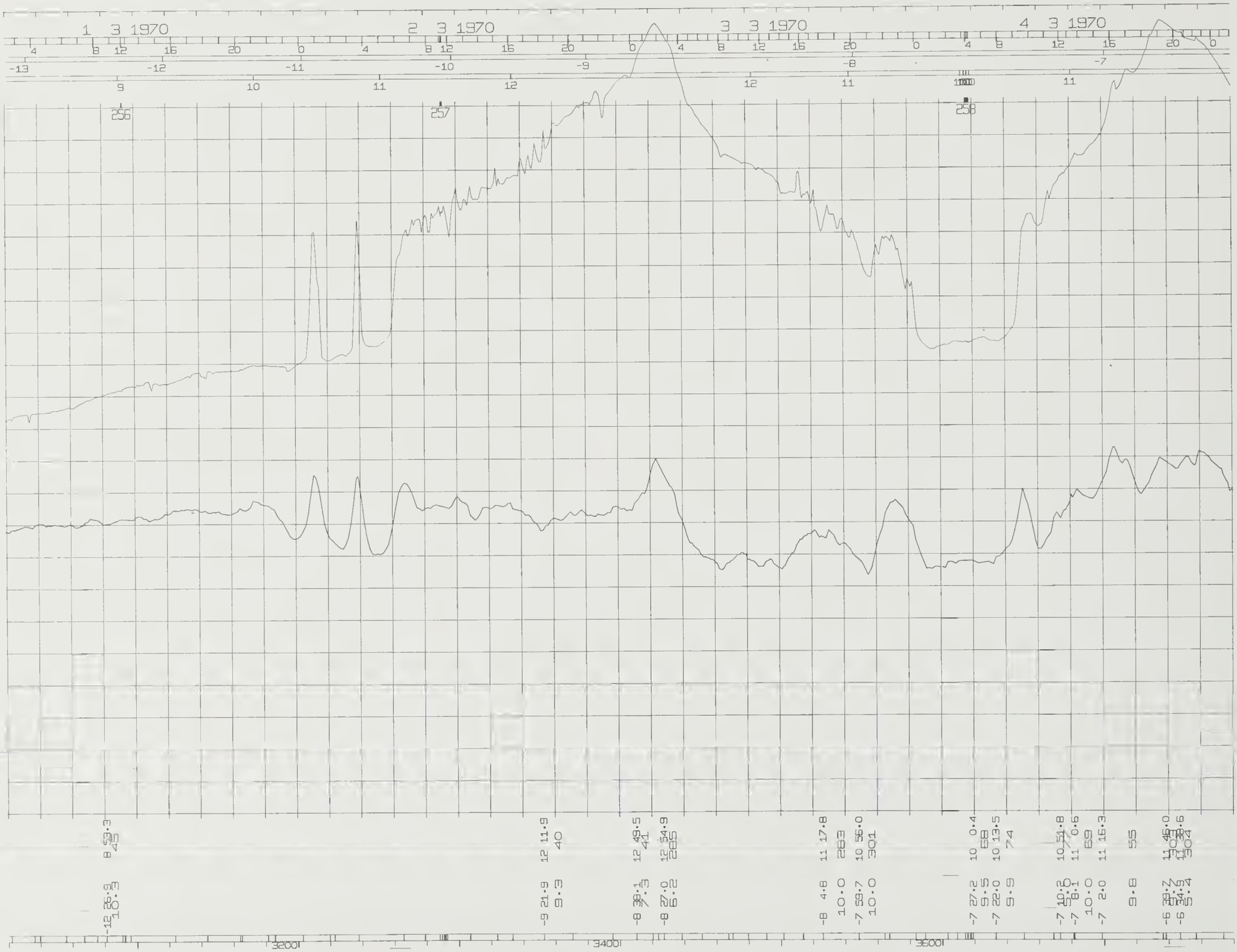

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29 12 1969
M G D
210
211
Recife
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9·8 228
-4 41·0 -31 48·4
5·9 215
-6 35·1 -33 24·3
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7·8 224
-7 34·5 -34 22·1
7·5 207
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5000
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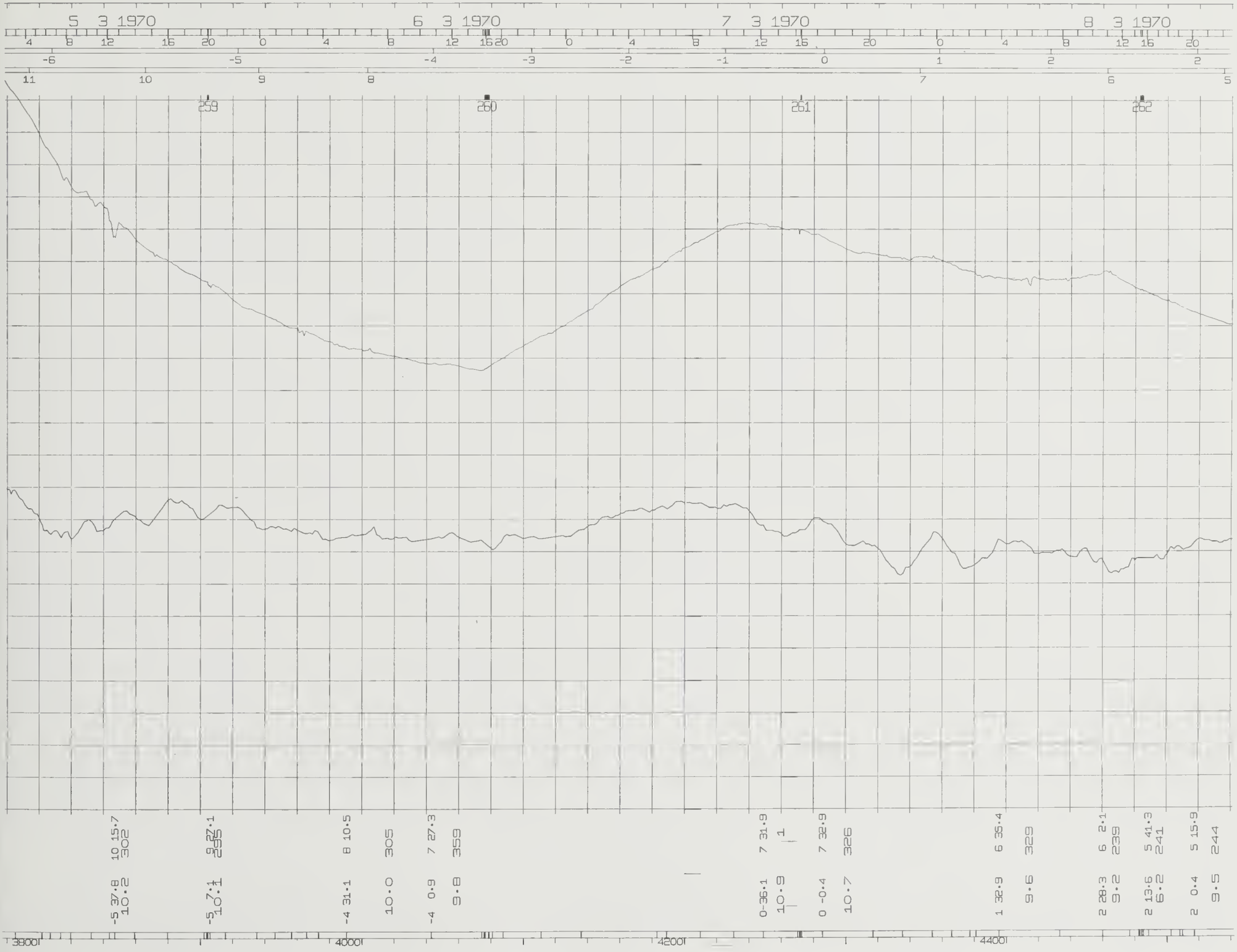

Capetown
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200
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4800
4400
4000
3600
3200
2800
2400
2000
1600
1200
800
-33 50·2 18 10·2
10·1 272
-33 46·2 17 8·8
9·0 263
-33 50·8 16 23·2
4·0 166
-34 8·4 15 30·0
8·5 270
-34 2·9 15 28·7
9·7 276
-33 59·3 14 4·7
8·9 268
-33 55·1 12 59·8
10·0 273
-33 53·4 12 11·5
9·7 262
-34 3·4 10 13·8
9·3 270
-33 56·0 7 37·6
10·7 309
238
239
240
14 2 1970
15 2 1970
16 2 1970
GD

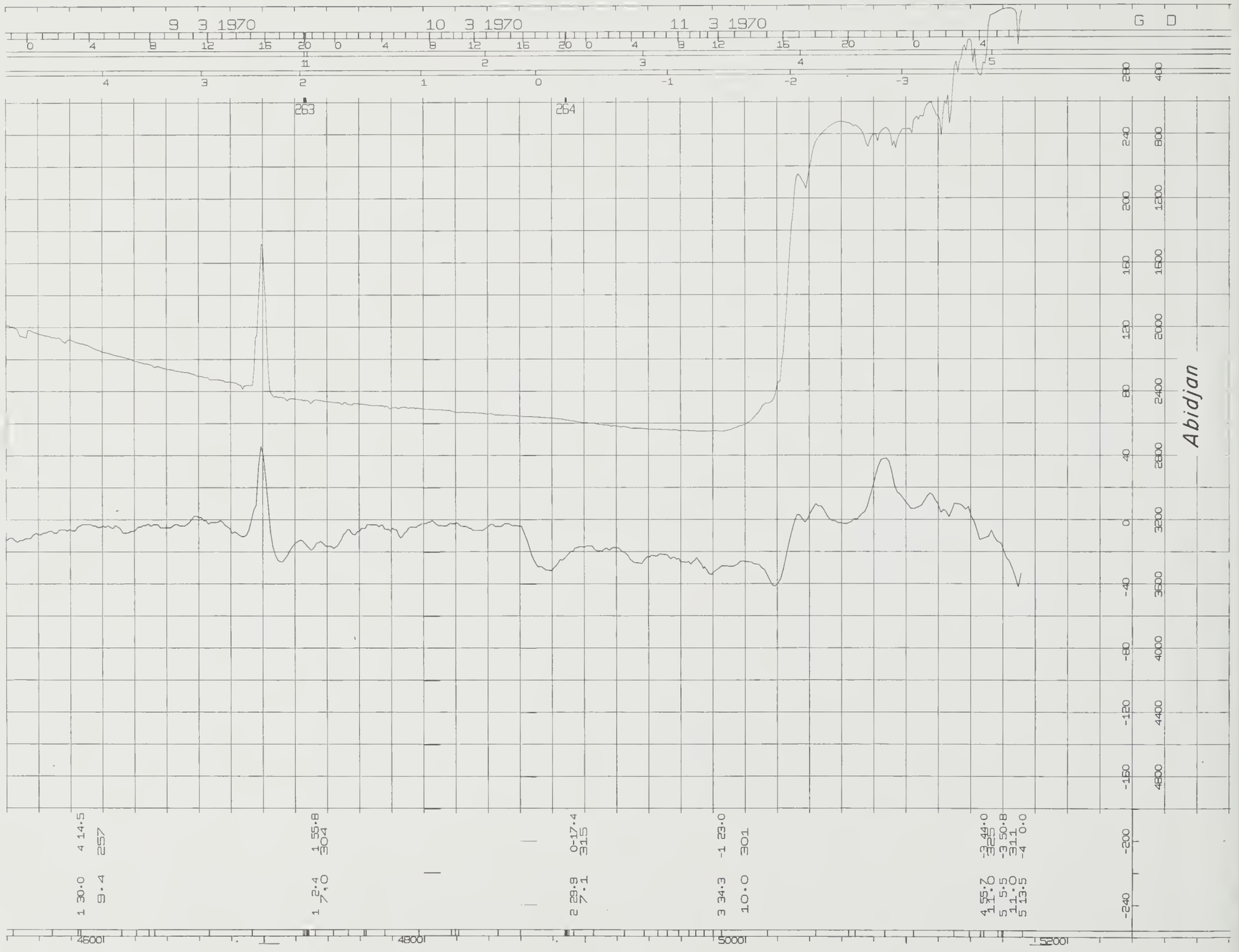

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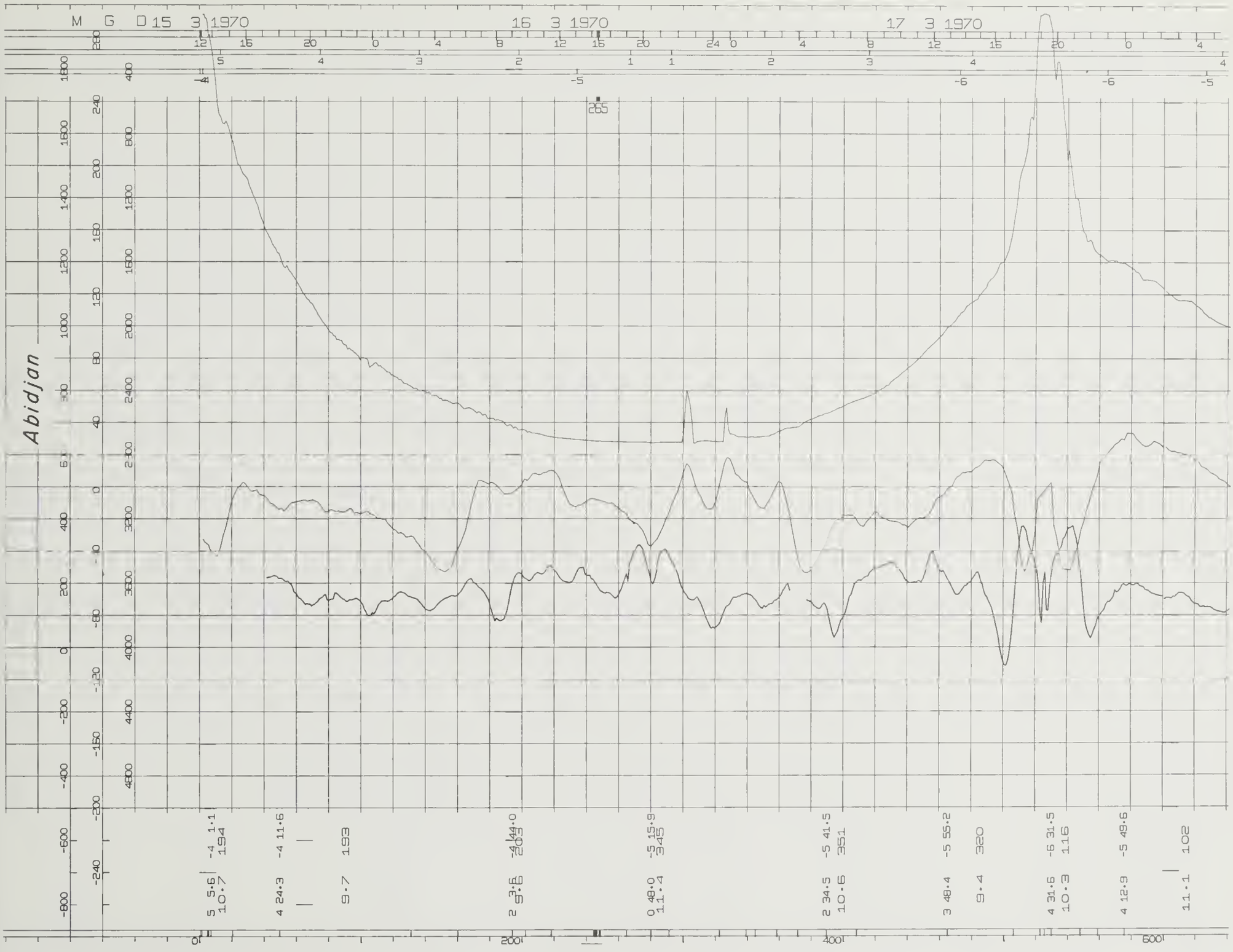

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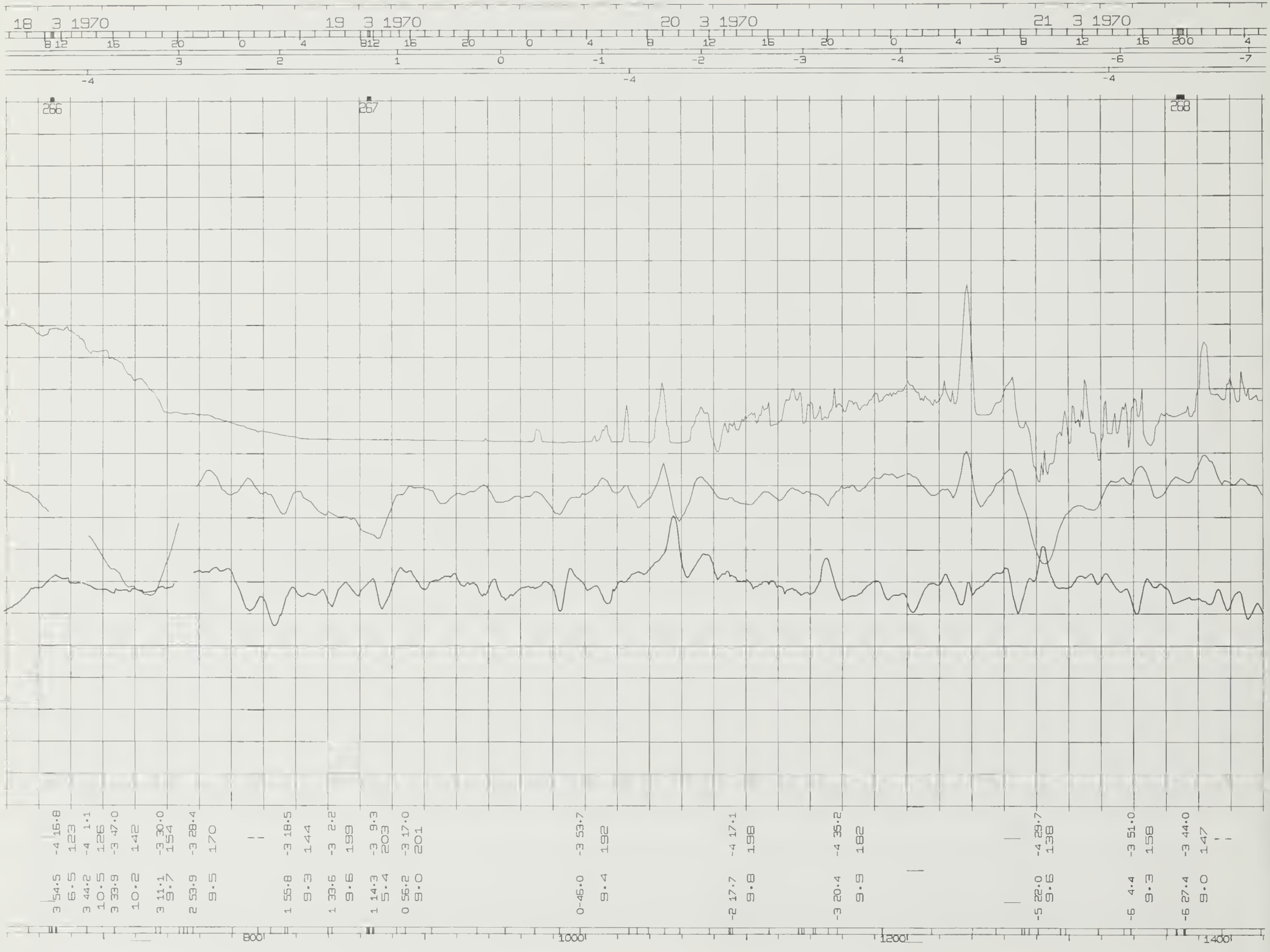

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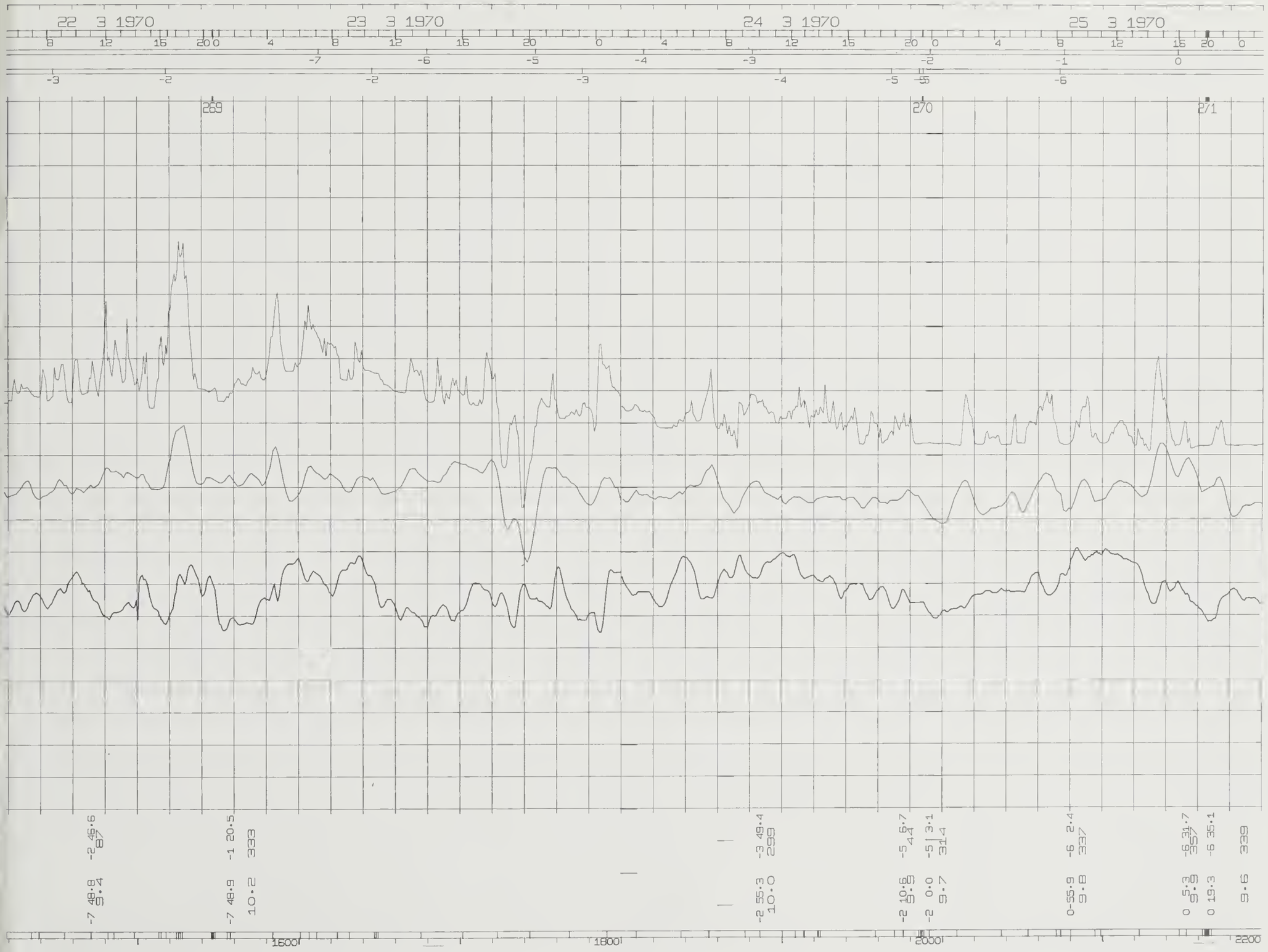

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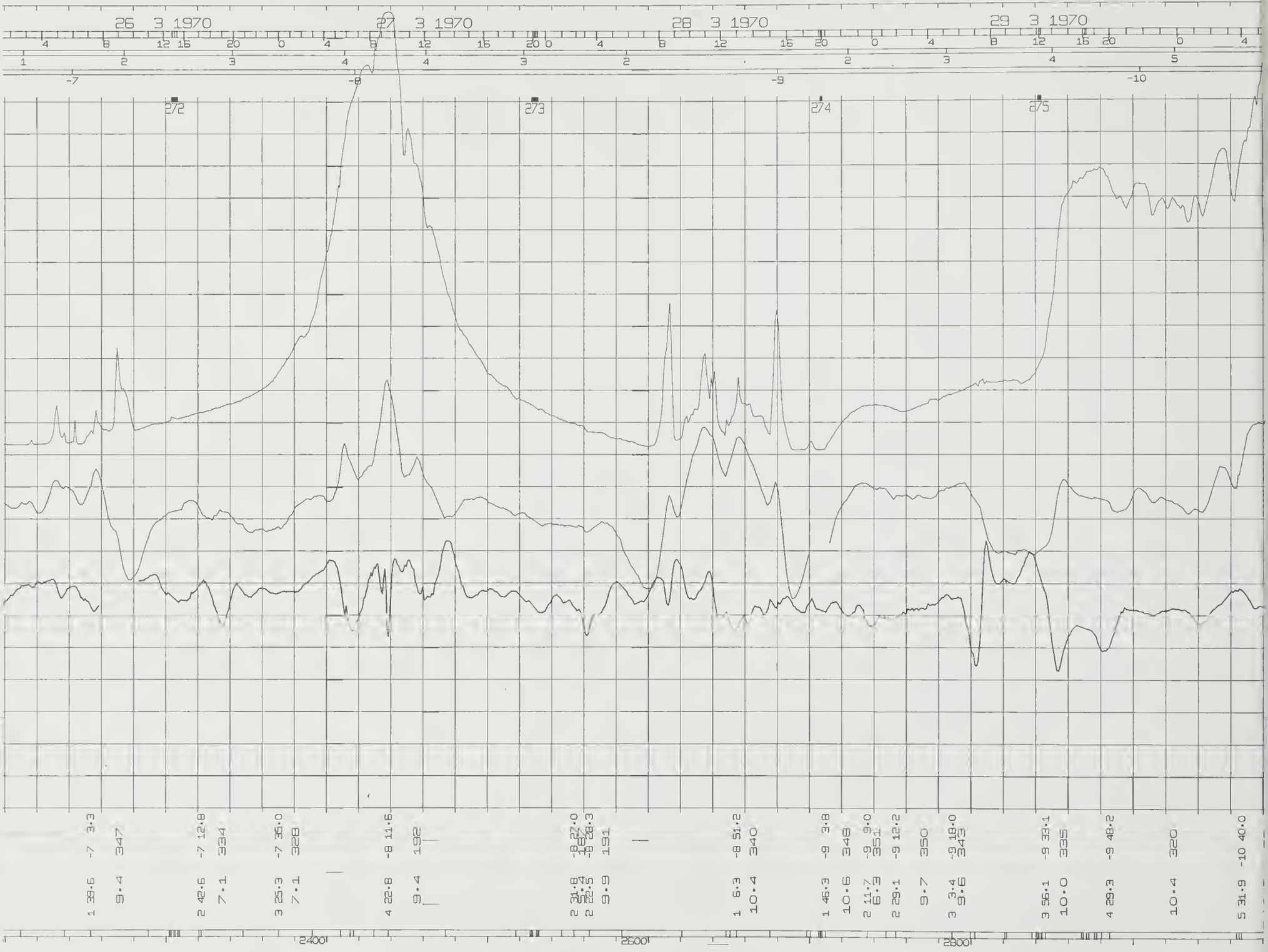

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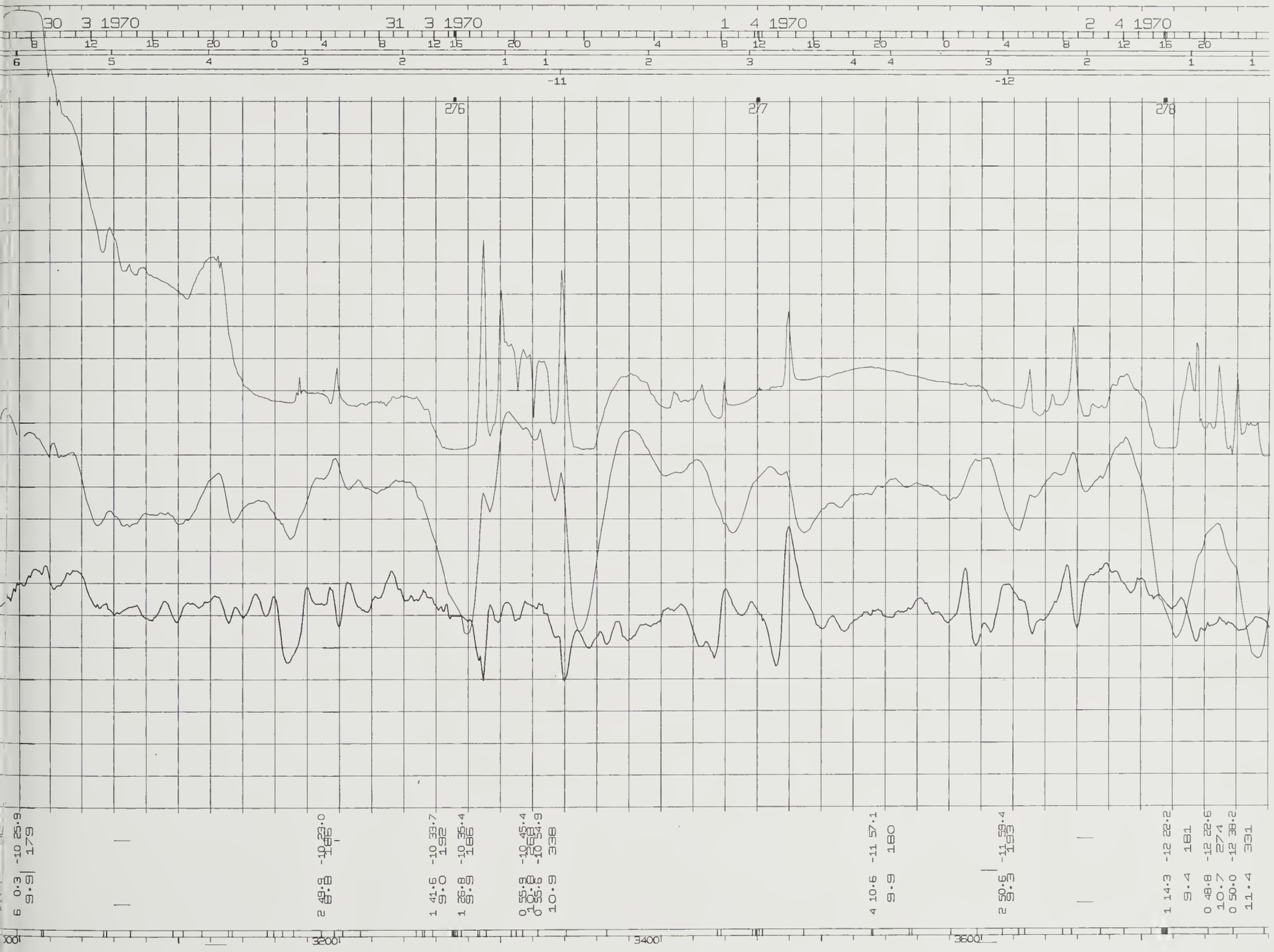

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263
264
Abidjan

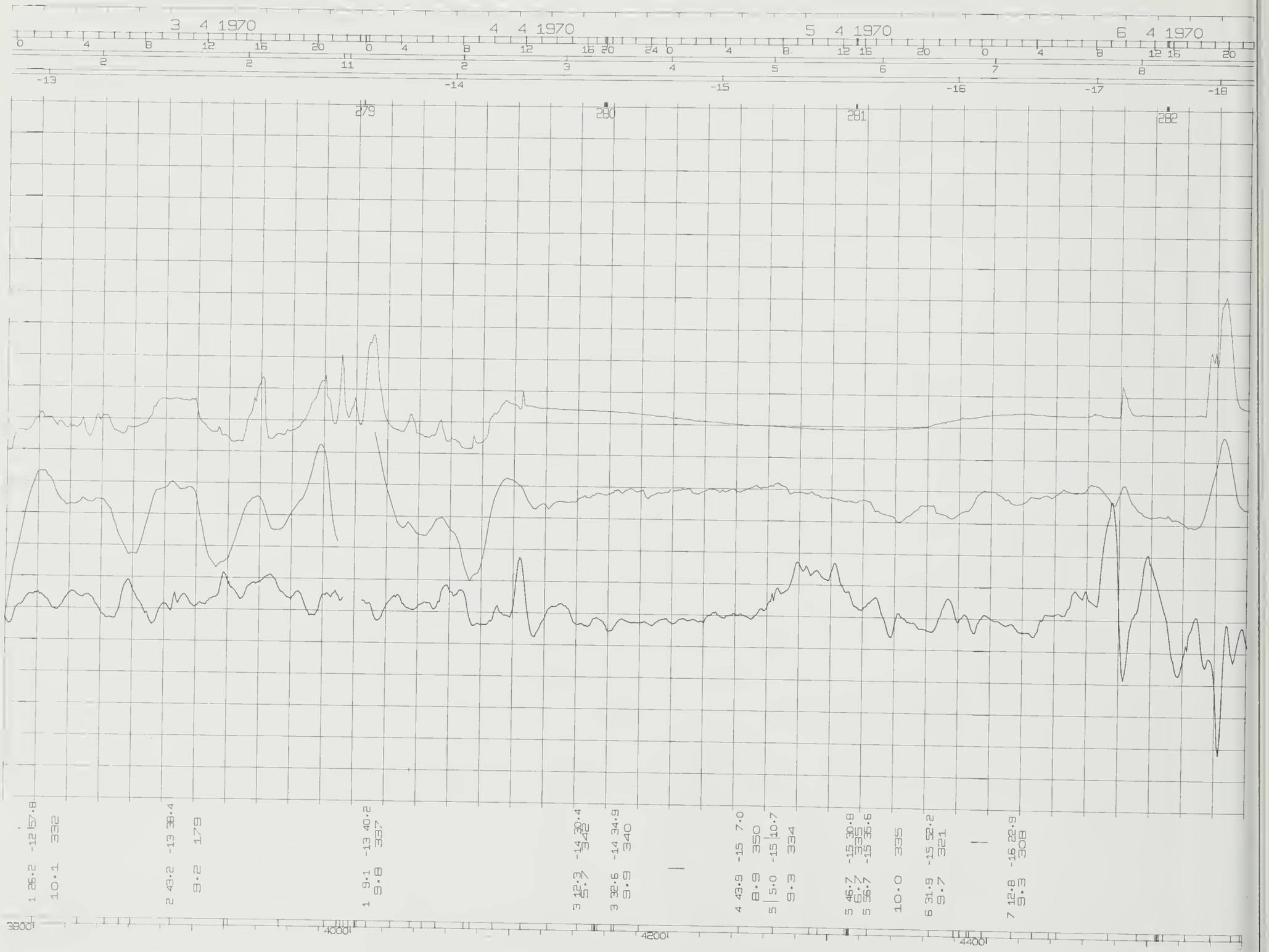

M G D 15 3 1970
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Abidjan

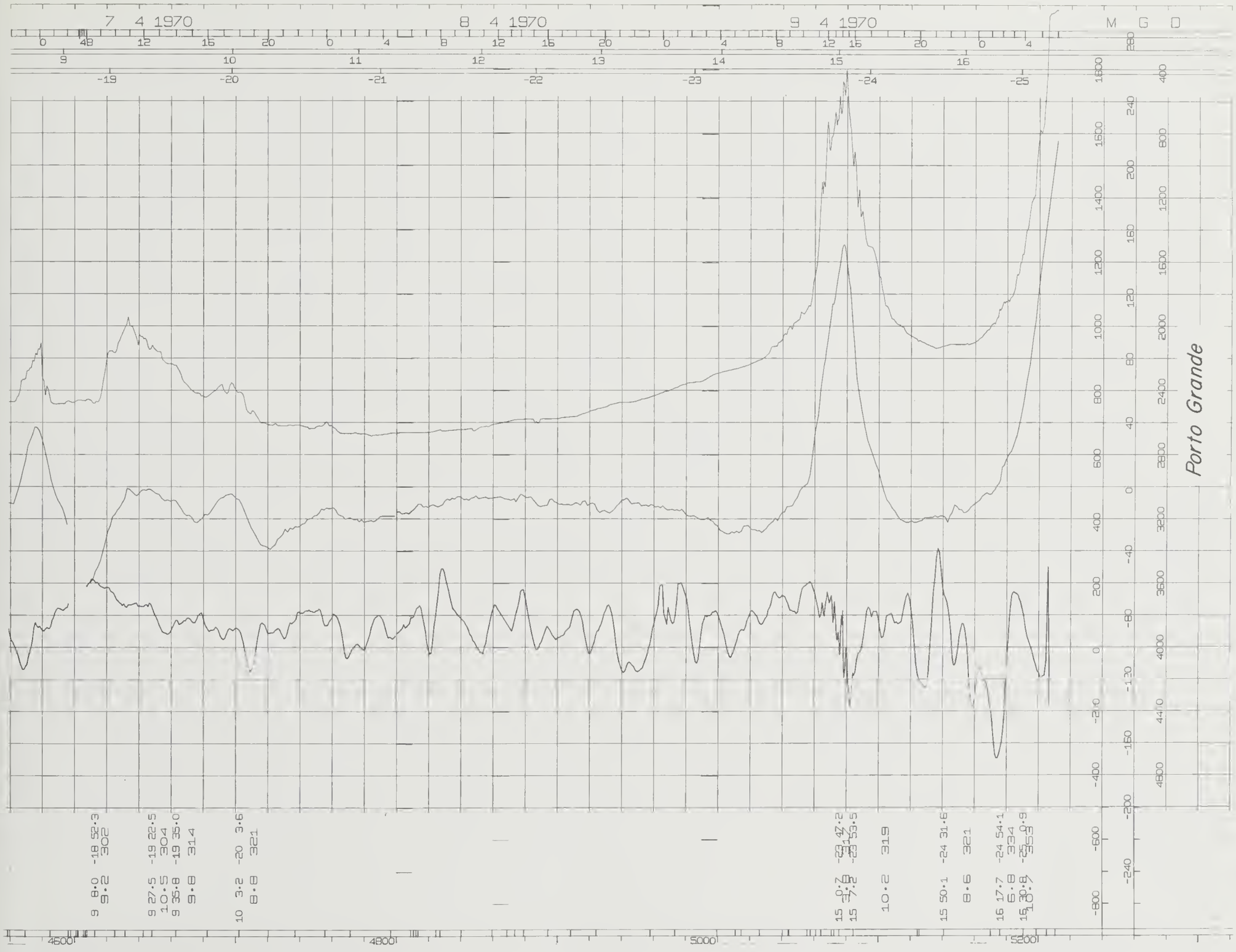

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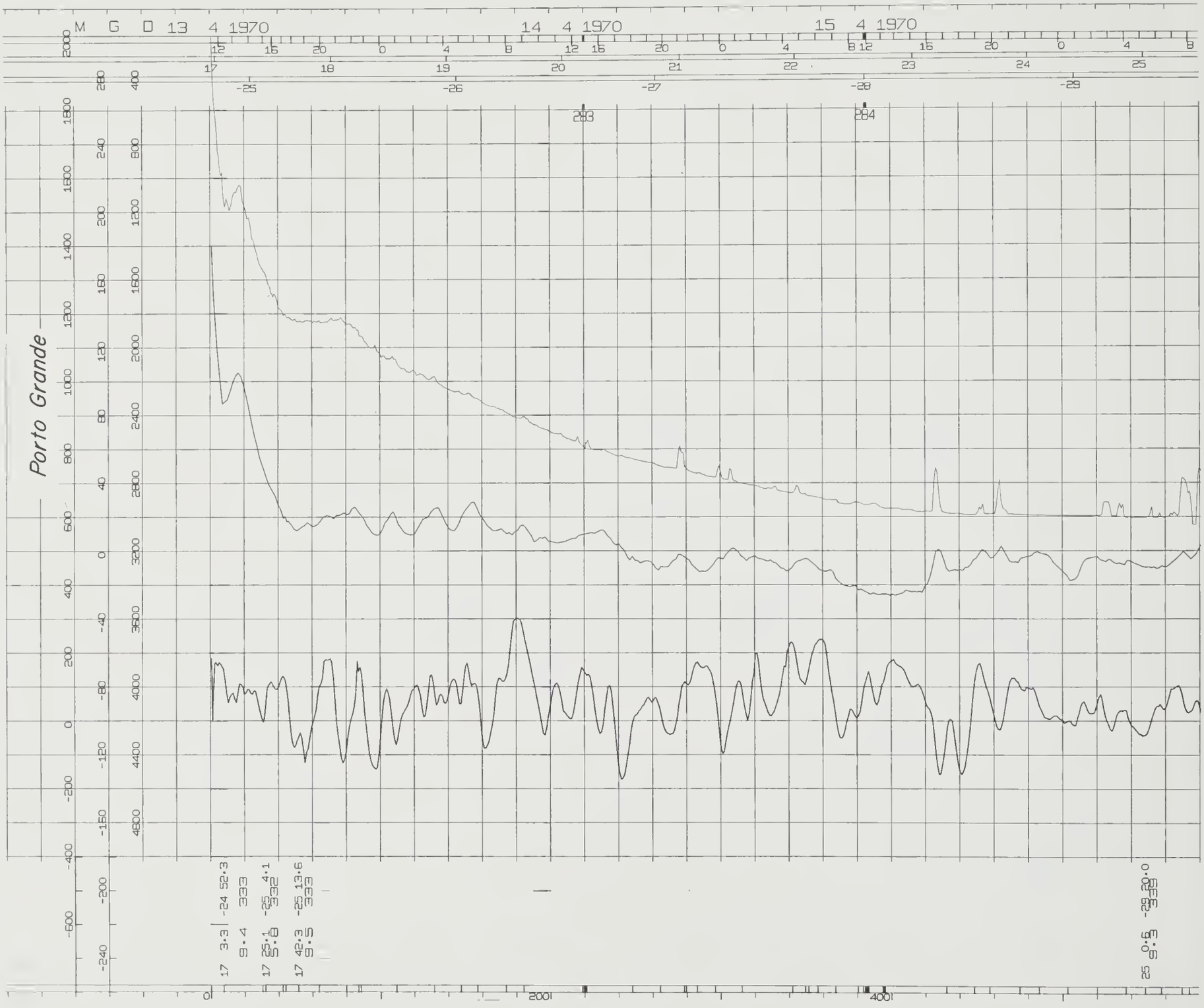

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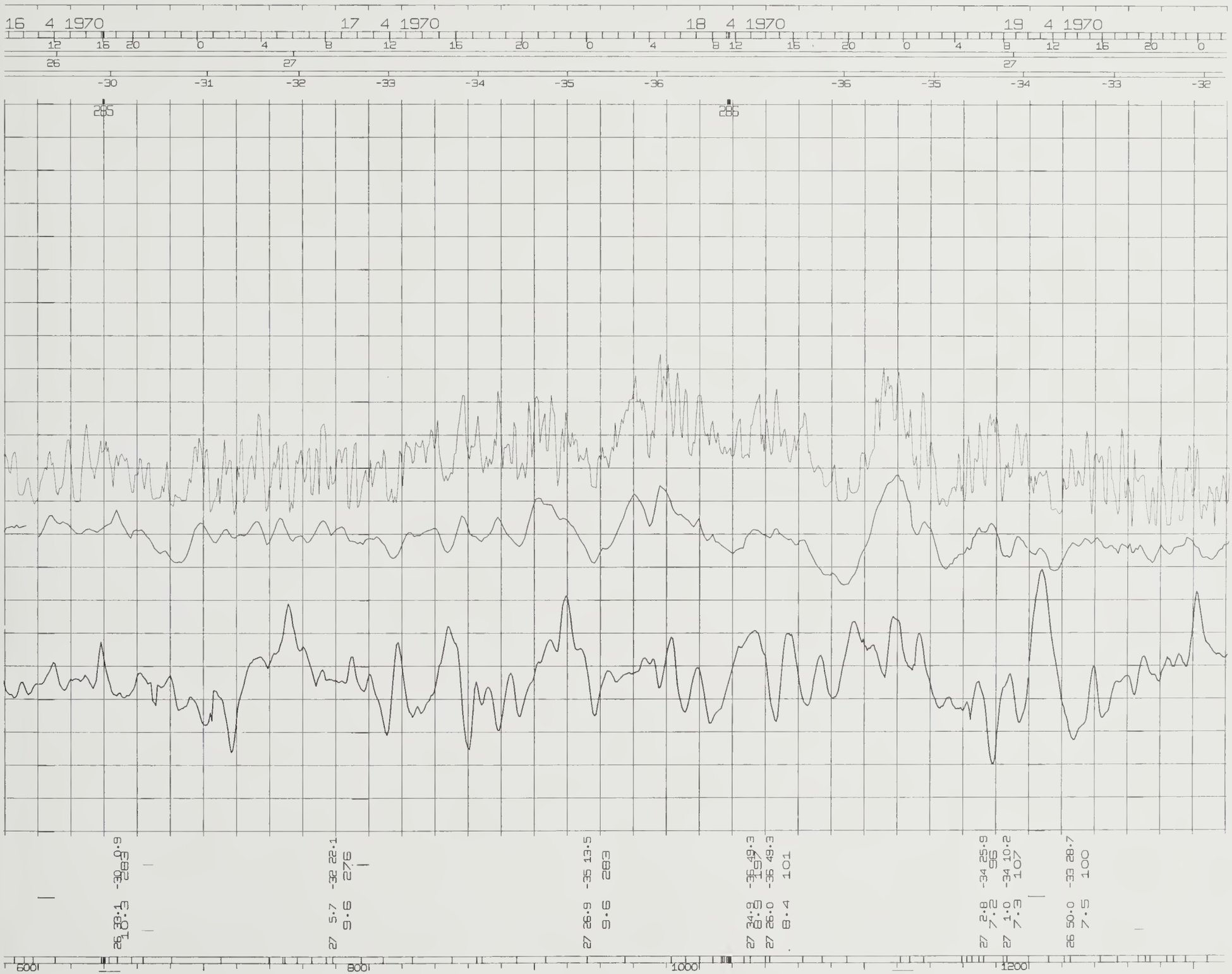

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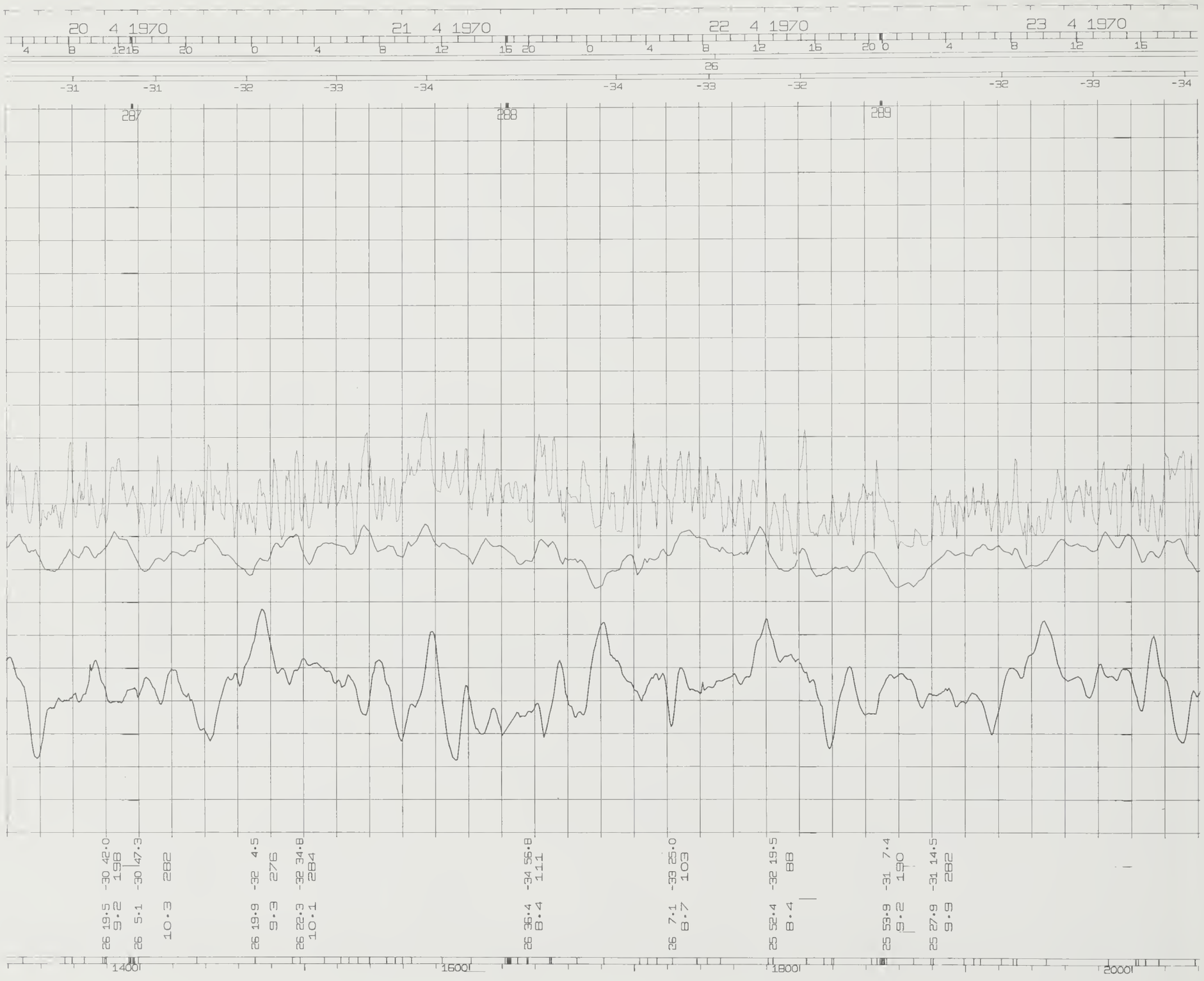

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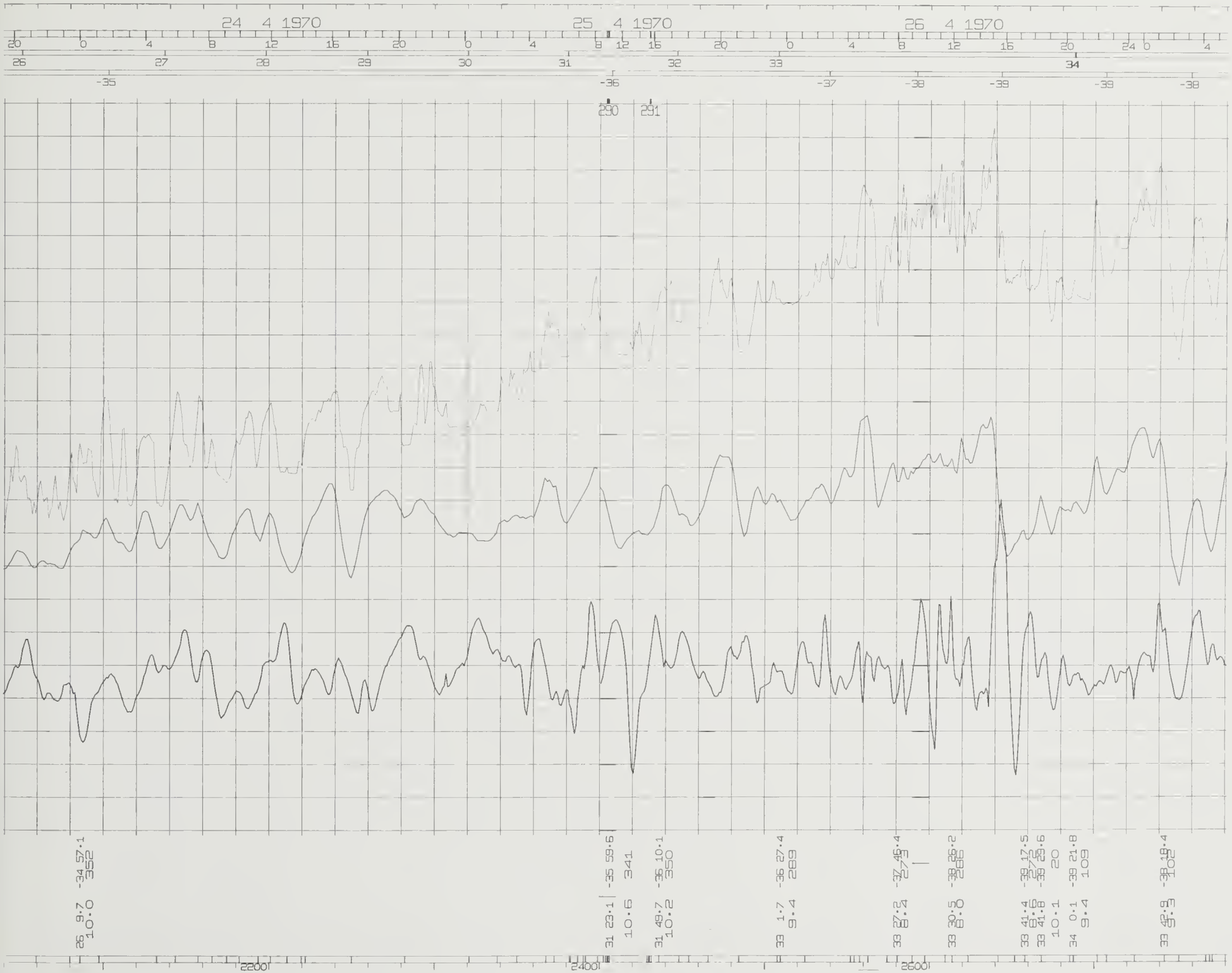

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9.2 179
1 9.1 -13 40.2
9.8 337
3 12.3 -14 30.4
9.7 342
3 32.6 -14 34.9
9.9 340
4 43.9 -15 7.0
8.9 350
5 5.0 -15 10.7
9.3 334
5 46.7 -15 30.8
9.7 335
5 56.7 -15 35.6
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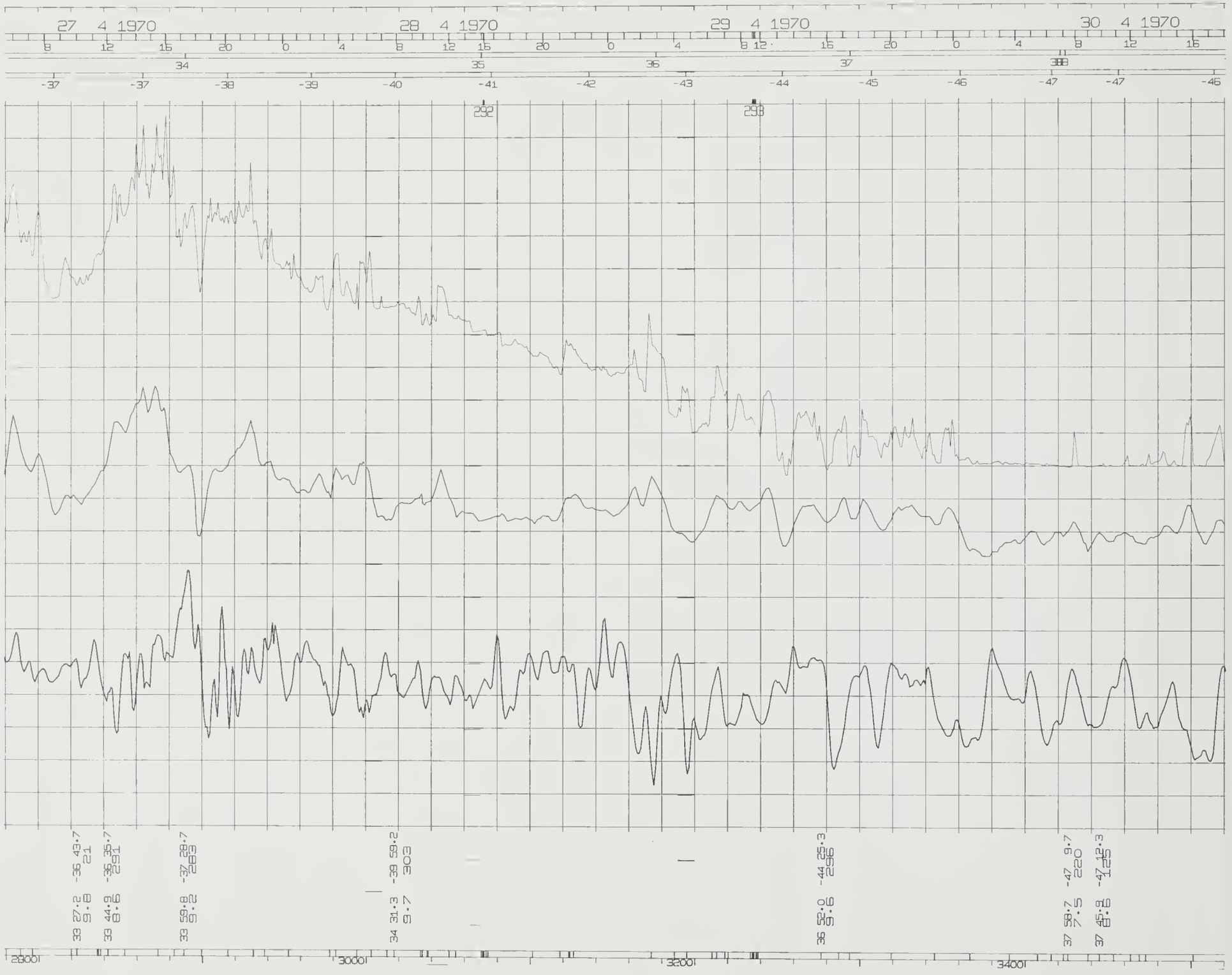

7 4 1970
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9 4 1970
M G D
Porto Grande

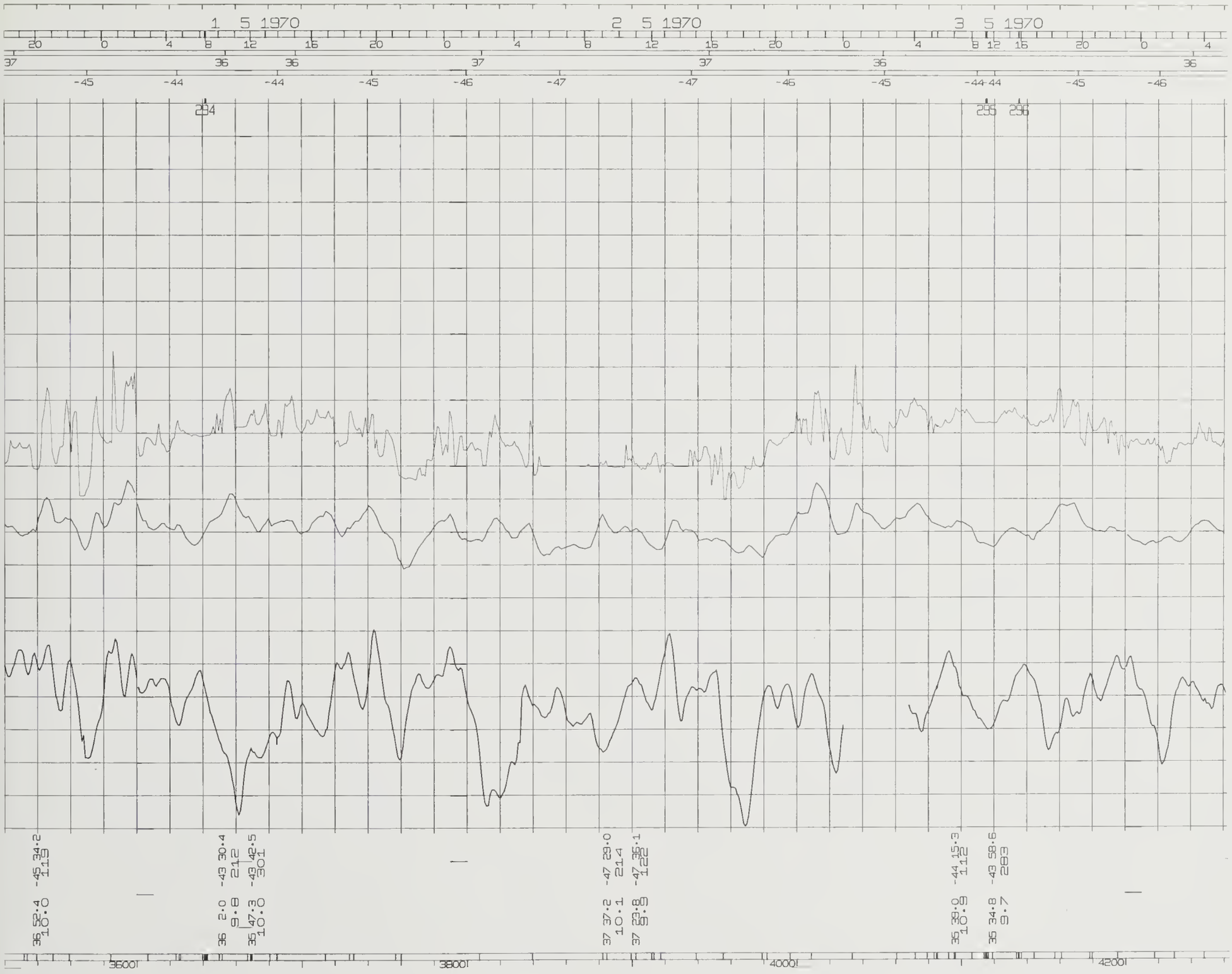

M G D 13 4 1970
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15 4 1970
Porto Grande

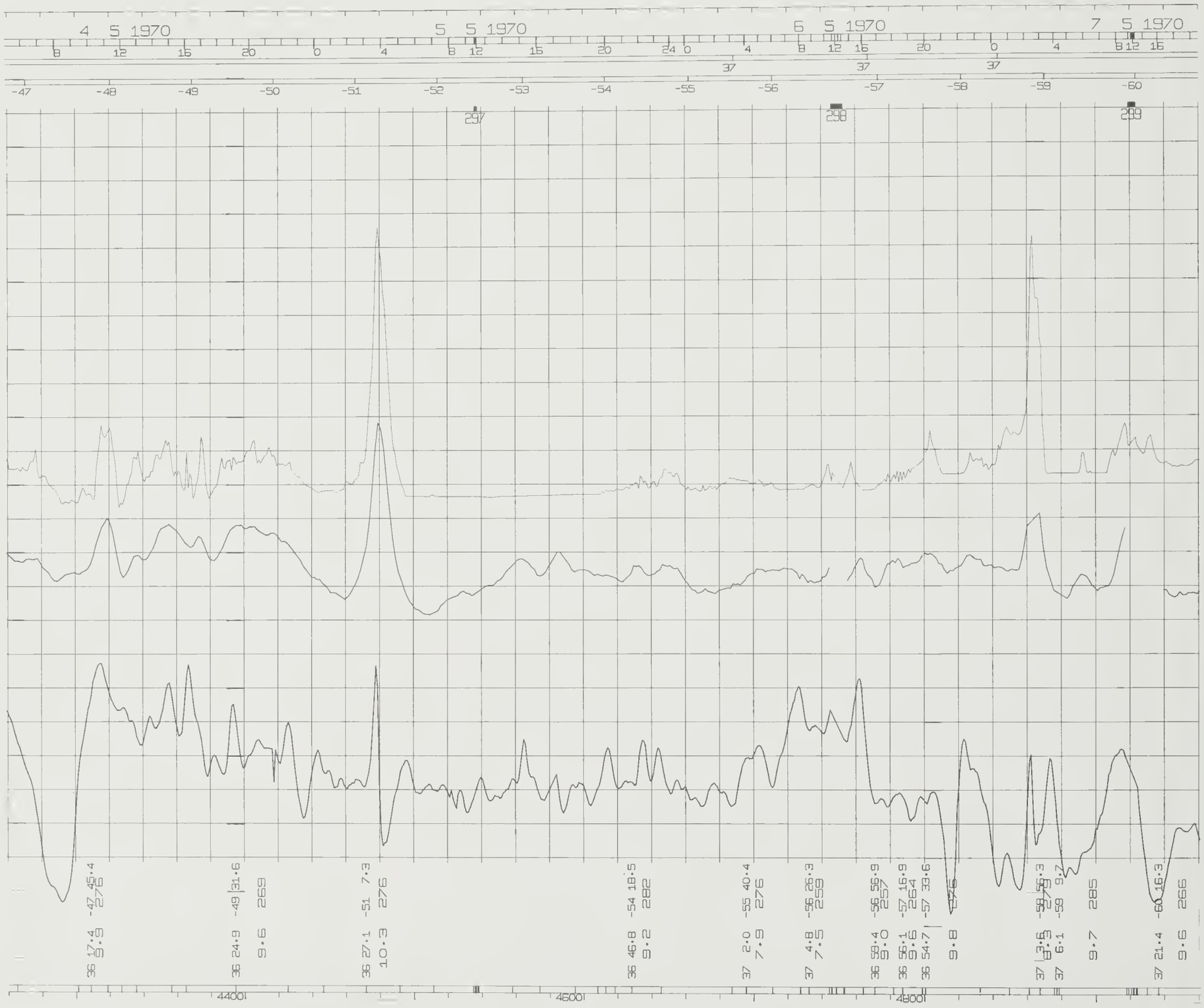

16 4 1970
17 4 1970
18 4 1970
19 4 1970
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1200


20 4 1970
21 4 1970
22 4 1970
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1400
1600
1800
2000

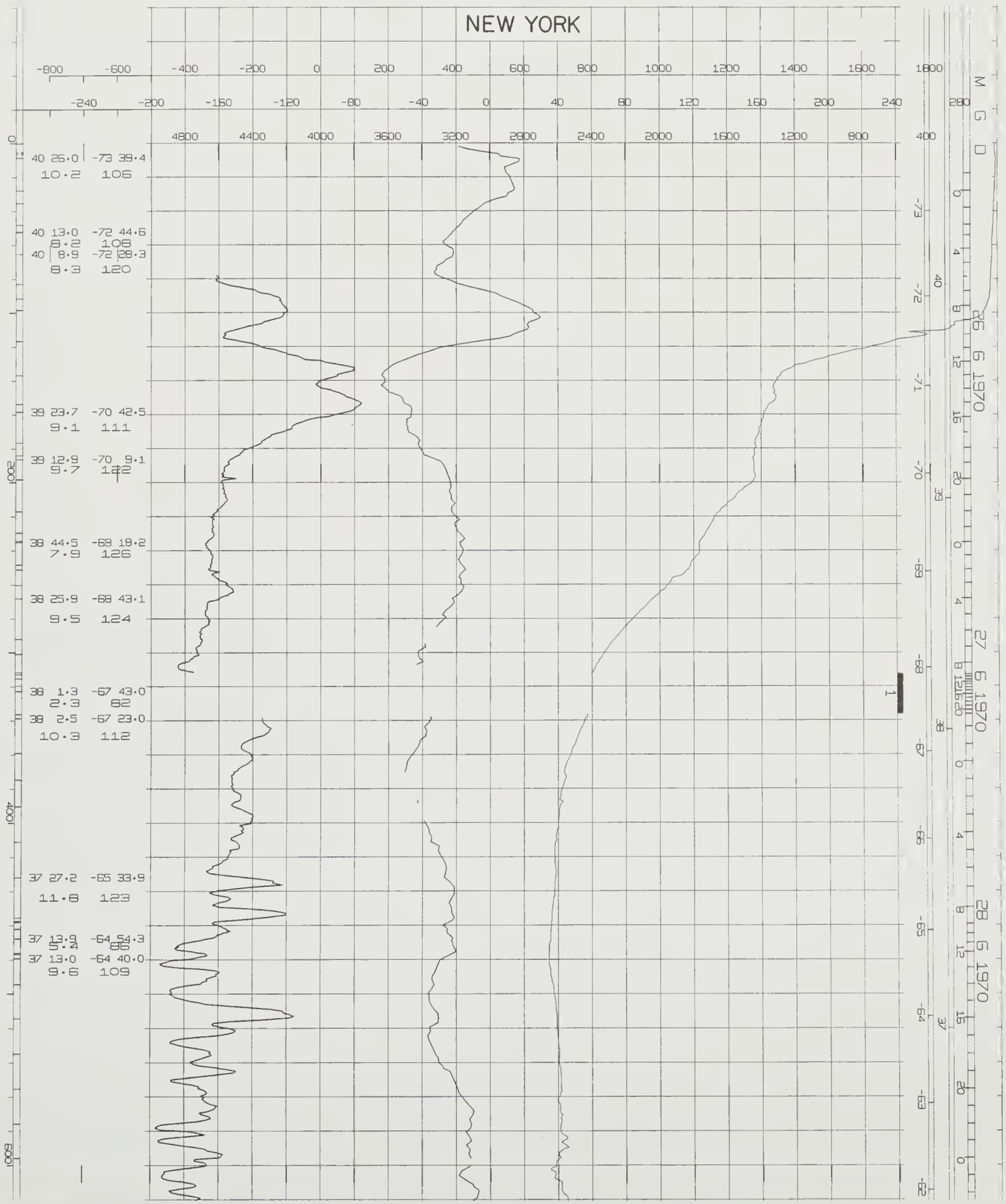

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26 4 1970
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291
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2400
2600

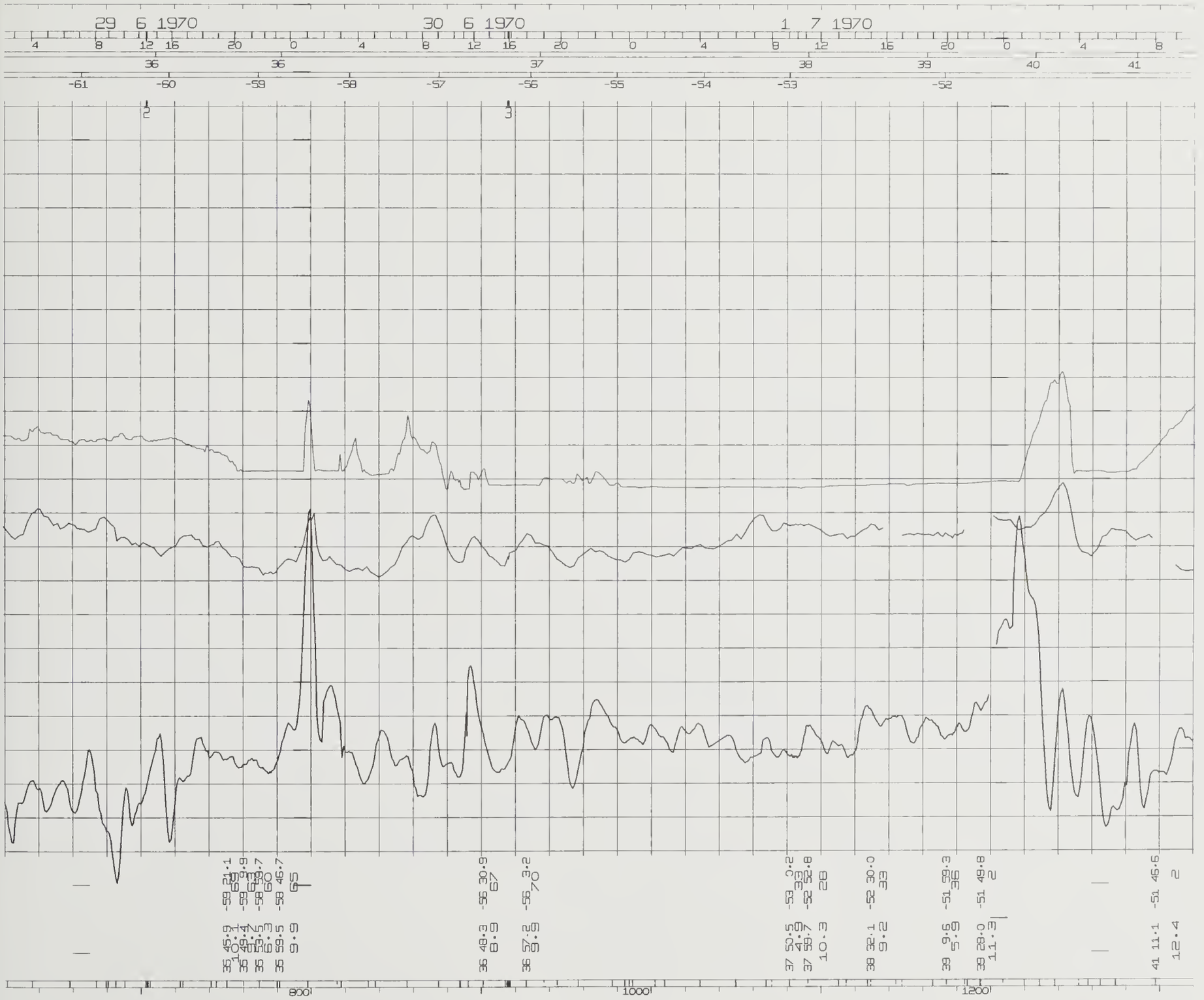

27 4 1970
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30 4 1970
292
293
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21
-36 35.7
2951
-37 28.7
2883
-39 59.2
3013
-44 25.3
2956
-47 9.7
2220
-47 12.3
1255
33 27.2
9.8
33 44.8
8.6
33 59.8
9.2
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3400

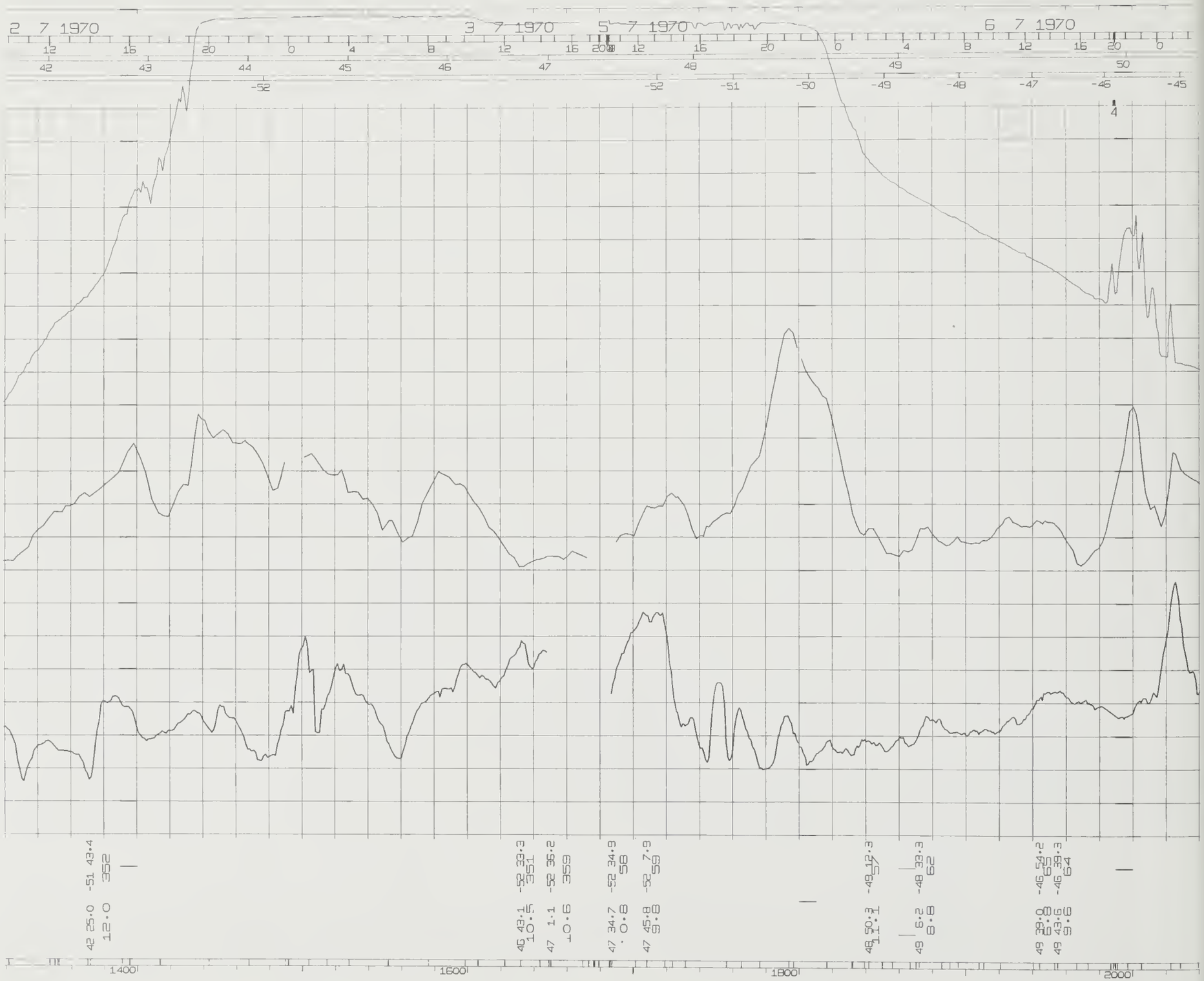

1 5 1970
2 5 1970
3 5 1970
294
295 296
36 52·4 -45 34·2 113
10·0
36 2·0 -43 30·4 212
9·8
35 47·3 -43 42·5 301
10·0
37 37·2 -47 29·0 214
10·1
37 23·8 -47 35·1 122
9·6
35 38·0 -44 15·3 112
10·9
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9·7
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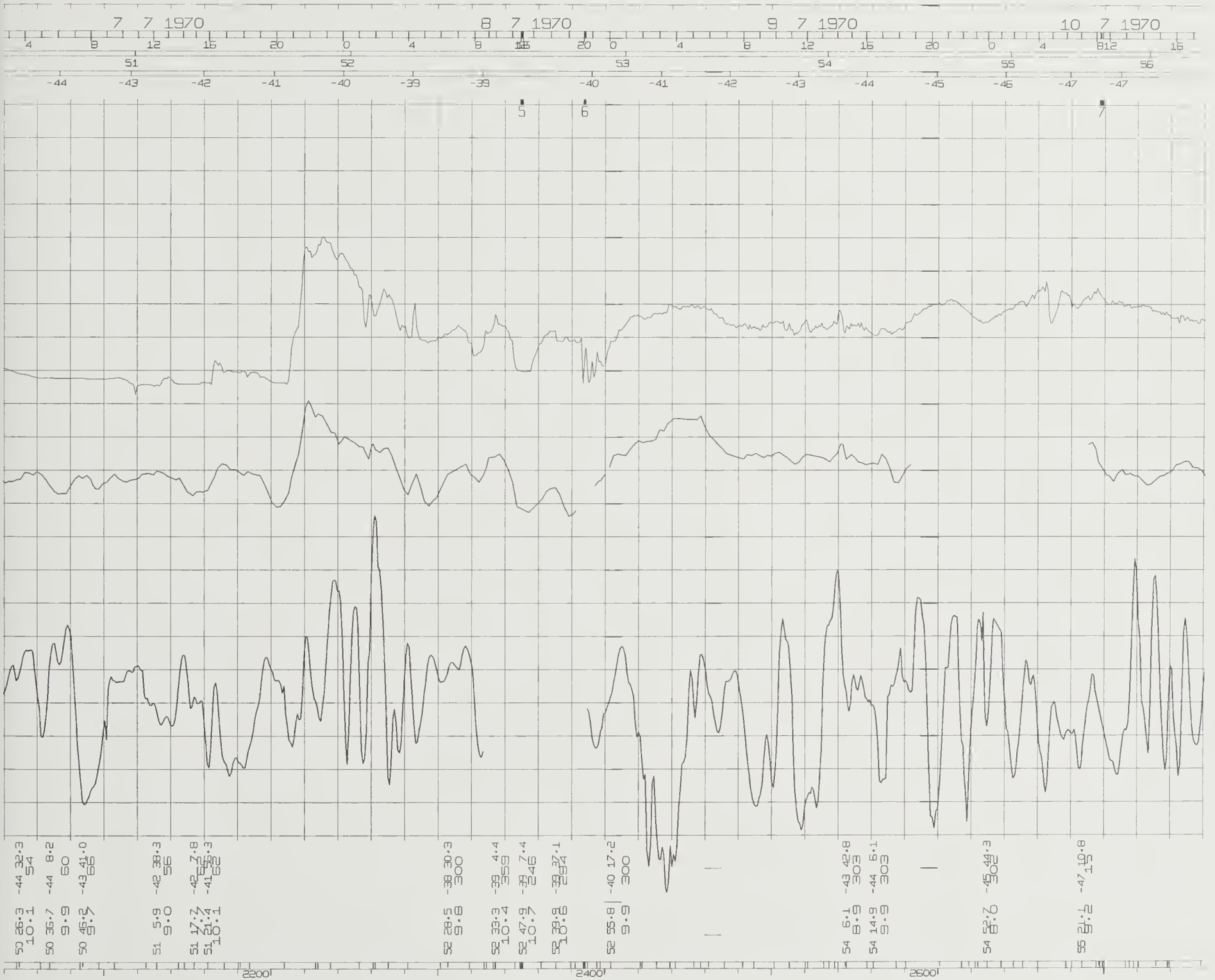

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6 5 1970
7 5 1970
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4600
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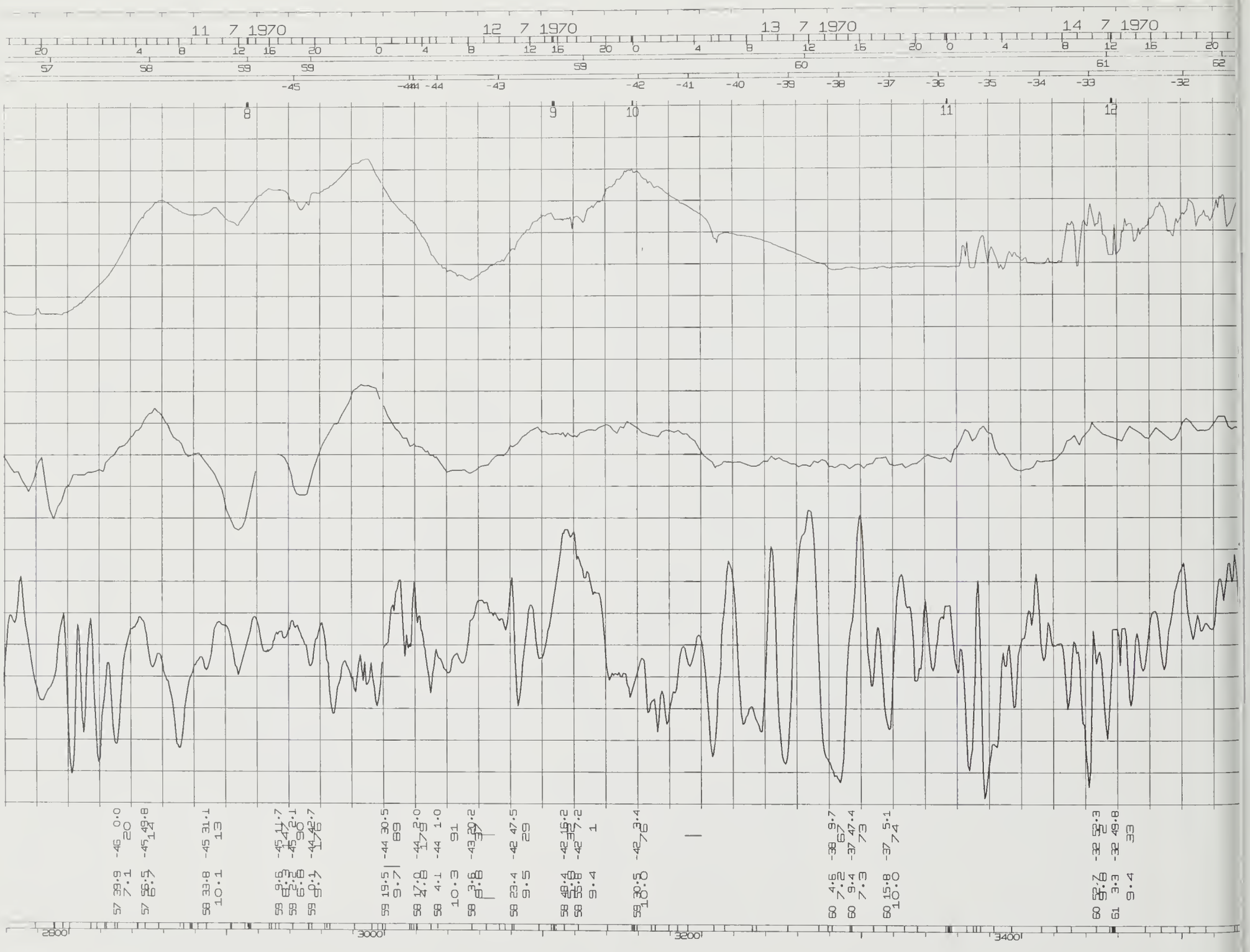

8 5 1970
9 5 1970
10 5 1970
M G D
New York

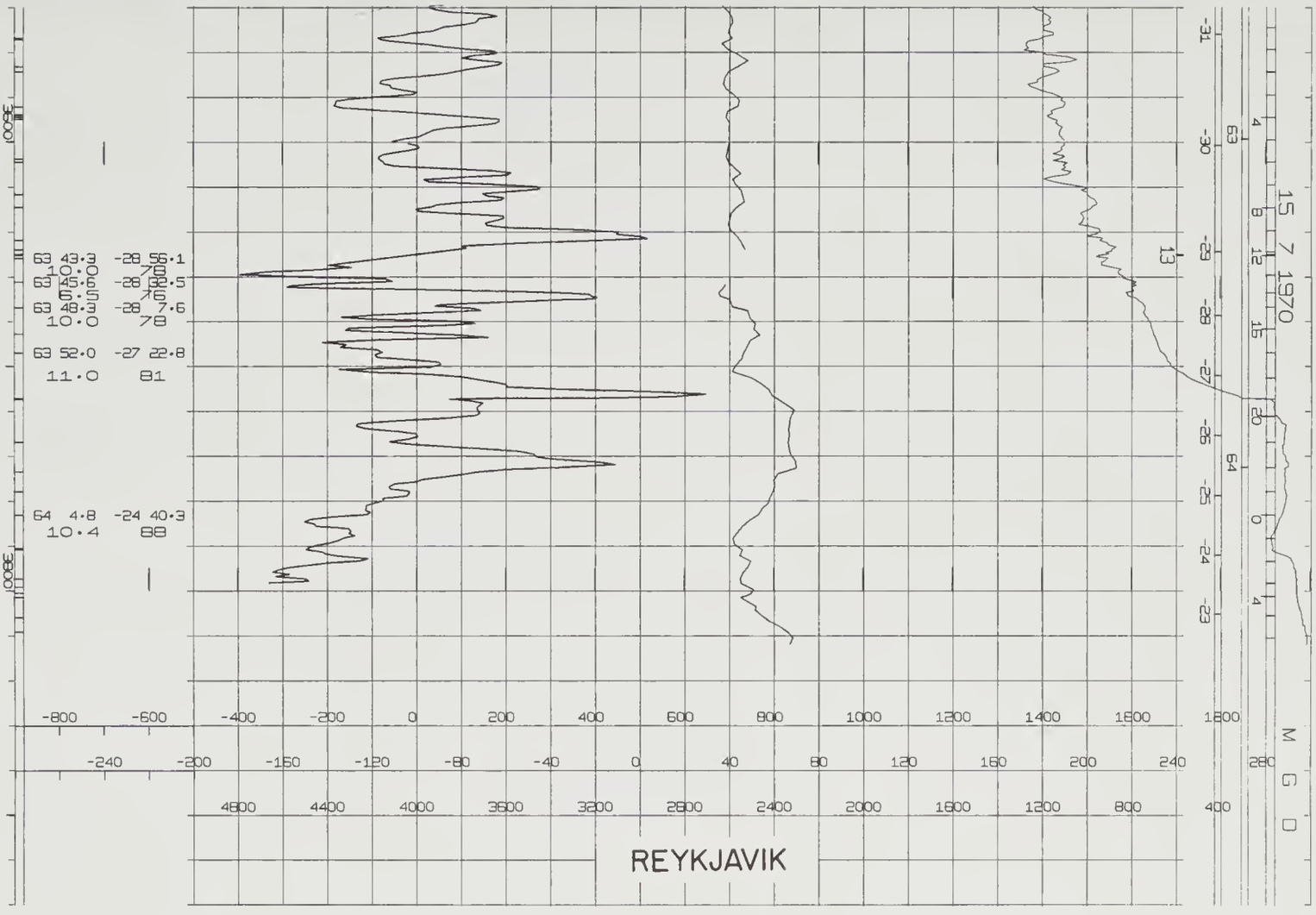

NEW YORK
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-240 -200 -150 -120 -80 -40 0 40 80 120 160 200 240
4800 4400 4000 3600 3200 2800 2400 2000 1600 1200 800 400
0
200
400
600
40 26.0 -73 39.4
10.2 106
40 13.0 -72 44.6
8.2 108
40 8.9 -72 28.3
8.3 120
39 23.7 -70 42.5
9.1 111
39 12.9 -70 9.1
9.7 122
38 44.5 -69 18.2
7.9 126
38 25.9 -68 43.1
9.5 124
38 1.3 -67 43.0
2.3 82
38 2.5 -67 23.0
10.3 112
37 27.2 -65 33.9
11.8 123
37 13.9 -64 54.3
5.4 86
37 13.0 -64 40.0
9.6 109
M G D
26 6 1970
27 6 1970
28 6 1970
-73 -72 -71 -70 -69 -68 -67 -66 -65 -64 -63 -62


29 6 1970
30 6 1970
1 7 1970
4 8 12 16 20 0 4 8 12 16 20 0 4 8 12 16 20 0 4 8
36 36 37 38 39 40 41
-61 -60 -59 -58 -57 -56 -55 -54 -53 -52
2
3
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-59 9.9
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-58 46.7
-56 30.9
-56 3.2
-53 0.2
-52 52.8
-52 30.0
-51 59.3
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-51 46.6
35 45.9
35 49.4
35 53.3
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39 28.0
41 11.1
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1000
1200

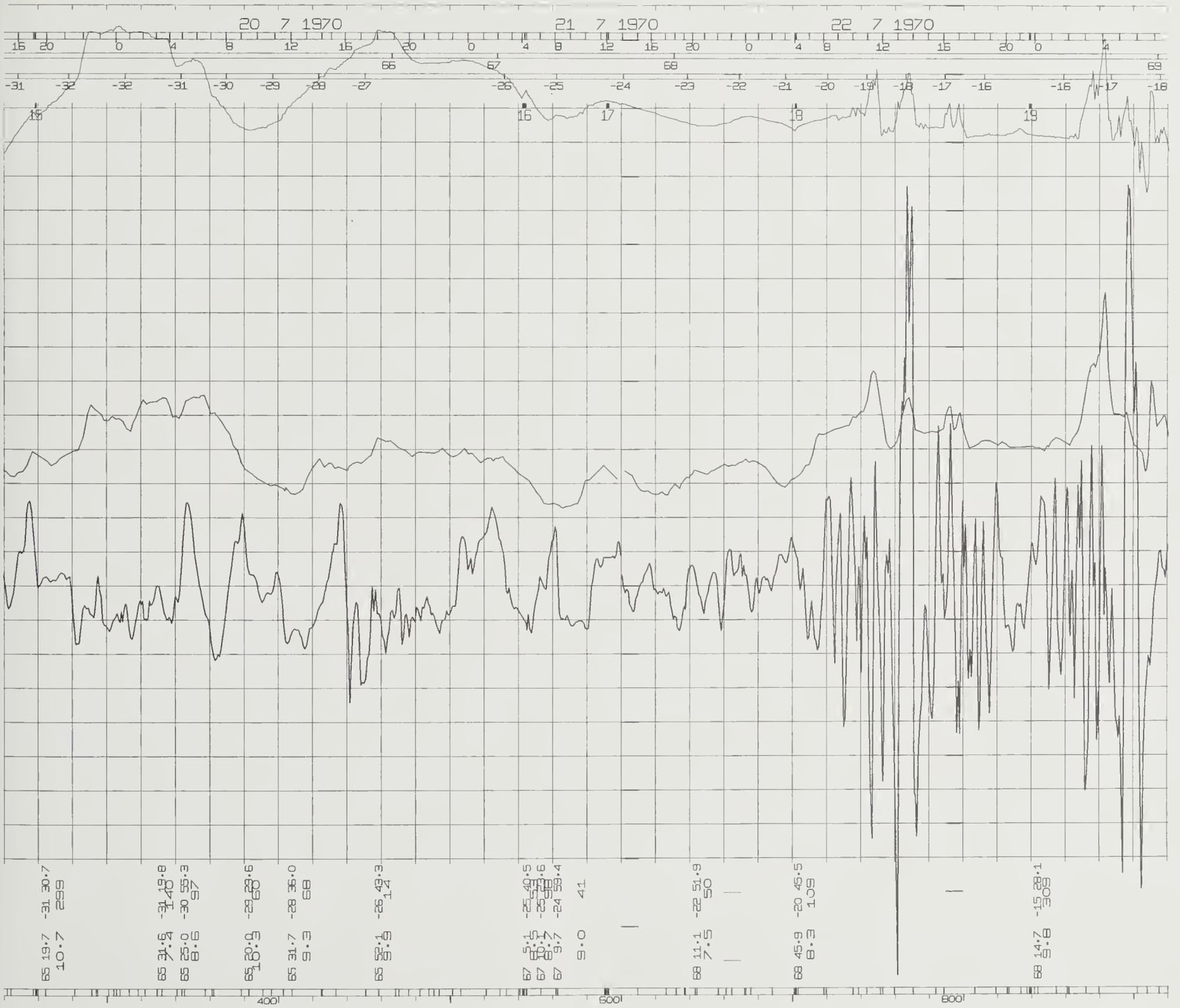

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3 7 1970
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6 7 1970
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12.0 352
46 43.1 -52 33.3
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47 1.1 -52 36.2
10.6 359
47 34.7 -52 34.9
10.8 58
47 45.8 -52 7.9
9.8 59
48 50.3 -49 12.3
11.1 57
49 6.2 -48 33.3
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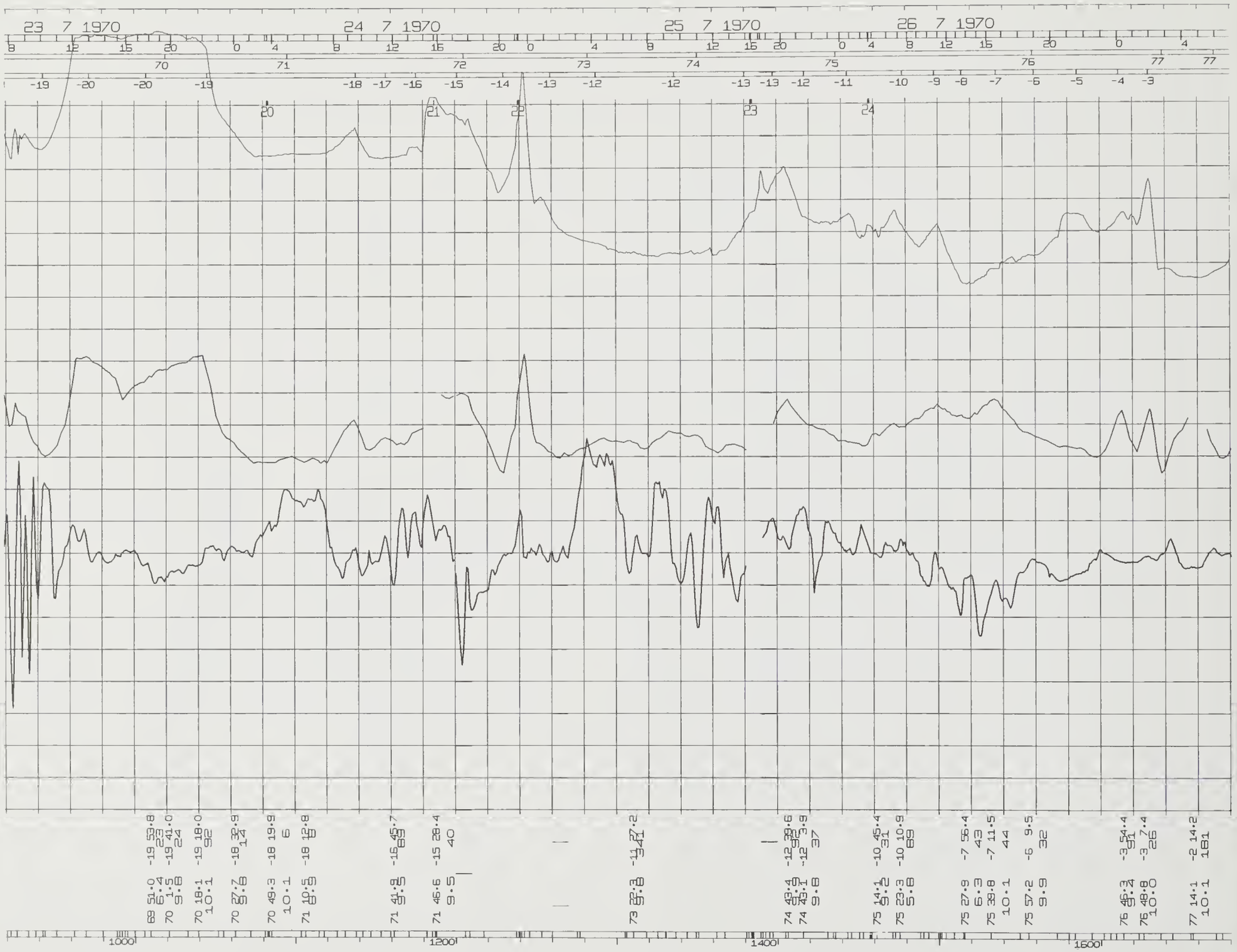

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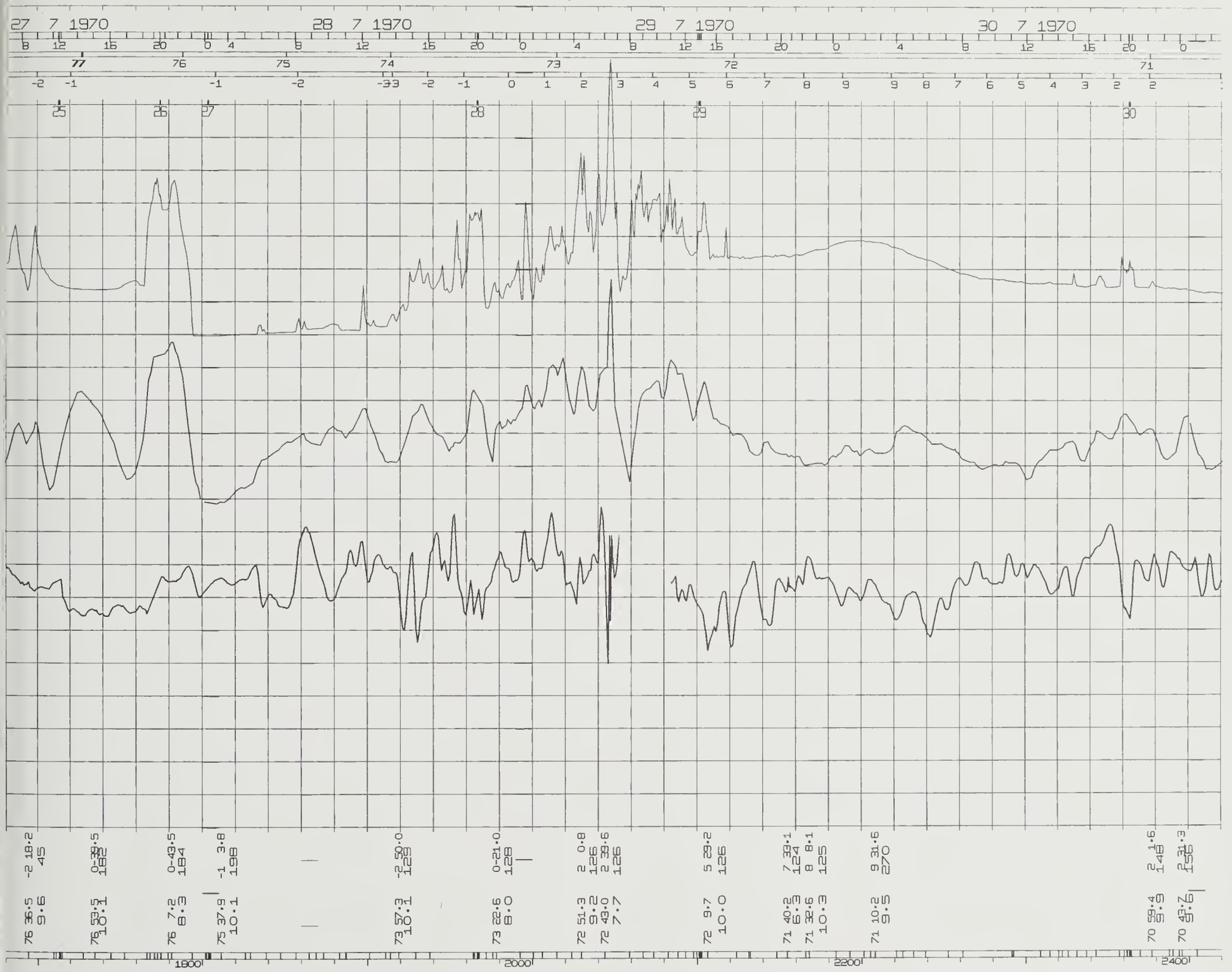

11 7 1970
12 7 1970
13 7 1970
14 7 1970
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11
12


63 43.3 -28 56.1
10.0 78
63 45.6 -28 32.5
6.5 76
63 48.3 -28 7.6
10.0 78
63 52.0 -27 22.8
11.0 81
64 4.8 -24 40.3
10.4 88
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3600
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-240 -200 -150 -120 -80 -40 0 40 80 120 160 200 240 280
4800 4400 4000 3600 3200 2800 2400 2000 1600 1200 800 400
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M G D
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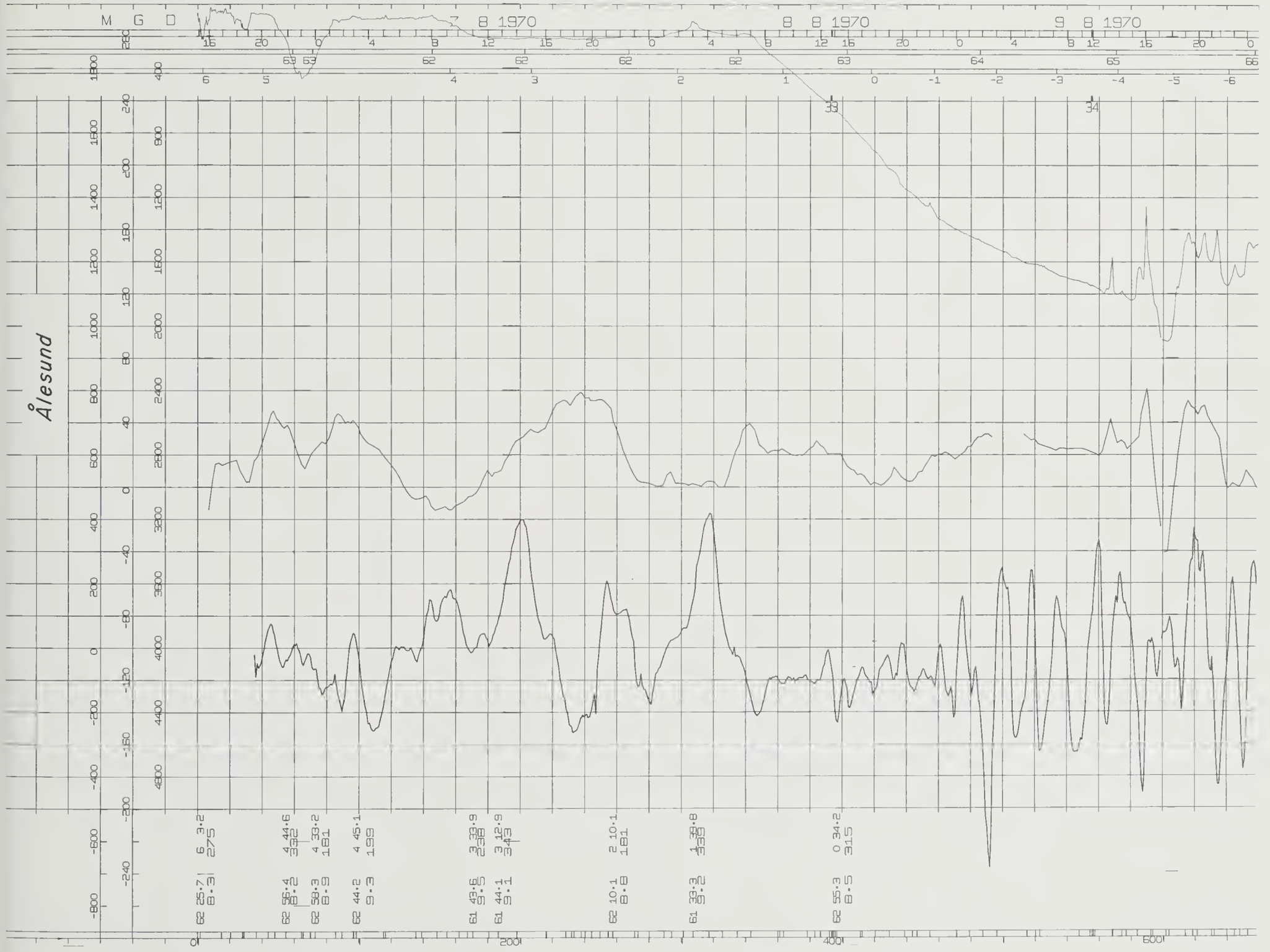
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19 7 1970
REYKJAVIK

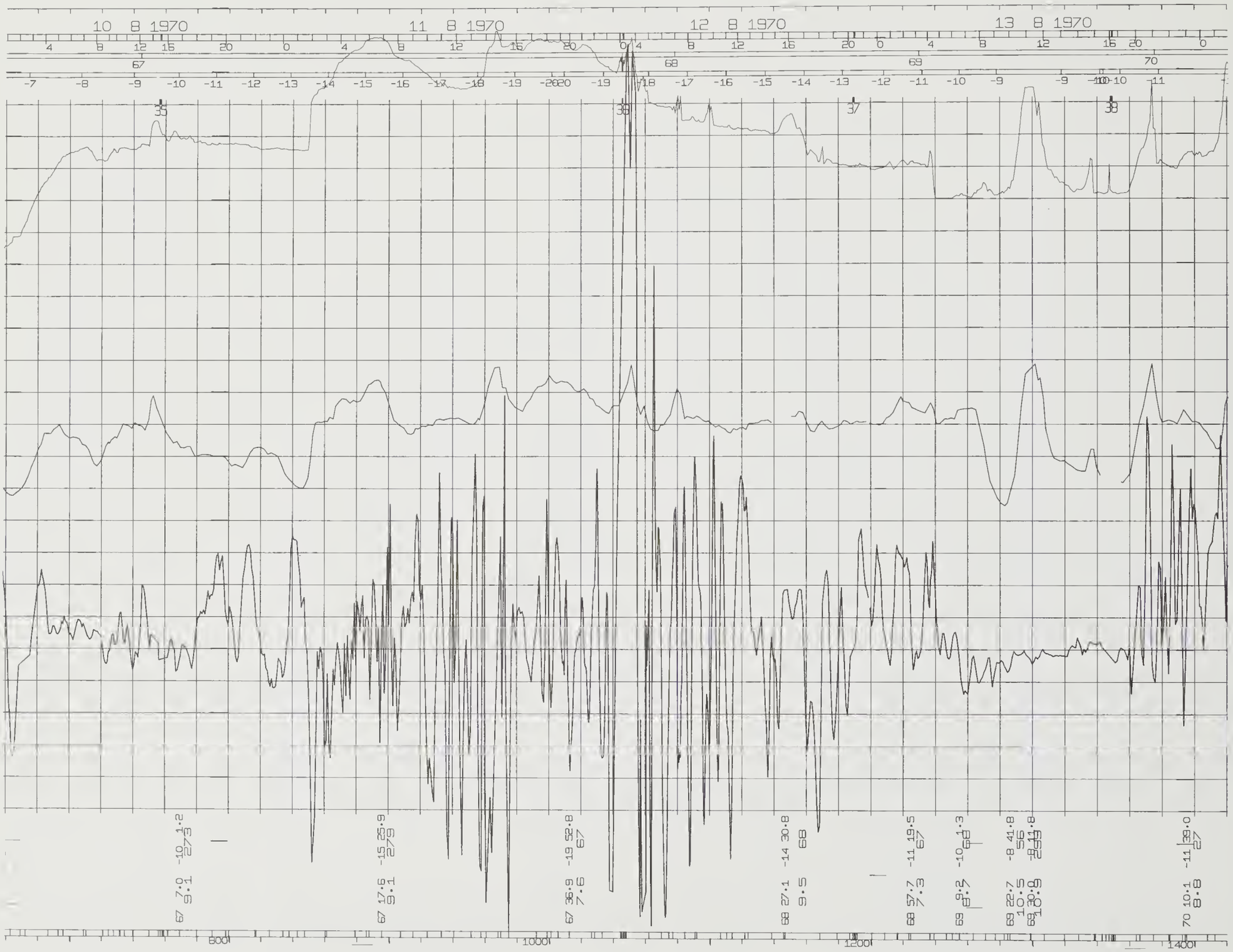

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22 7 1970

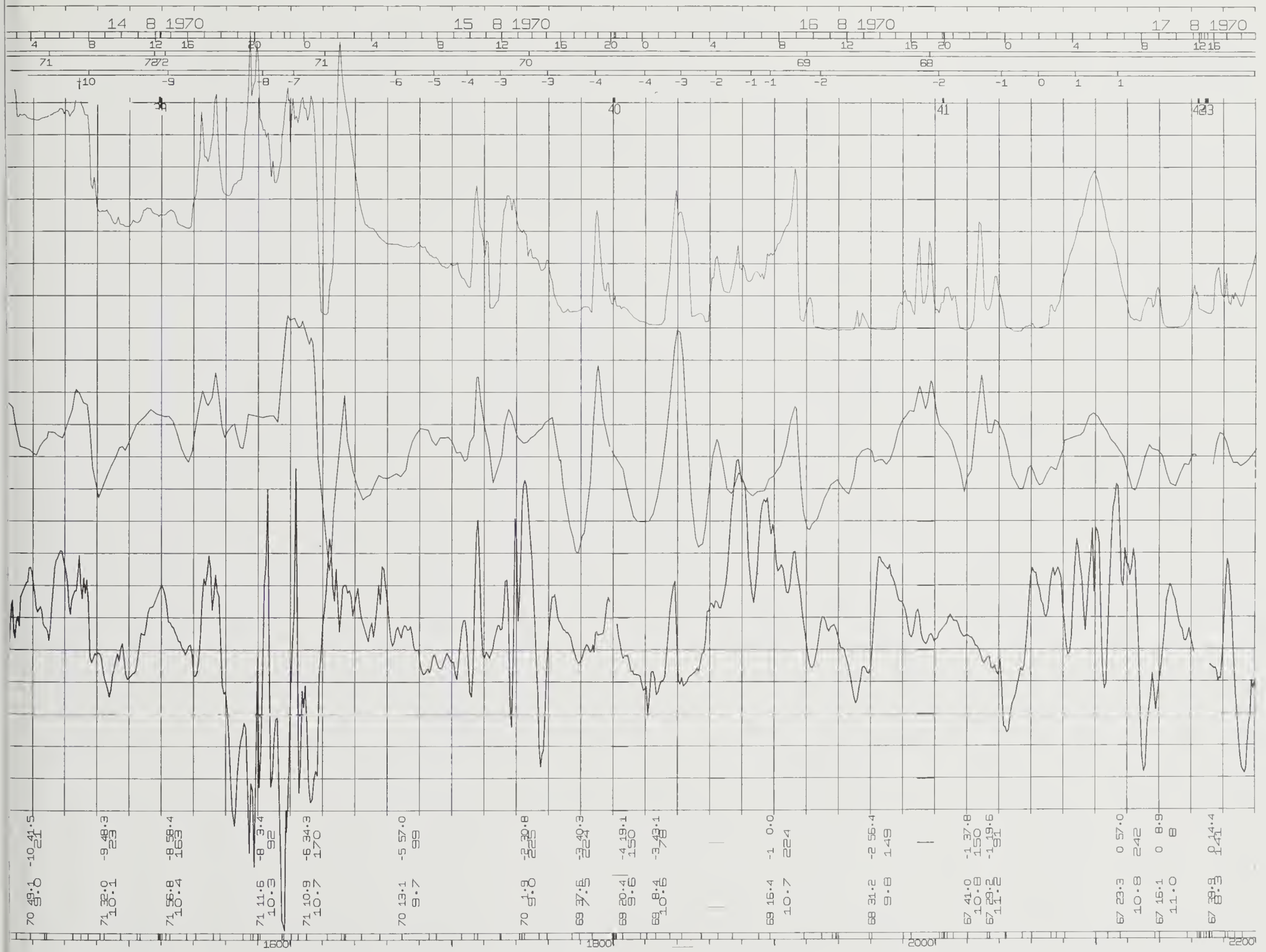

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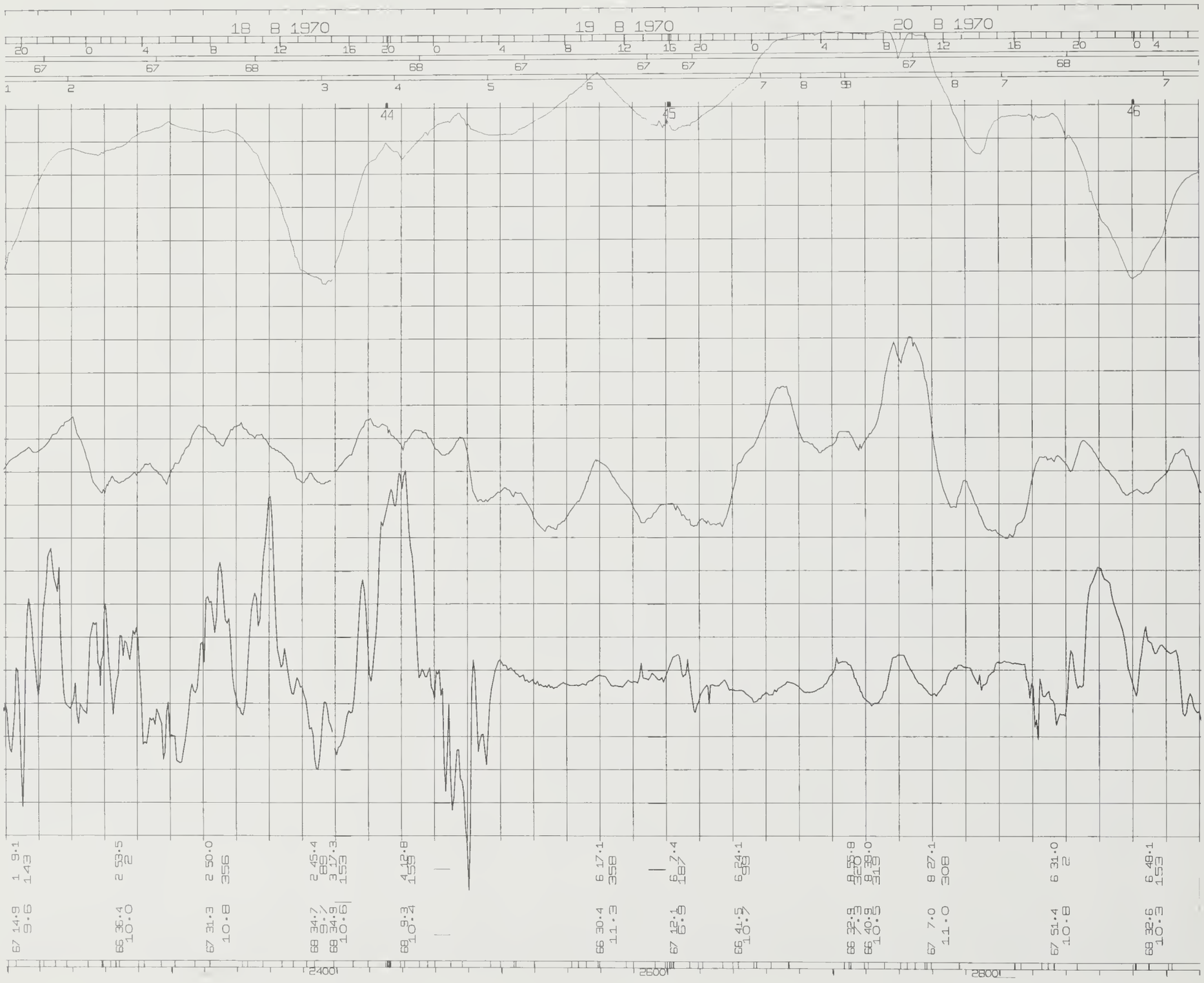

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28 7 1970
29 7 1970
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2400

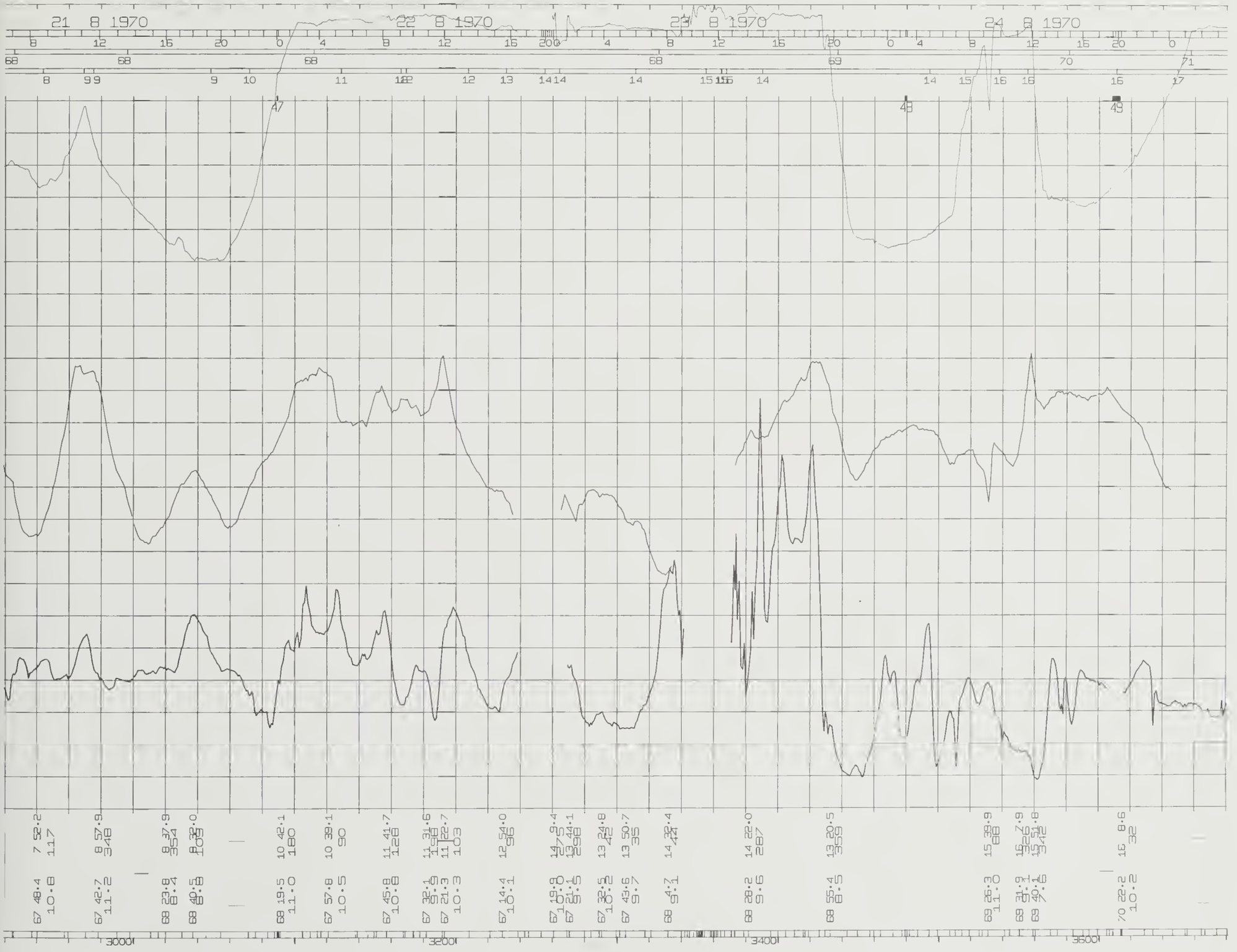
31 7 1970
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2 8 1970
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AALESUND

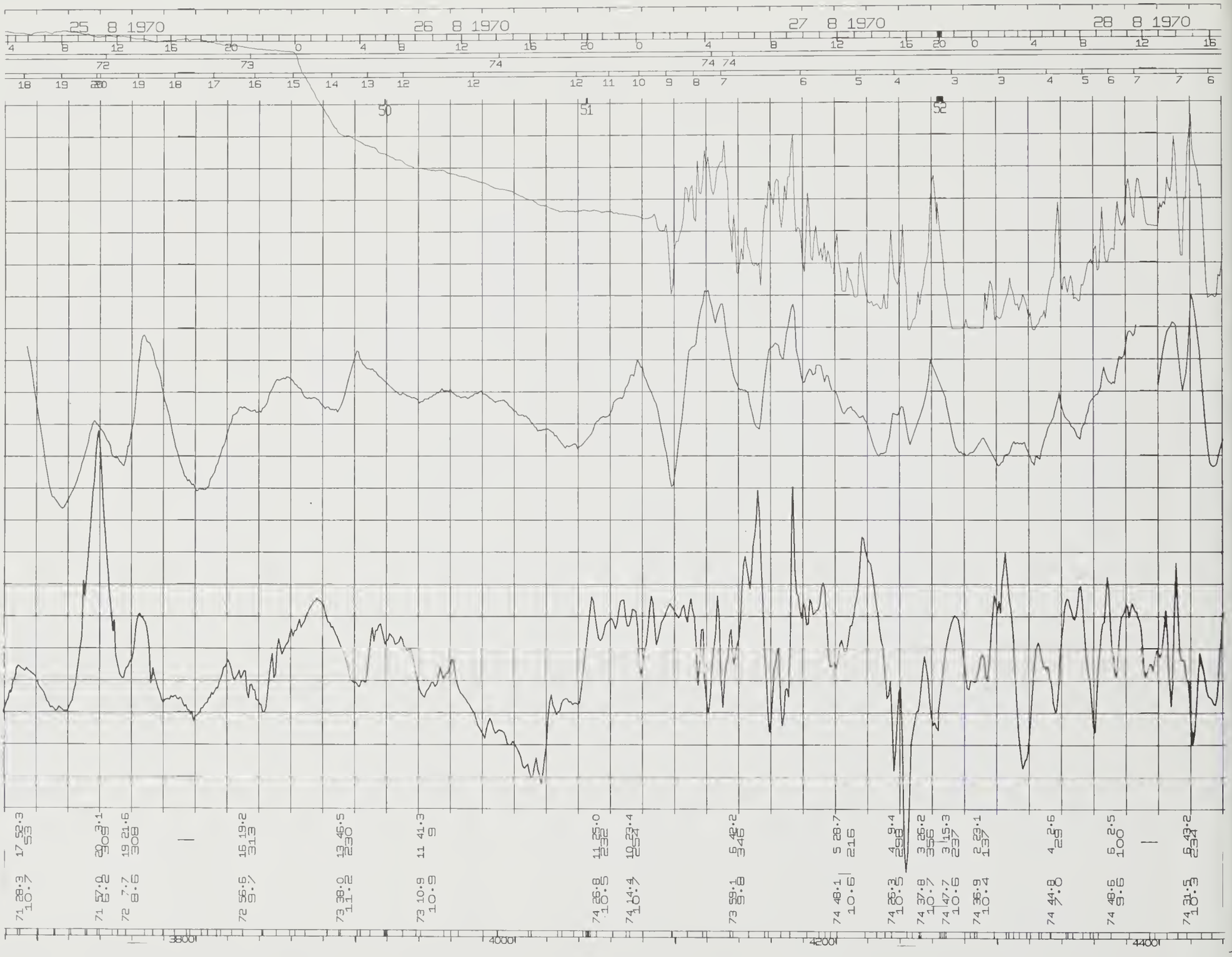

M G D
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8 8 1970
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Ålesund

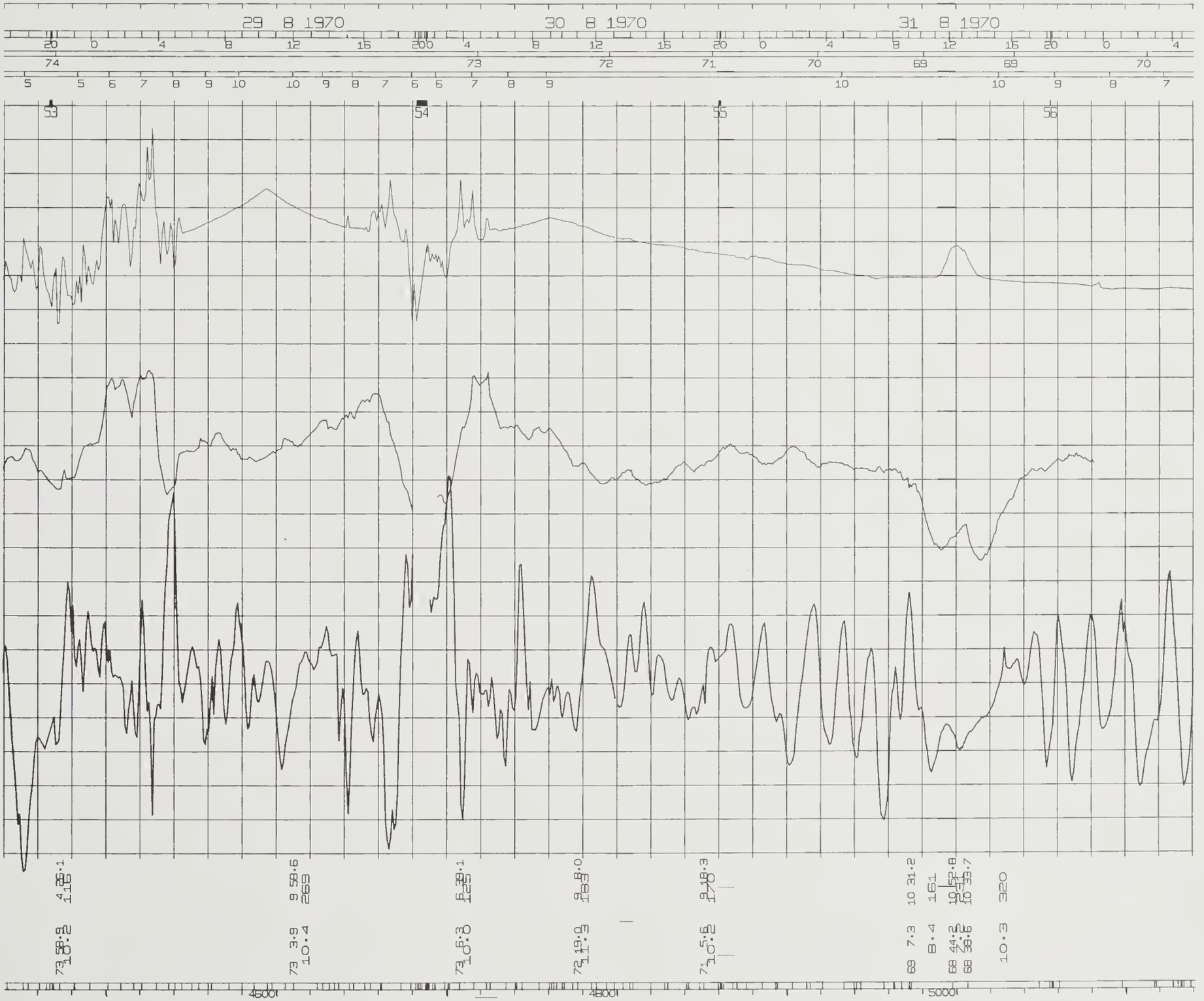

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12 8 1970
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1200
1400


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1600
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2000
2200

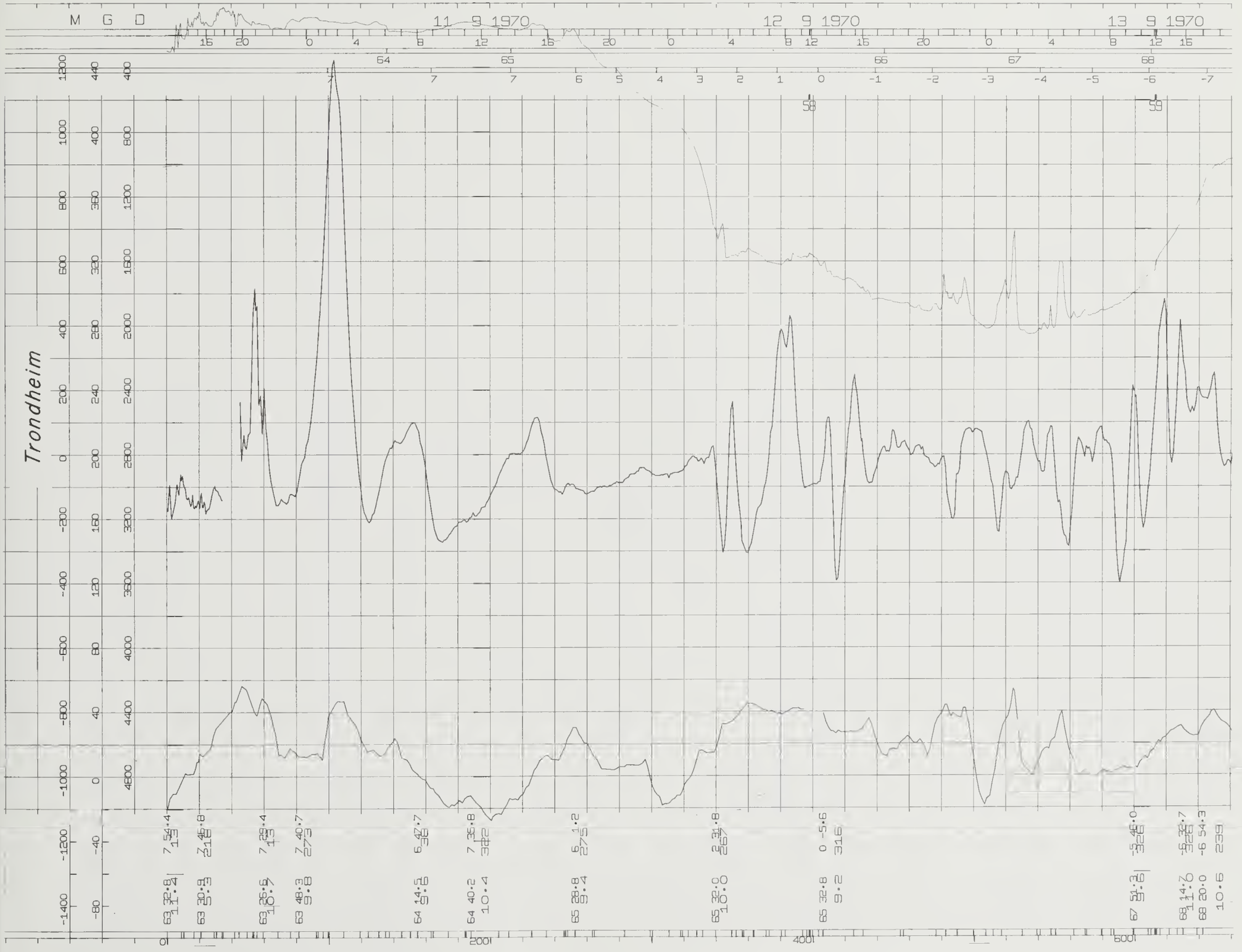

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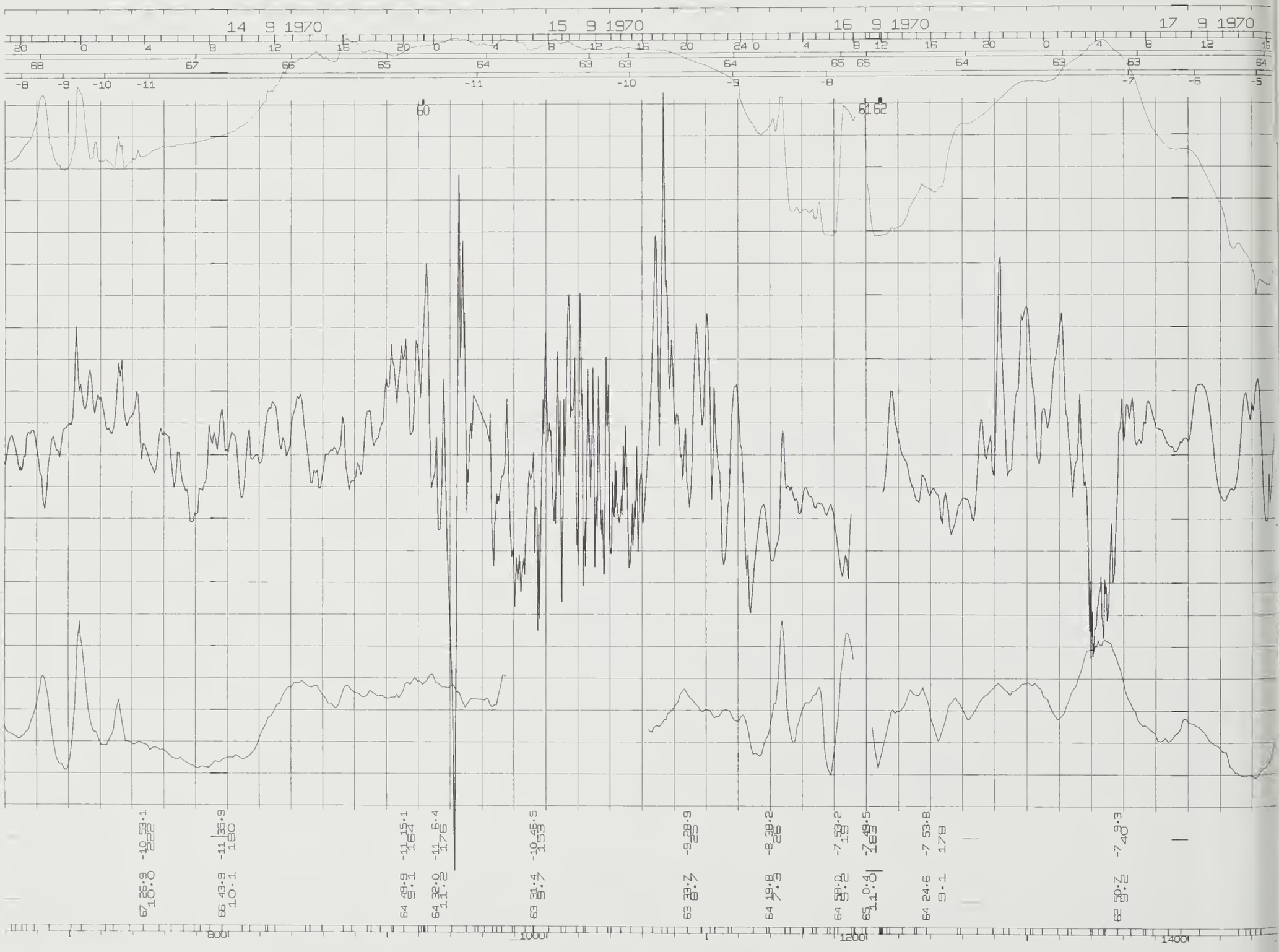

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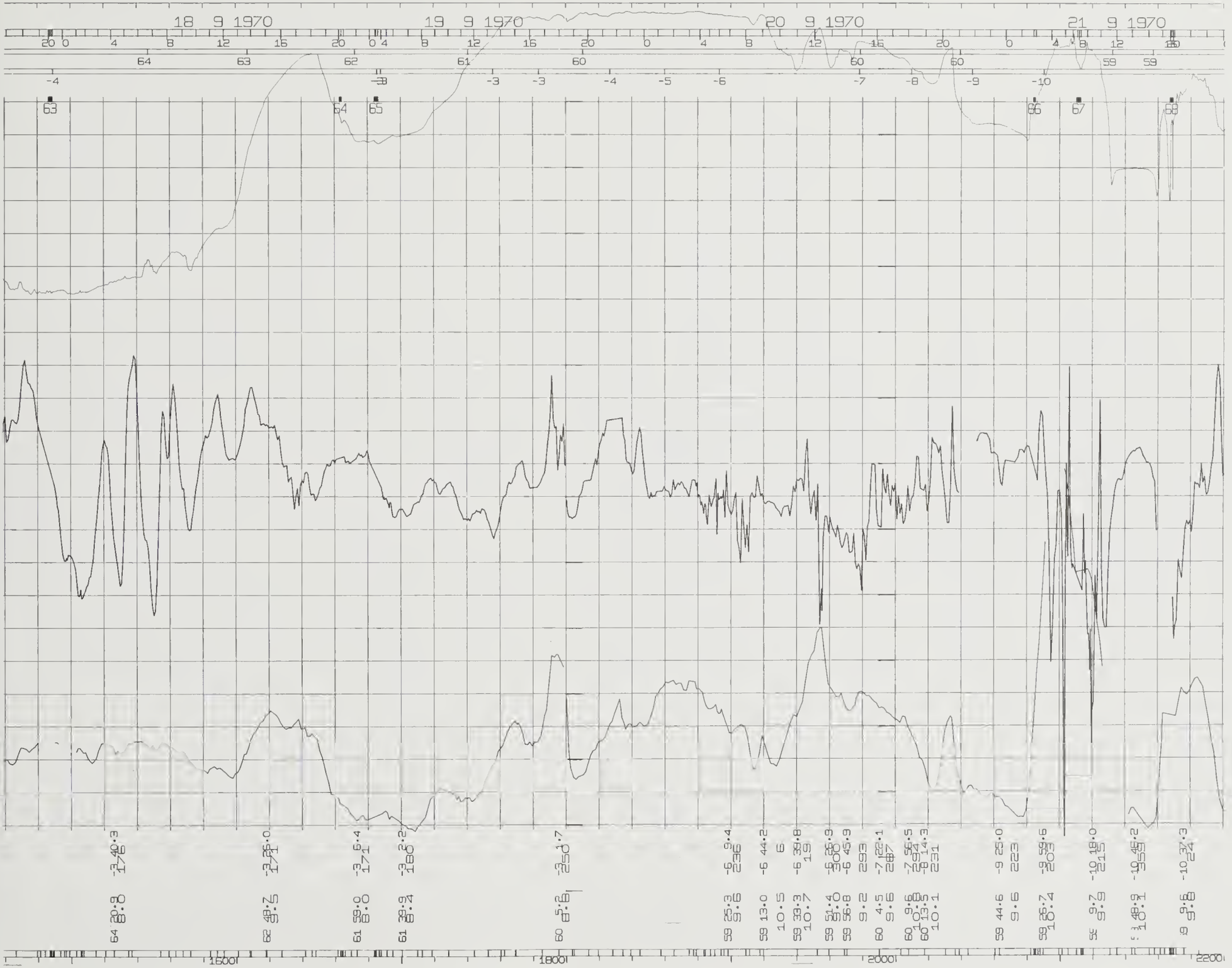

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28 8 1970
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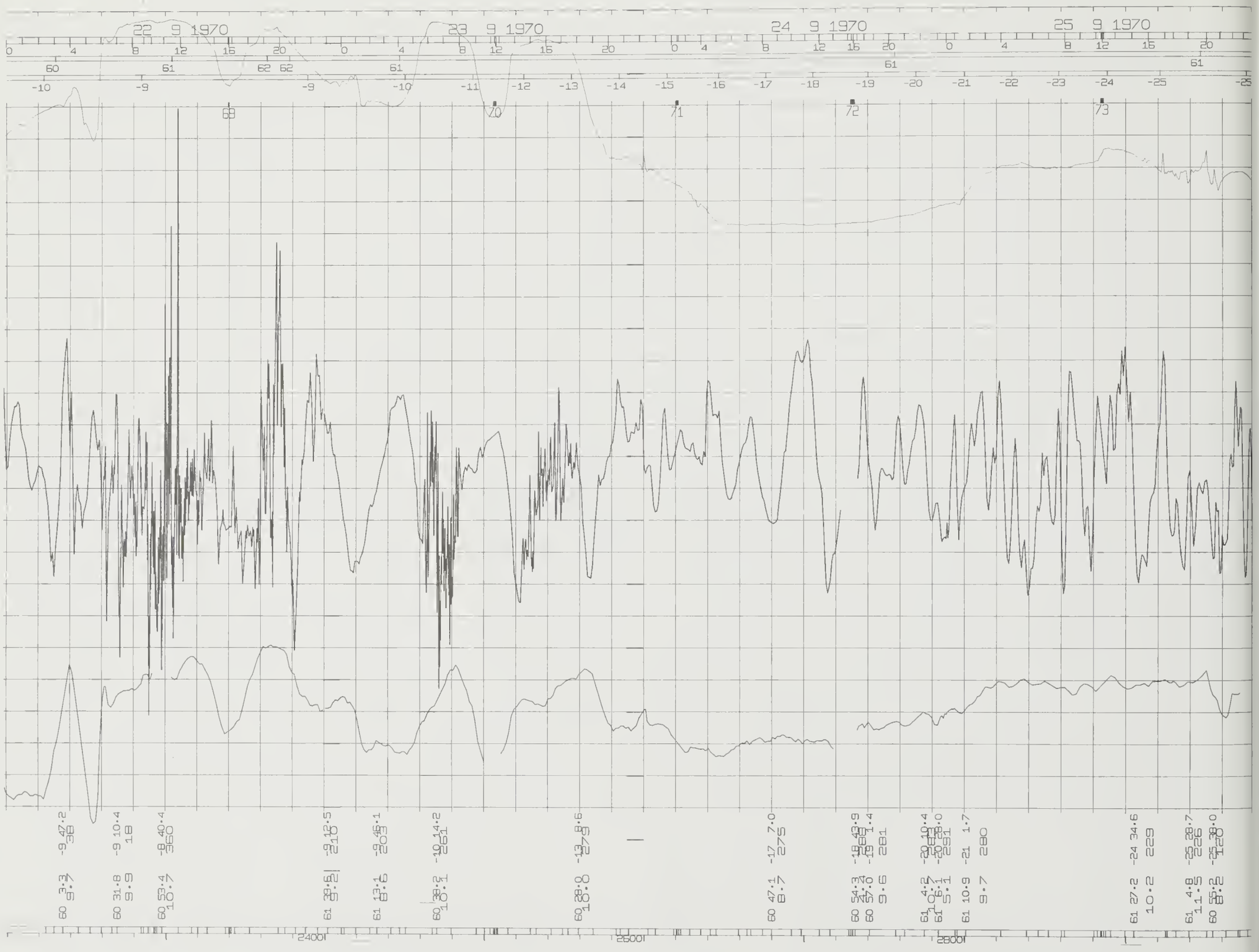

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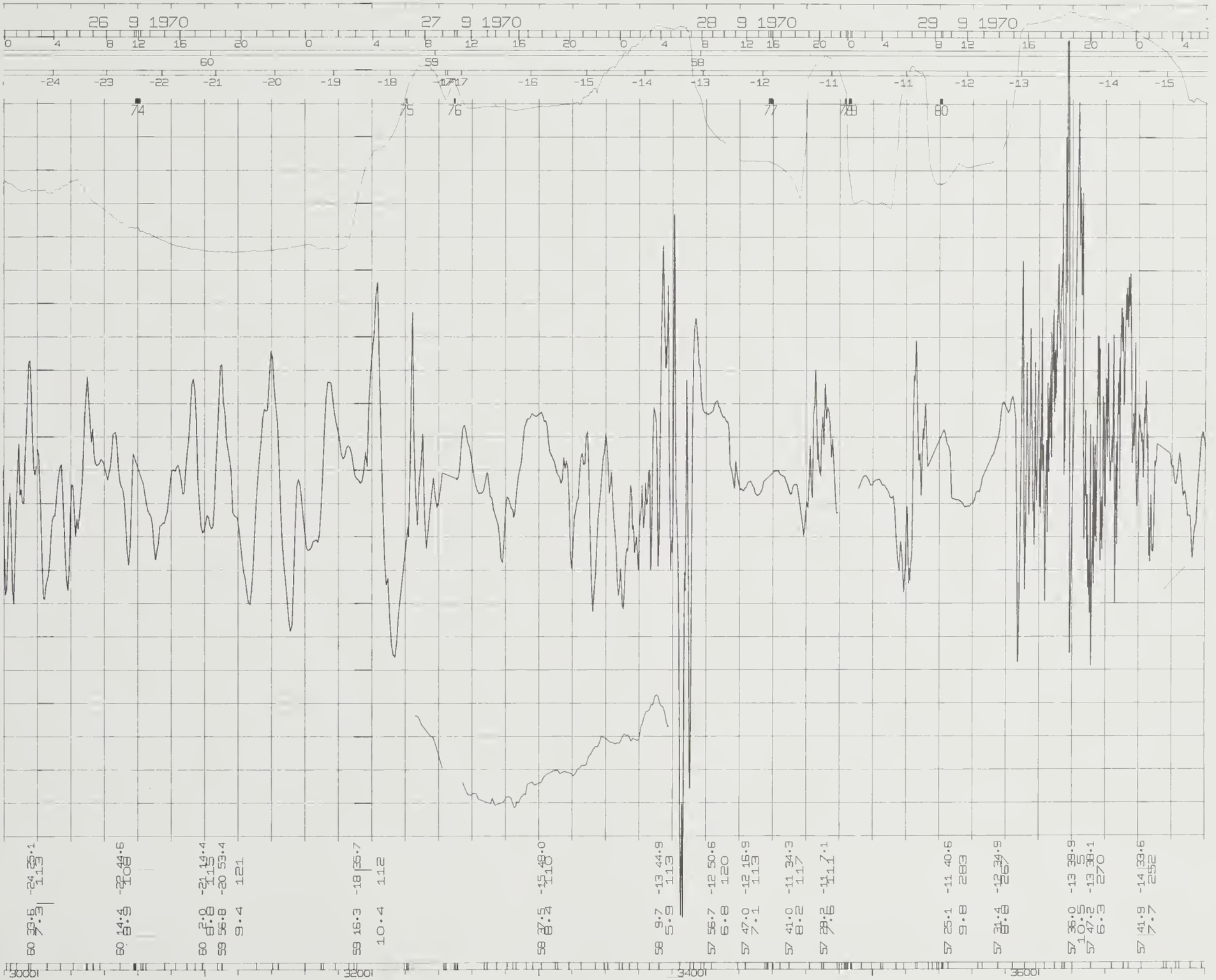
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3 9 1970
M G D
Trondheim
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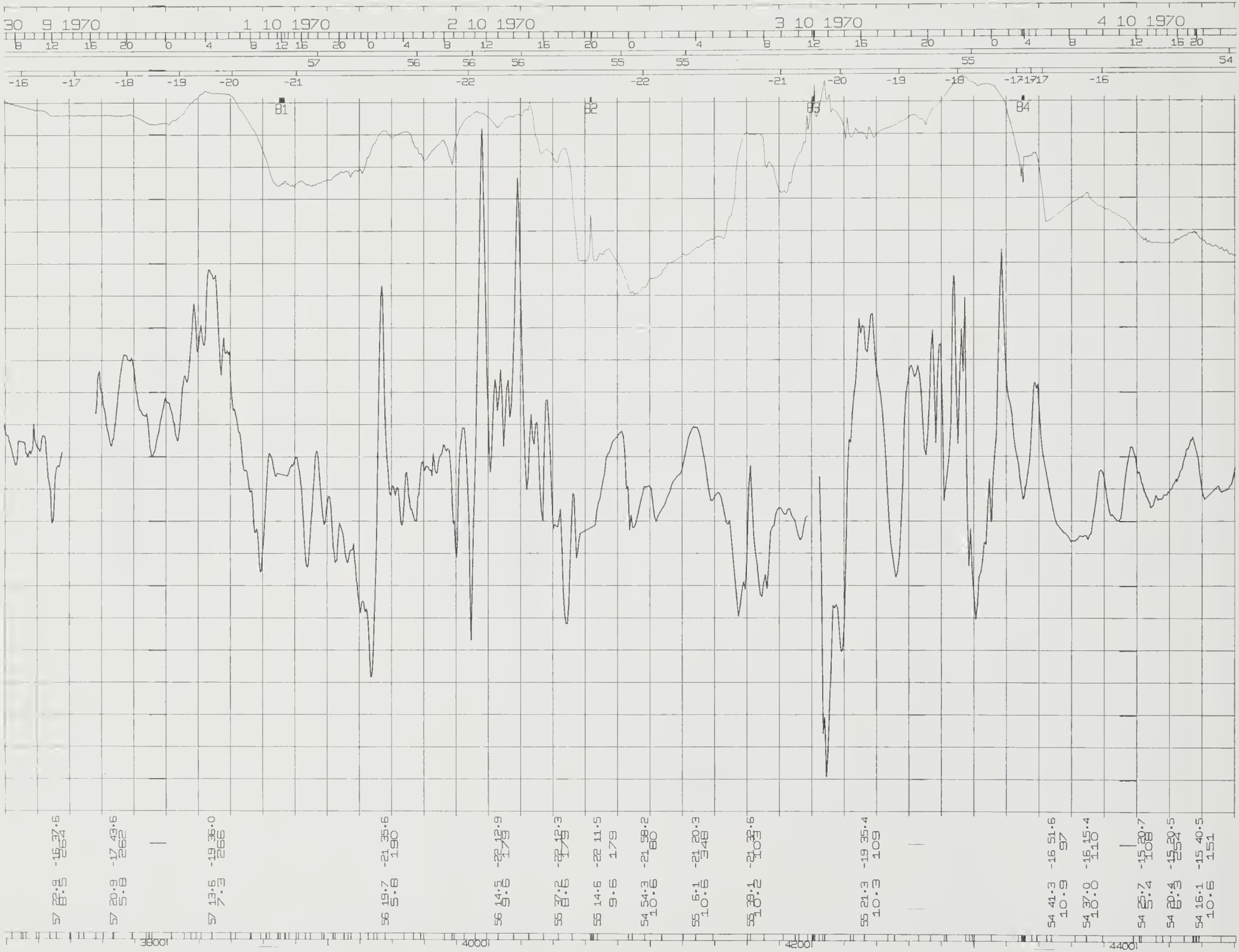

M G D
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12 9 1970
13 9 1970
Trondheim

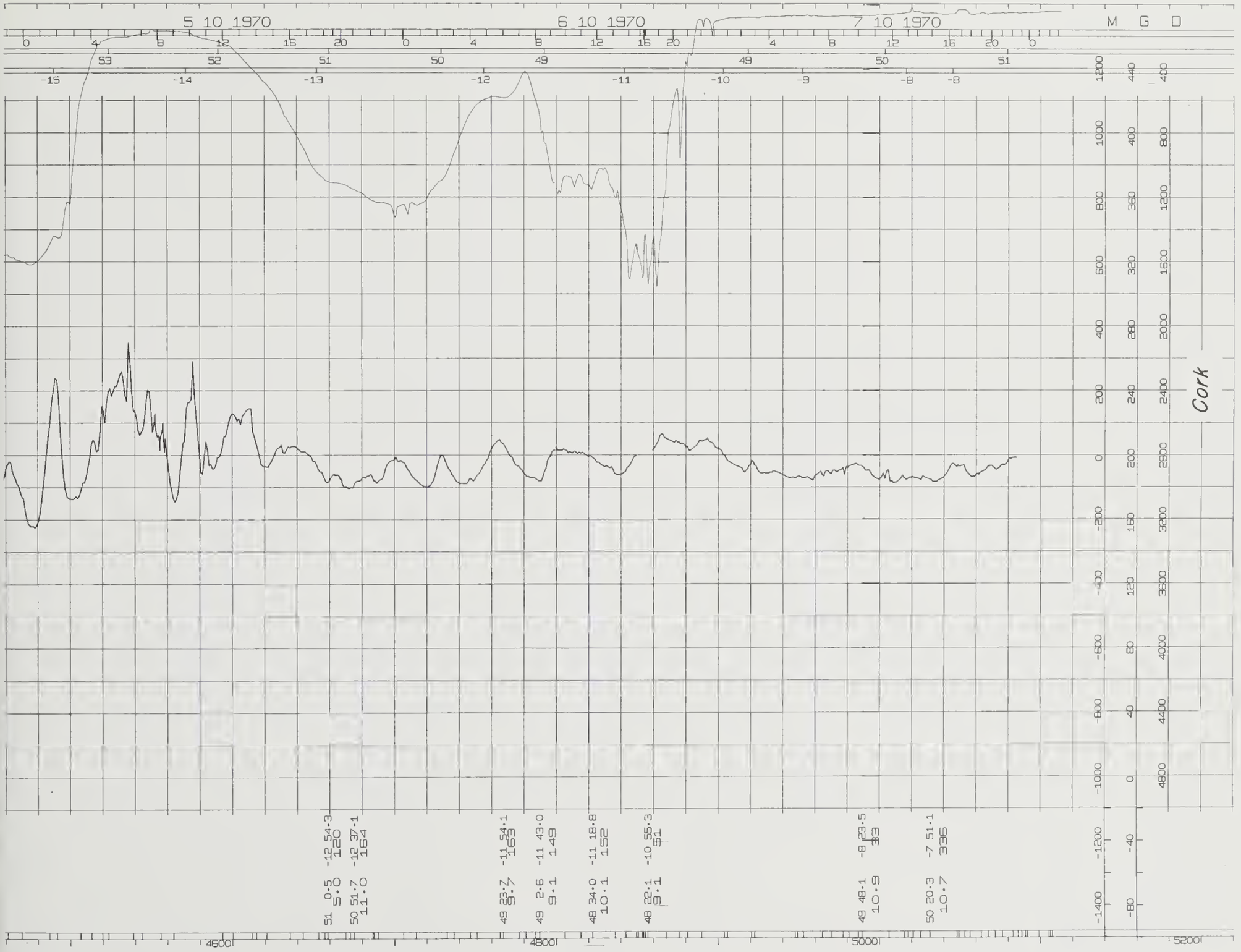

14 9 1970
15 9 1970
16 9 1970
17 9 1970
800
1000
1200
1400


18 9 1970
19 9 1970
20 9 1970
21 9 1970
1500
1800
2000
2200

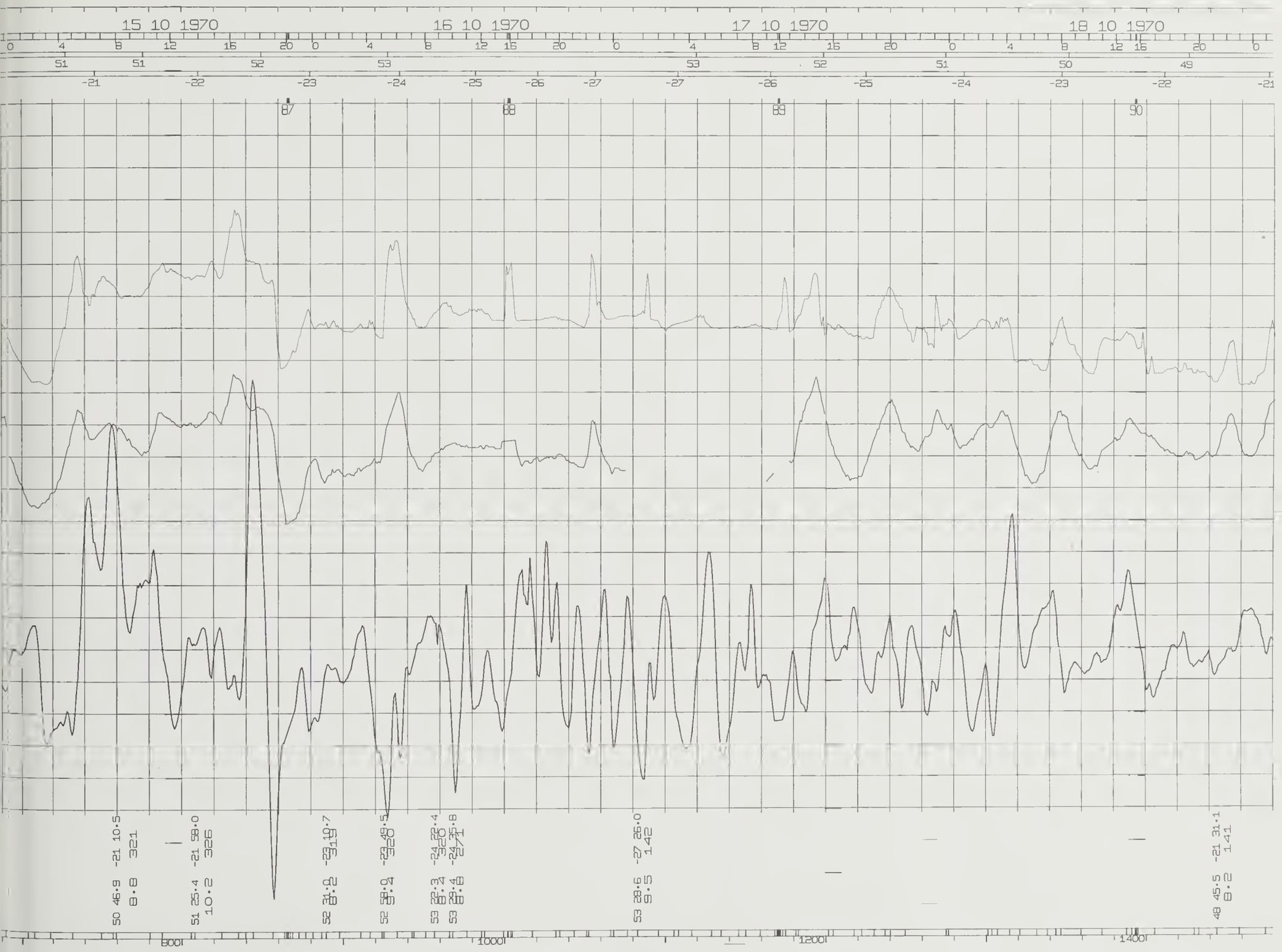

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24 9 1970
25 9 1970
68
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2500
2600

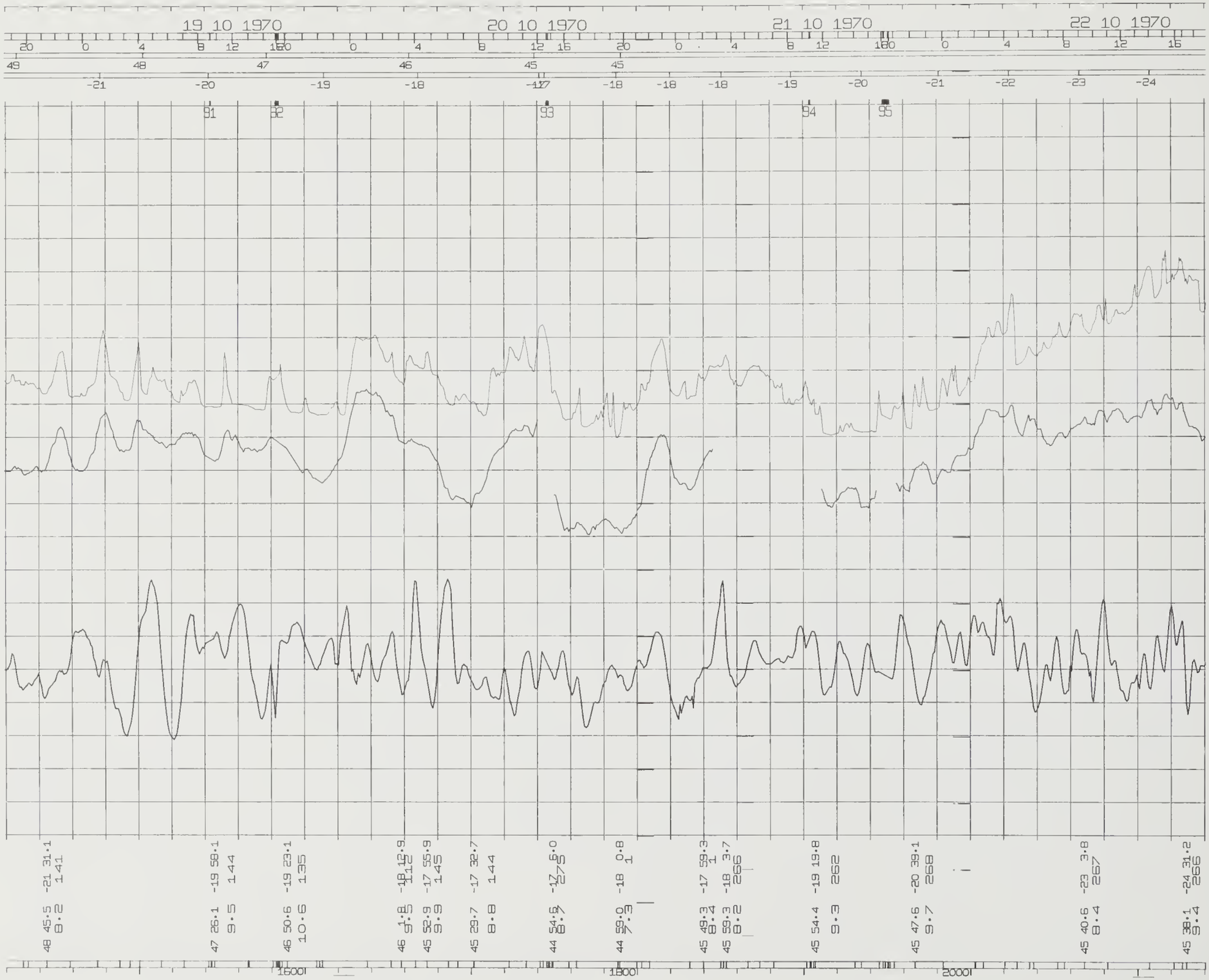

26 9 1970
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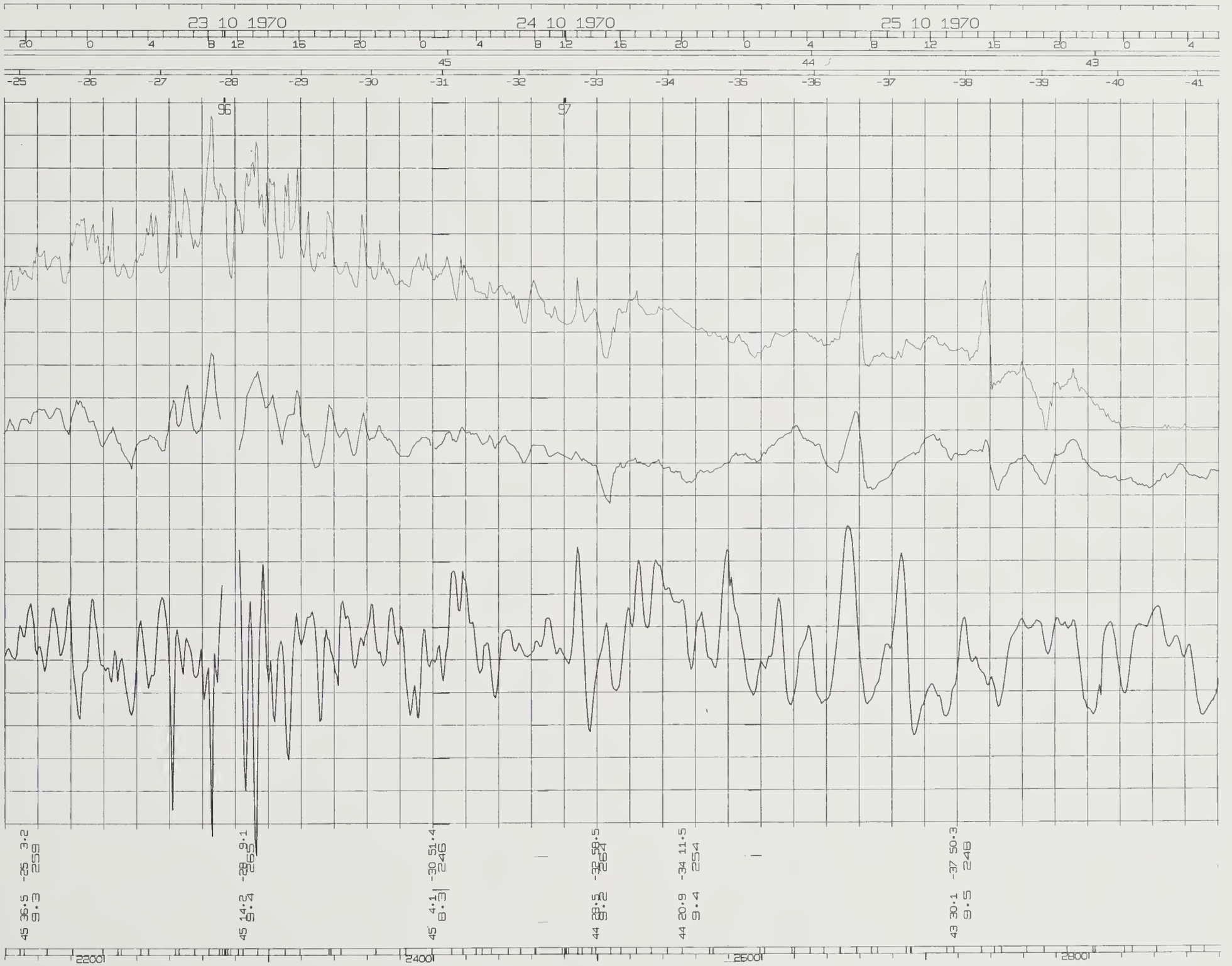

30 9 1970
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2 10 1970
3 10 1970
4 10 1970
B1
B2
B3
B4
3800
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4400

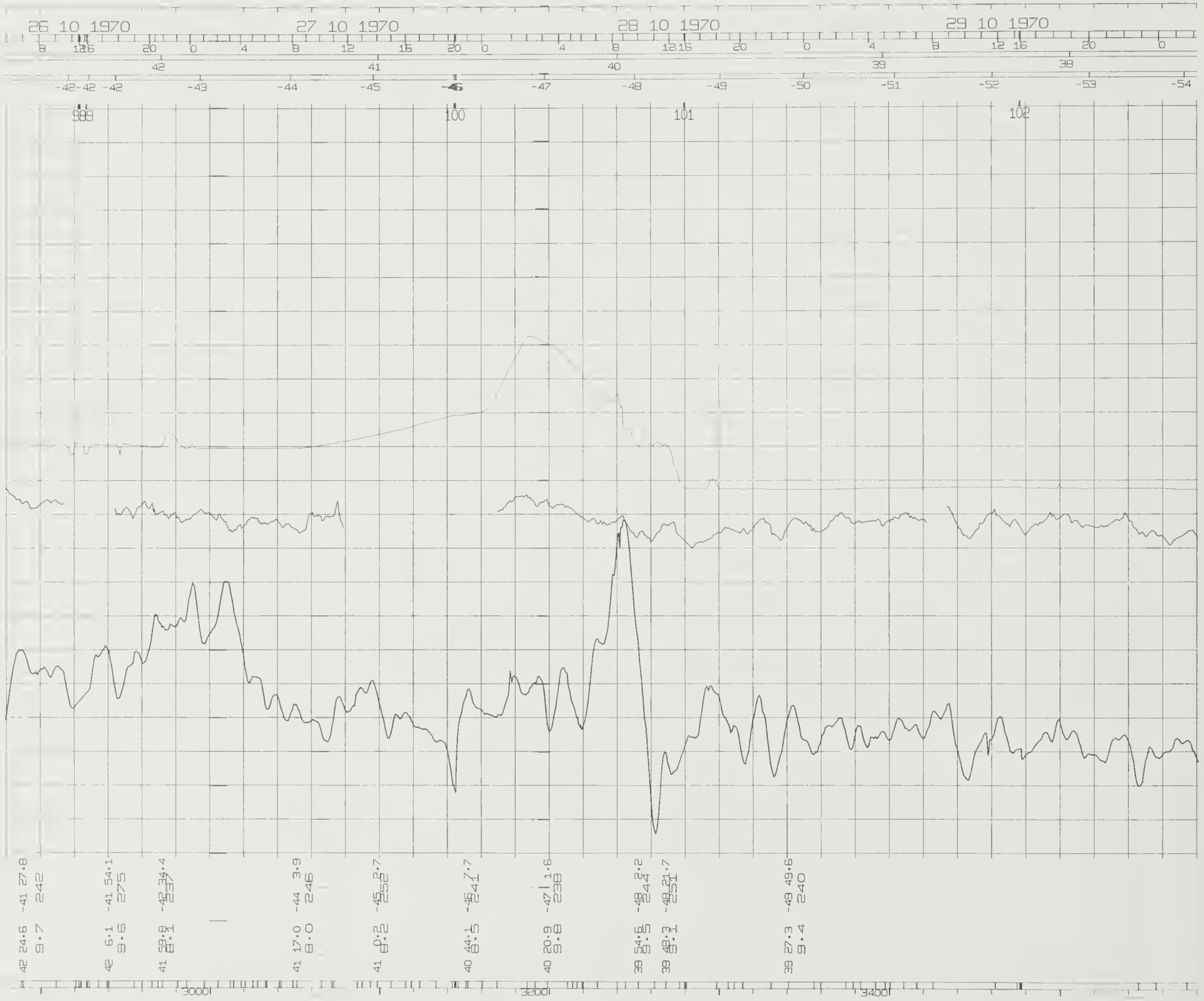

5 10 1970
6 10 1970
7 10 1970
M G D
Cork

M G D
12 10 1970
13 10 1970
14 10 1970
Cork

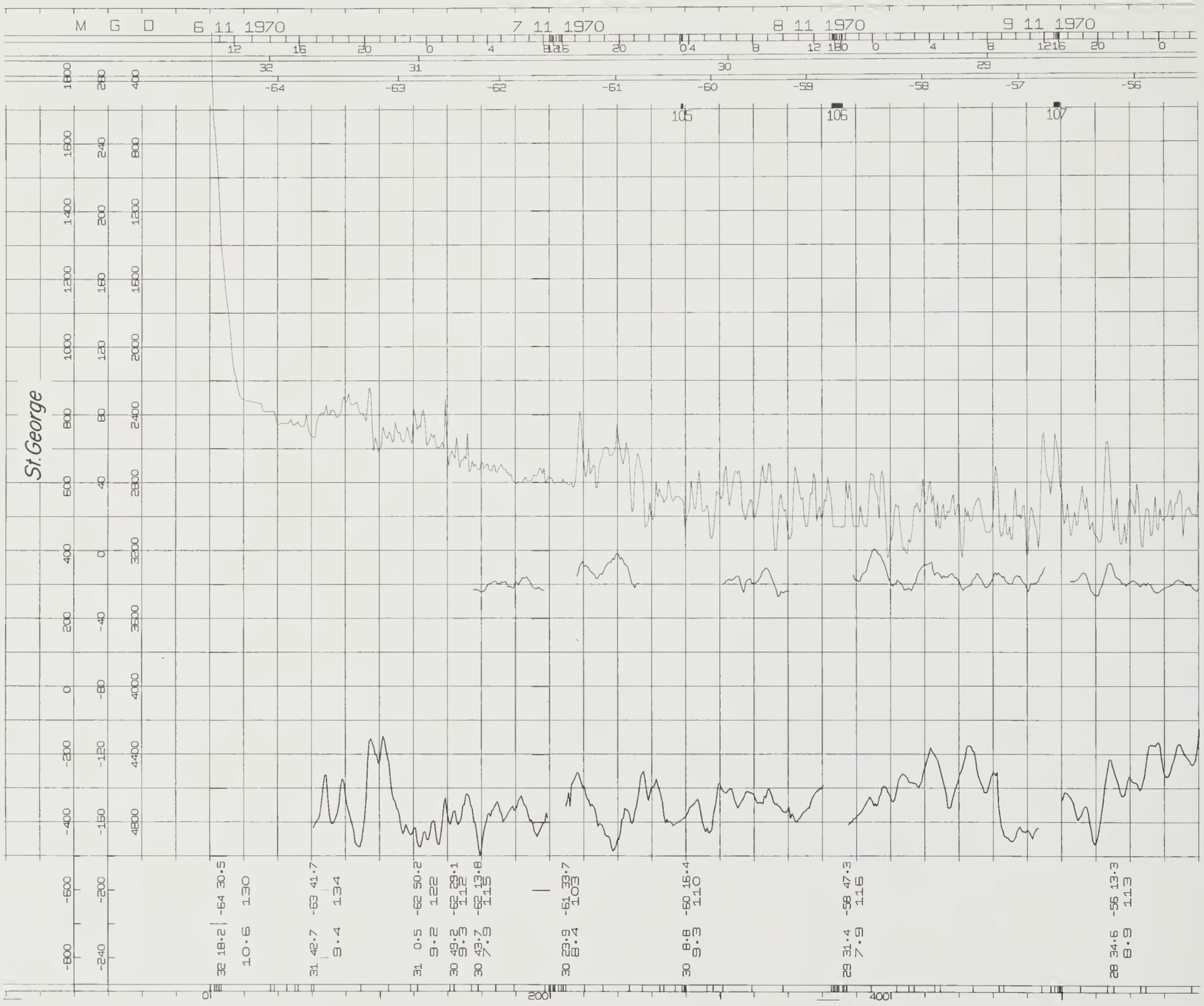

15 10 1970
16 10 1970
17 10 1970
18 10 1970
87
88
89
90
50 46·9 -21 10·5
8·8 321
51 25·4 -21 58·0
10·2 326
52 31·2 -23 10·7
52 38·4 -23 49·5
53 22·3 -24 22·4
53 28·8 -24 35·8
53 28·6 -27 26·0
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1200
1400

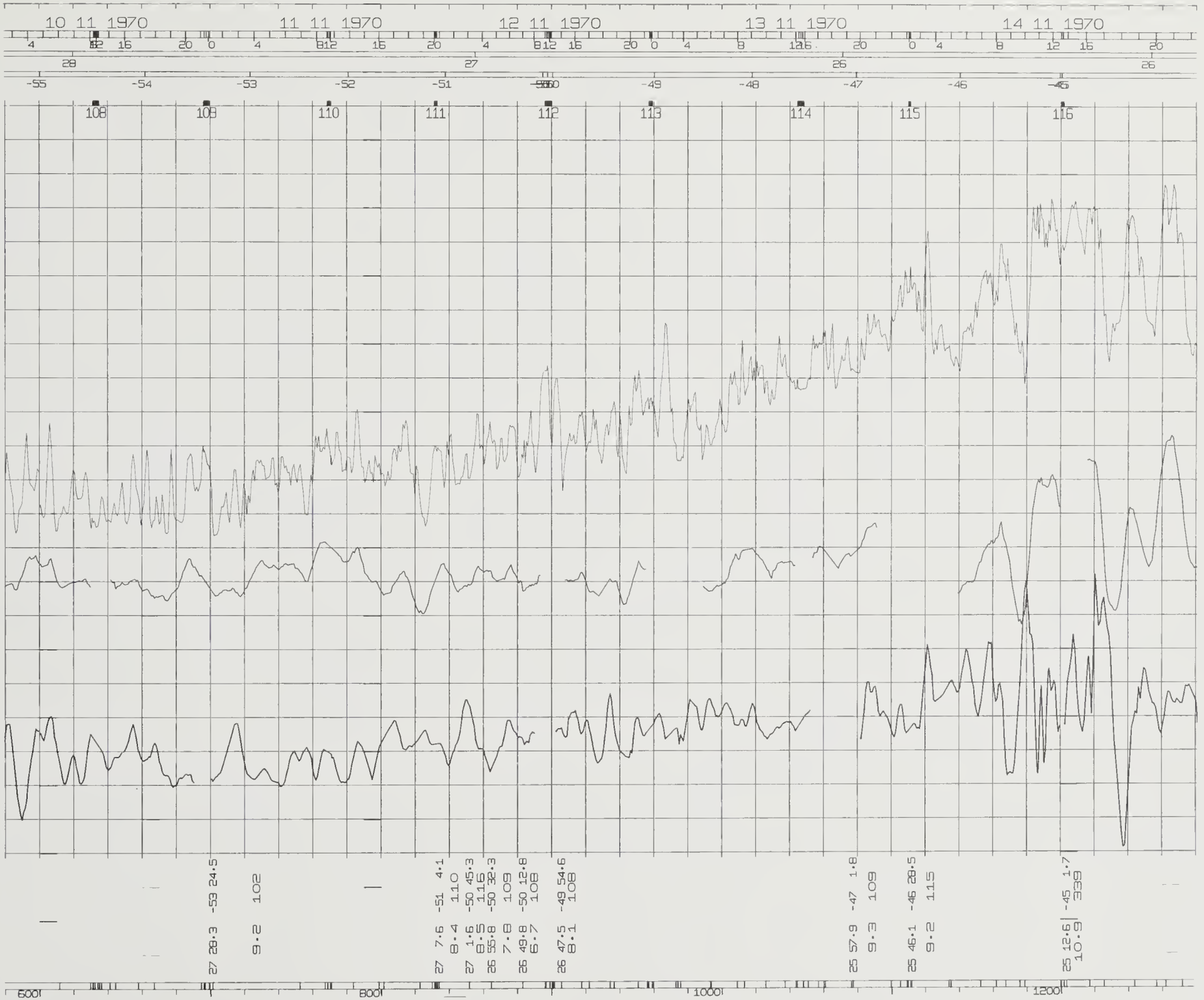

19 10 1970
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21 10 1970
22 10 1970
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94
95
1600
1800
2000

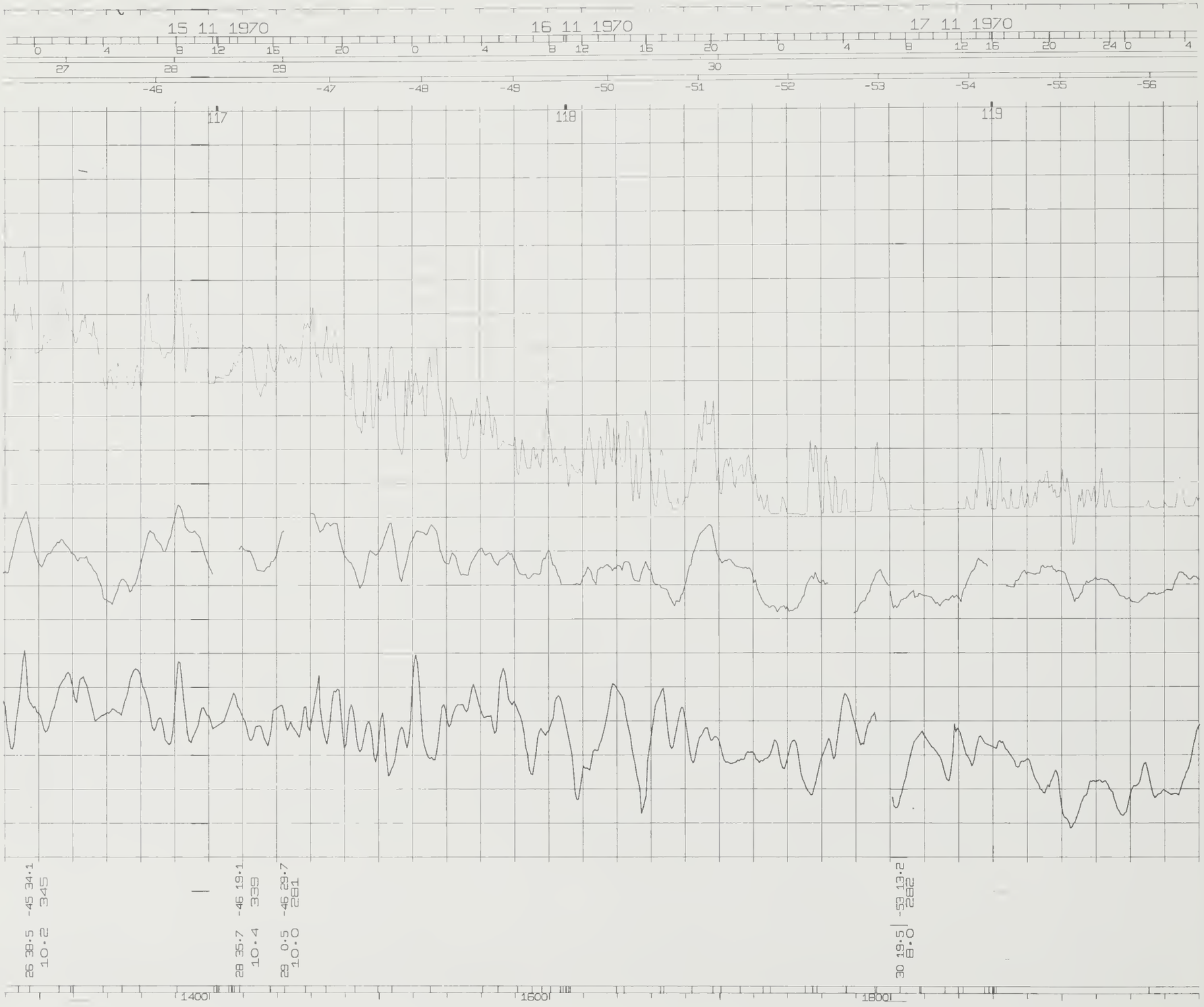

23 10 1970
24 10 1970
25 10 1970
96
97
-25 3·2 259
-28 9·1 265
-30 51·4 246
-32 58·5 264
-34 11·5 254
-37 50·3 248
45 36·5 9·3
45 14·2 9·4
45 4·1 8·3
44 28·5 9·2
44 20·9 9·4
43 30·1 9·5
2200
2400
2600
2800


26 10 1970
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28 10 1970
29 10 1970
989
100
101
102
3000
3200
3400

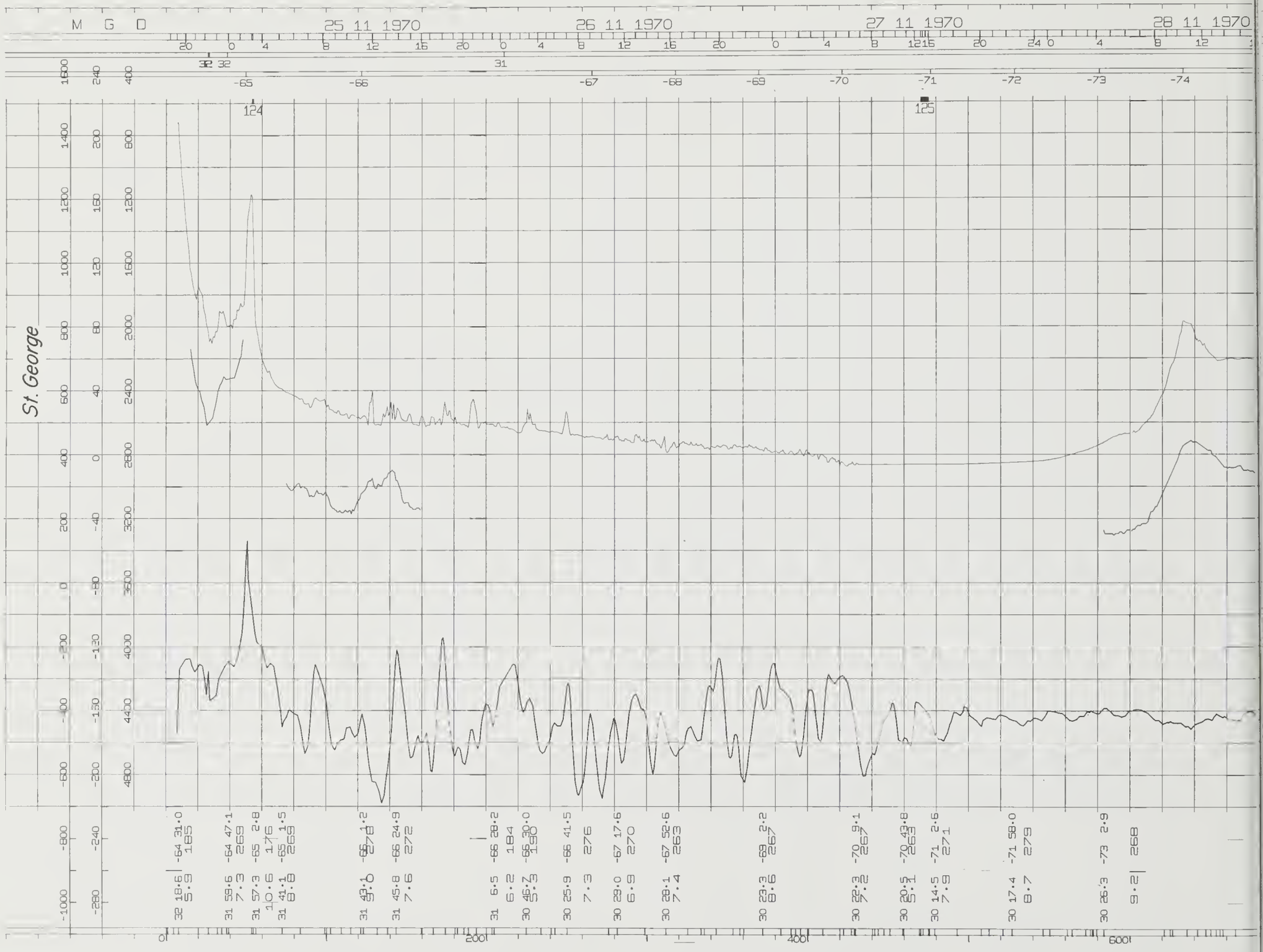

30 10 1970
31 10 1970
1 11 1970
M G D
103
104
St.George

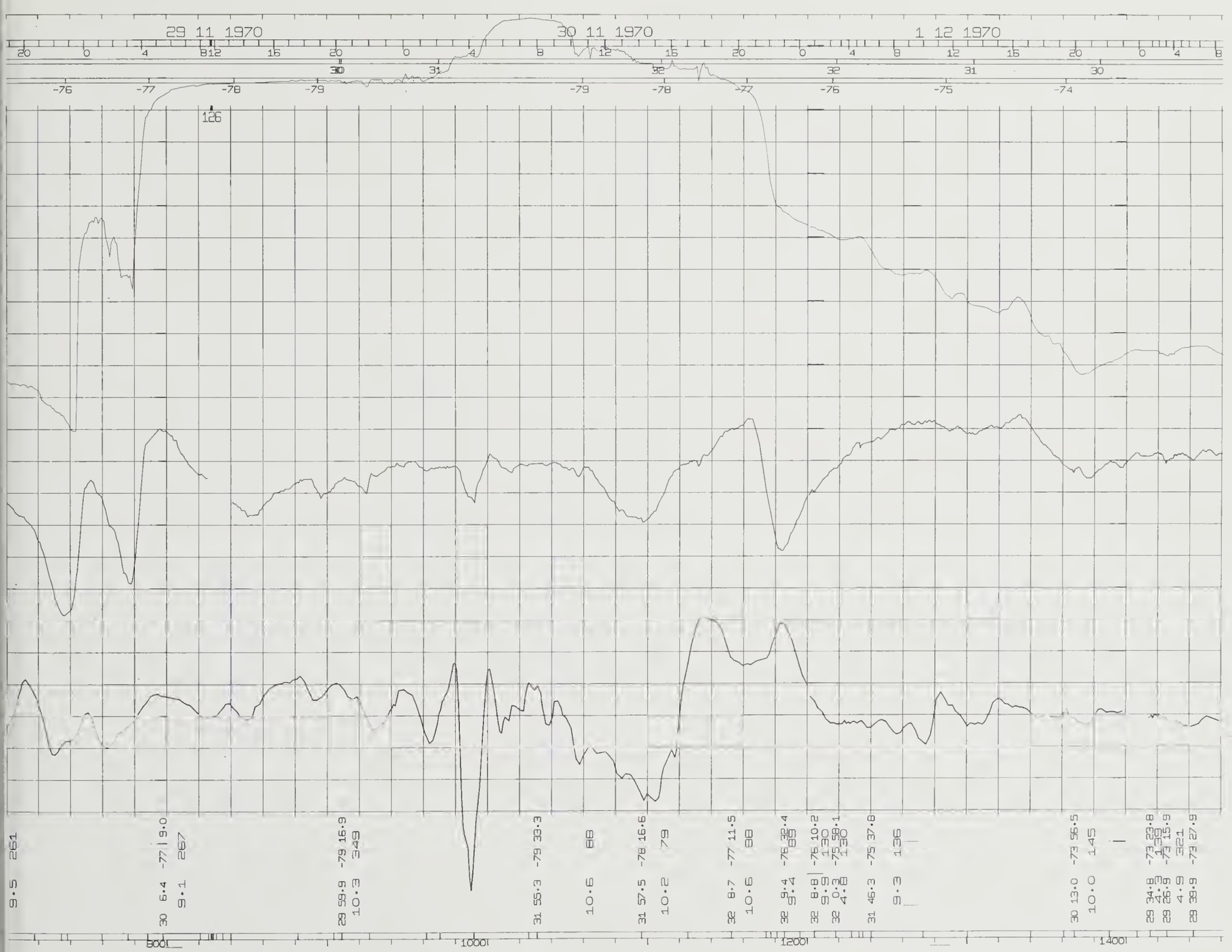

M G D
6 11 1970
7 11 1970
8 11 1970
9 11 1970
St.George
105
106
107

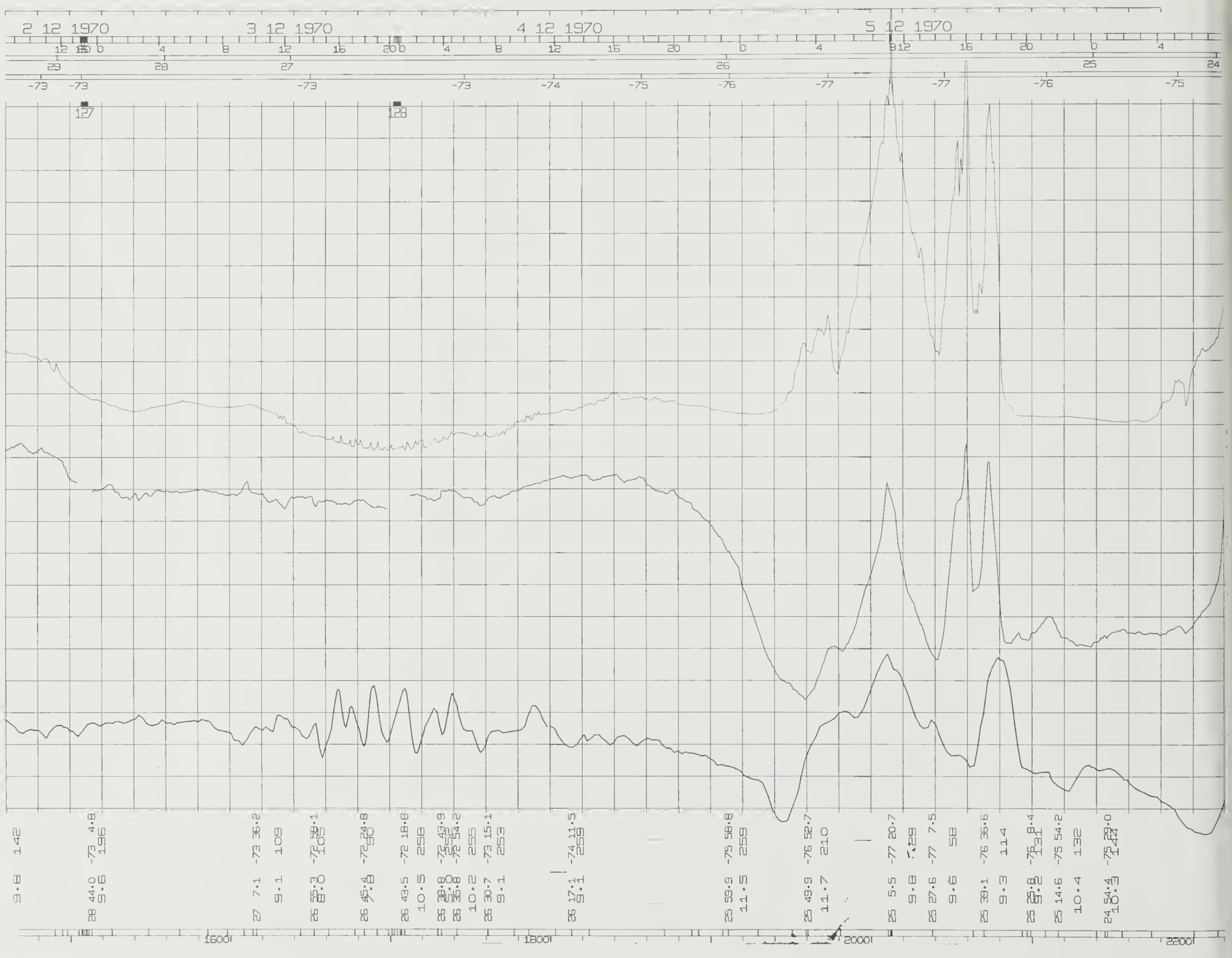

10 11 1970
11 11 1970
12 11 1970
13 11 1970
14 11 1970
-55
-54
-53
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-47
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108
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111
112
113
114
115
116
600
800
1000
1200

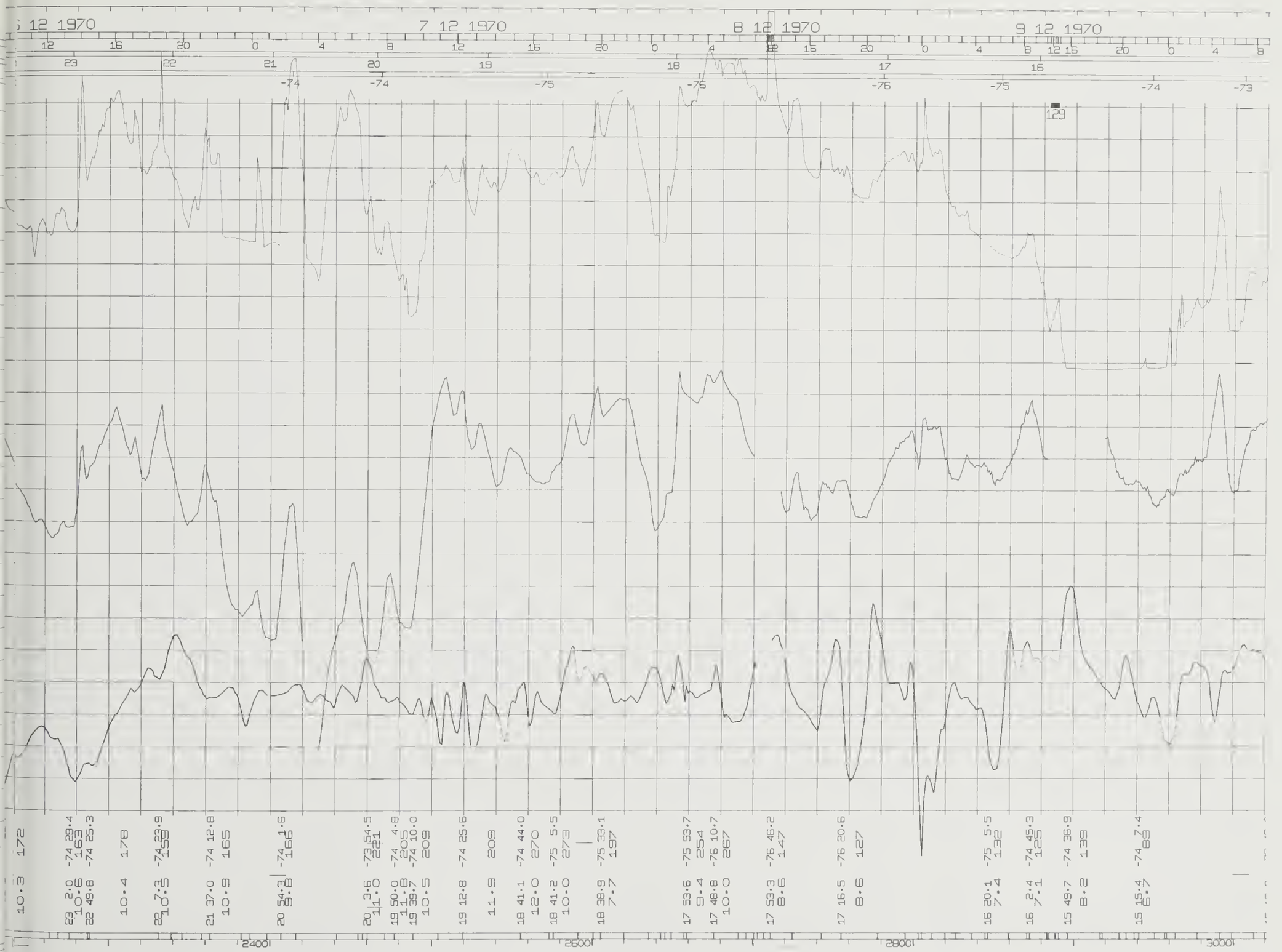

15 11 1970
16 11 1970
17 11 1970
0 4 8 12 16 20 0 4 8 12 16 20 0 4 8 12 16 20 24 0 4
27 28 29 30
-46 -47 -48 -49 -50 -51 -52 -53 -54 -55 -56
117
118
119
26 38·5 -45 34·1
10·2 345
28 35·7 -46 19·1
10·4 339
29 0·5 -46 29·7
10·0 281
30 19·5 -53 13·2
8·0 282
1400
1600
1800

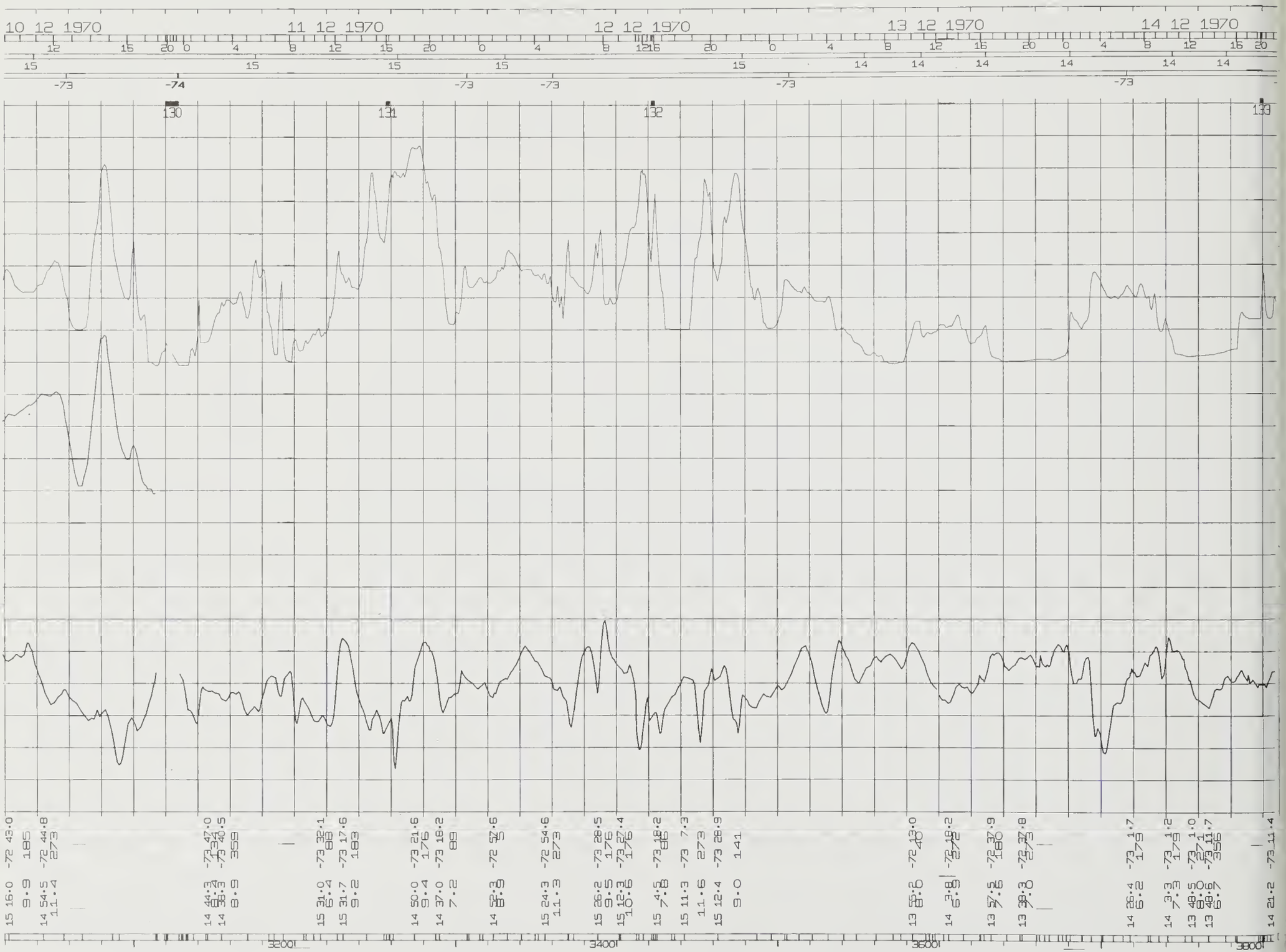
18 11 1970
19 11 1970
20 11 1970
M G D
St. George

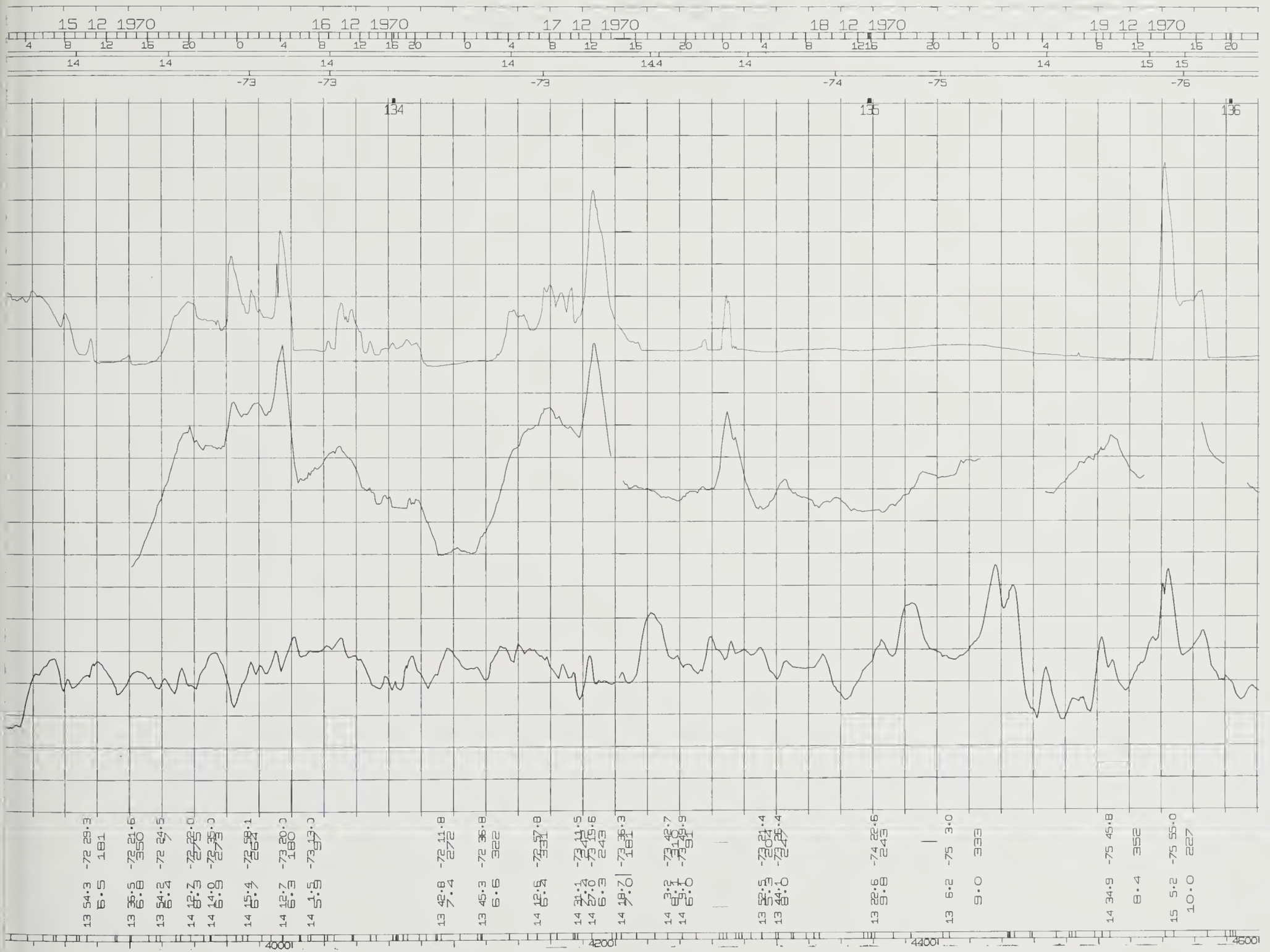

M G D
25 11 1970
26 11 1970
27 11 1970
28 11 1970
St. George

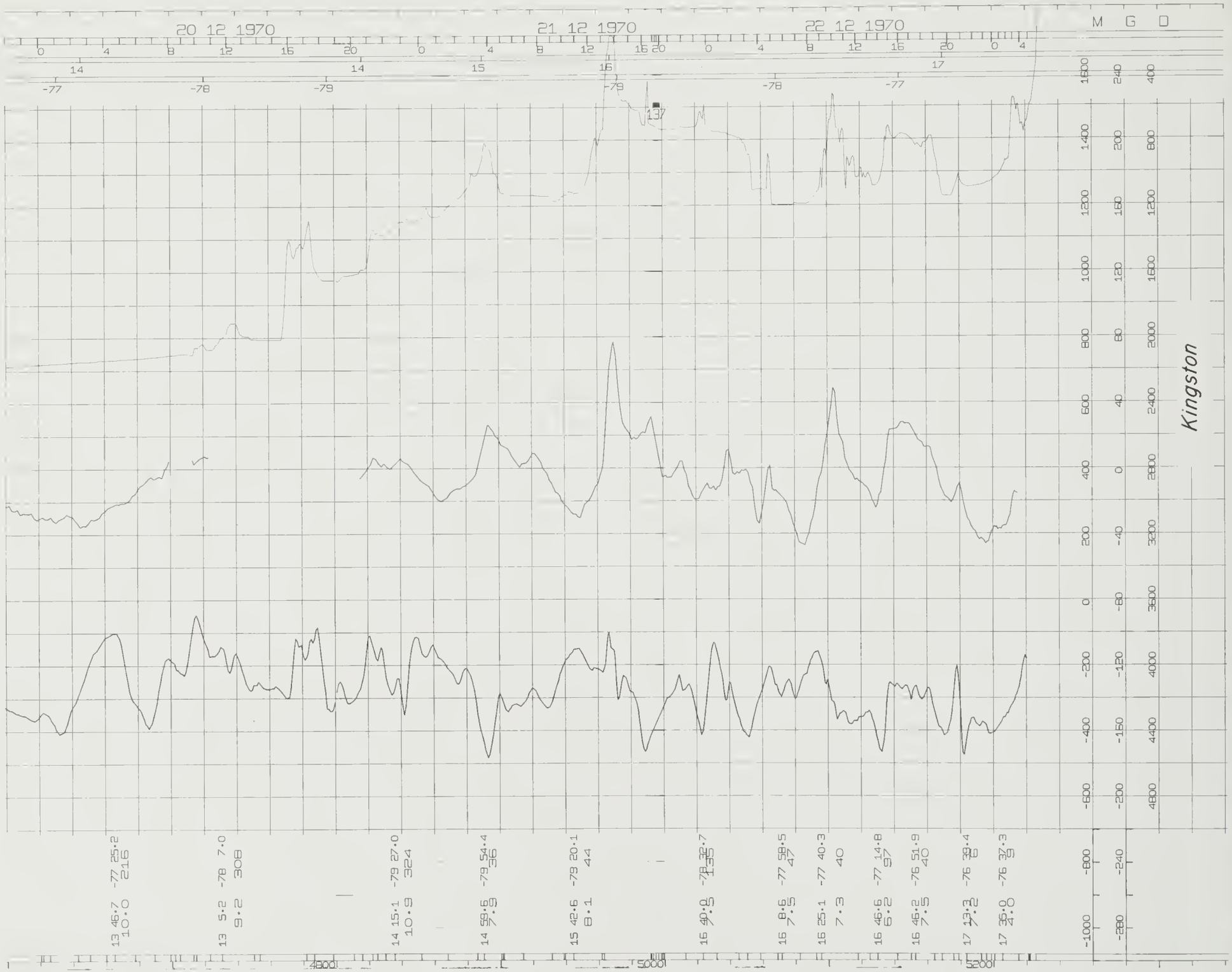

29 11 1970
30 11 1970
1 12 1970
126
800
1000
1200
1400

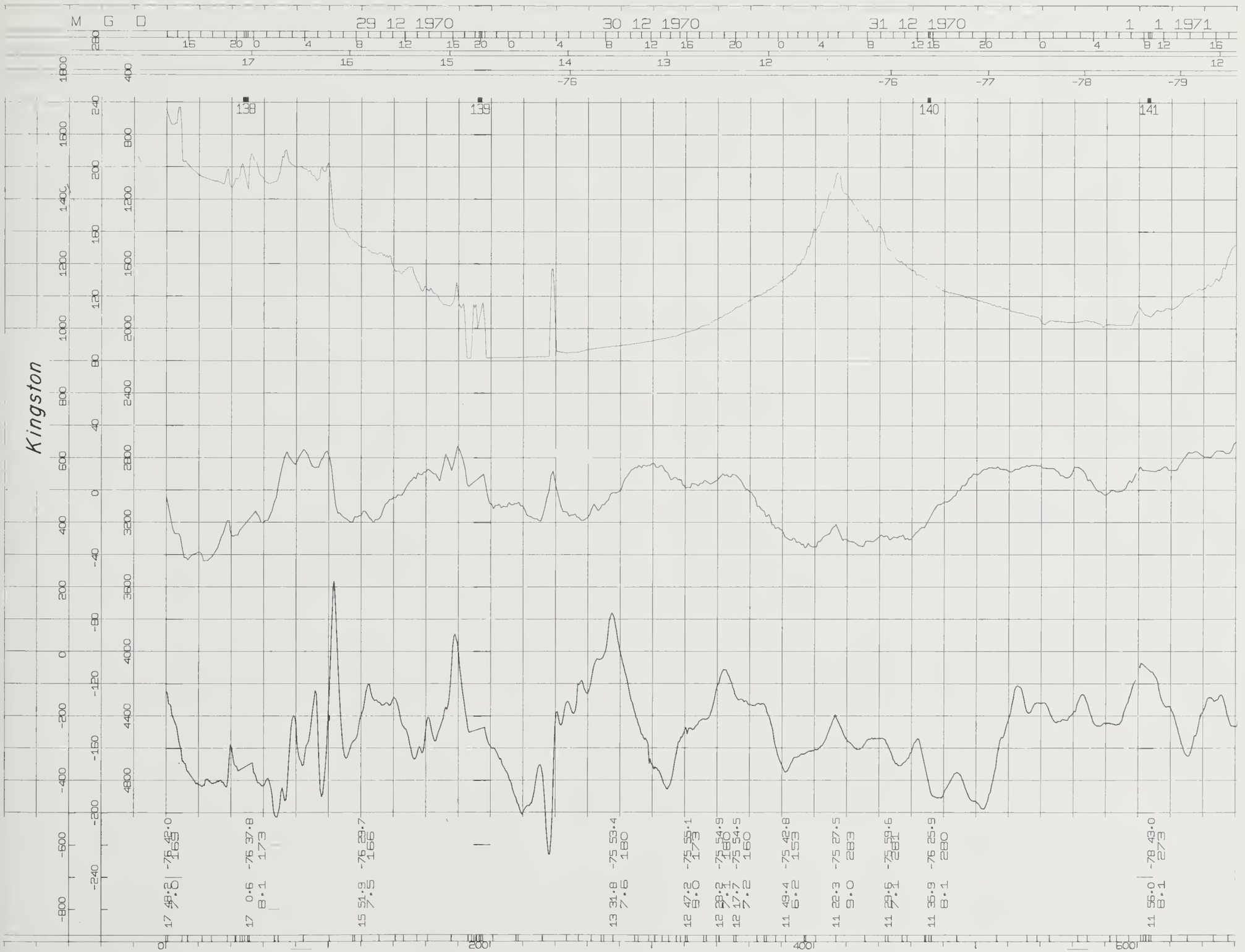

2 12 1970
3 12 1970
4 12 1970
5 12 1970
127
128
1600
1800
2000
2200

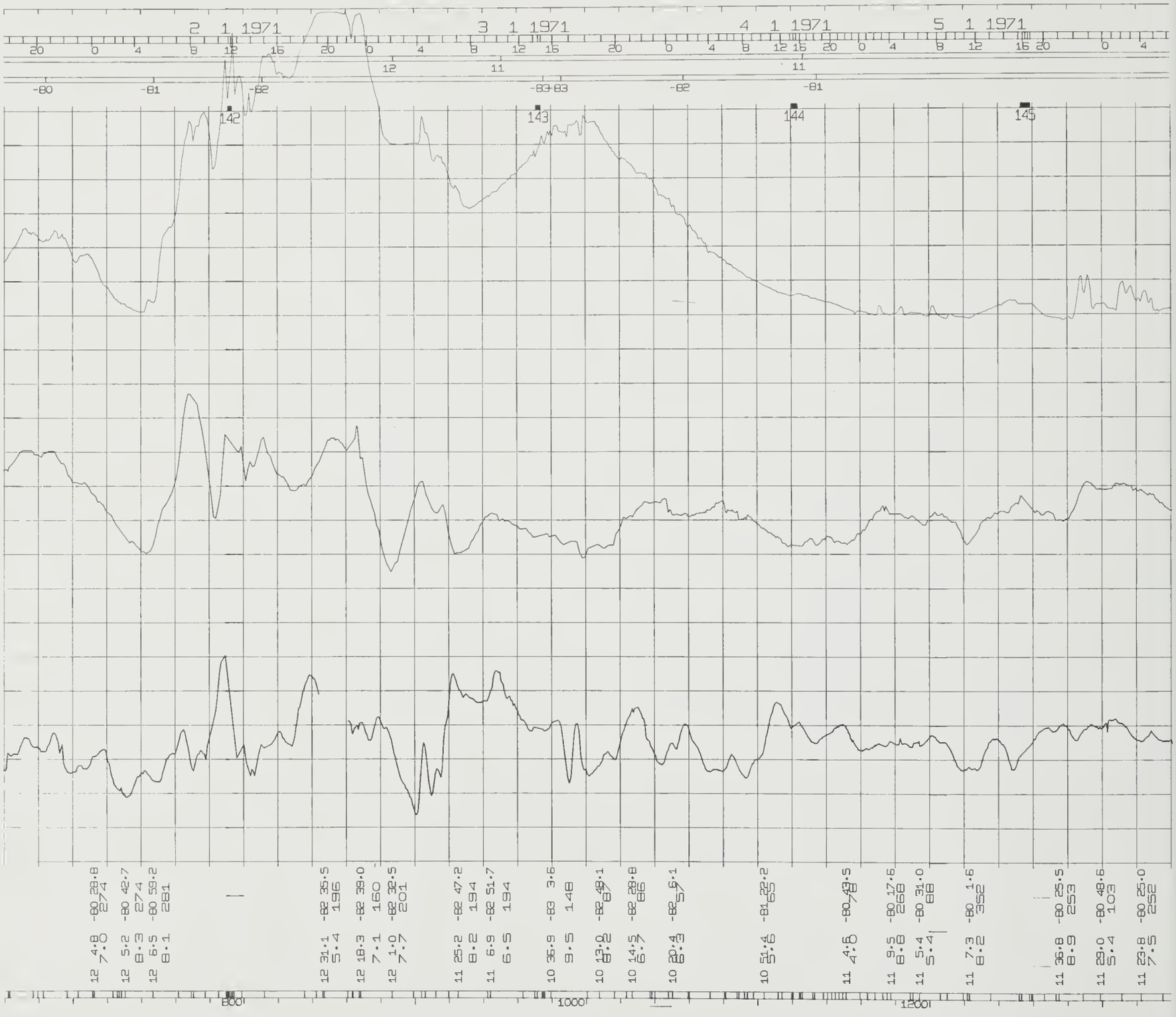

7 12 1970
8 12 1970
9 12 1970
129
2400
2600
2800
3000

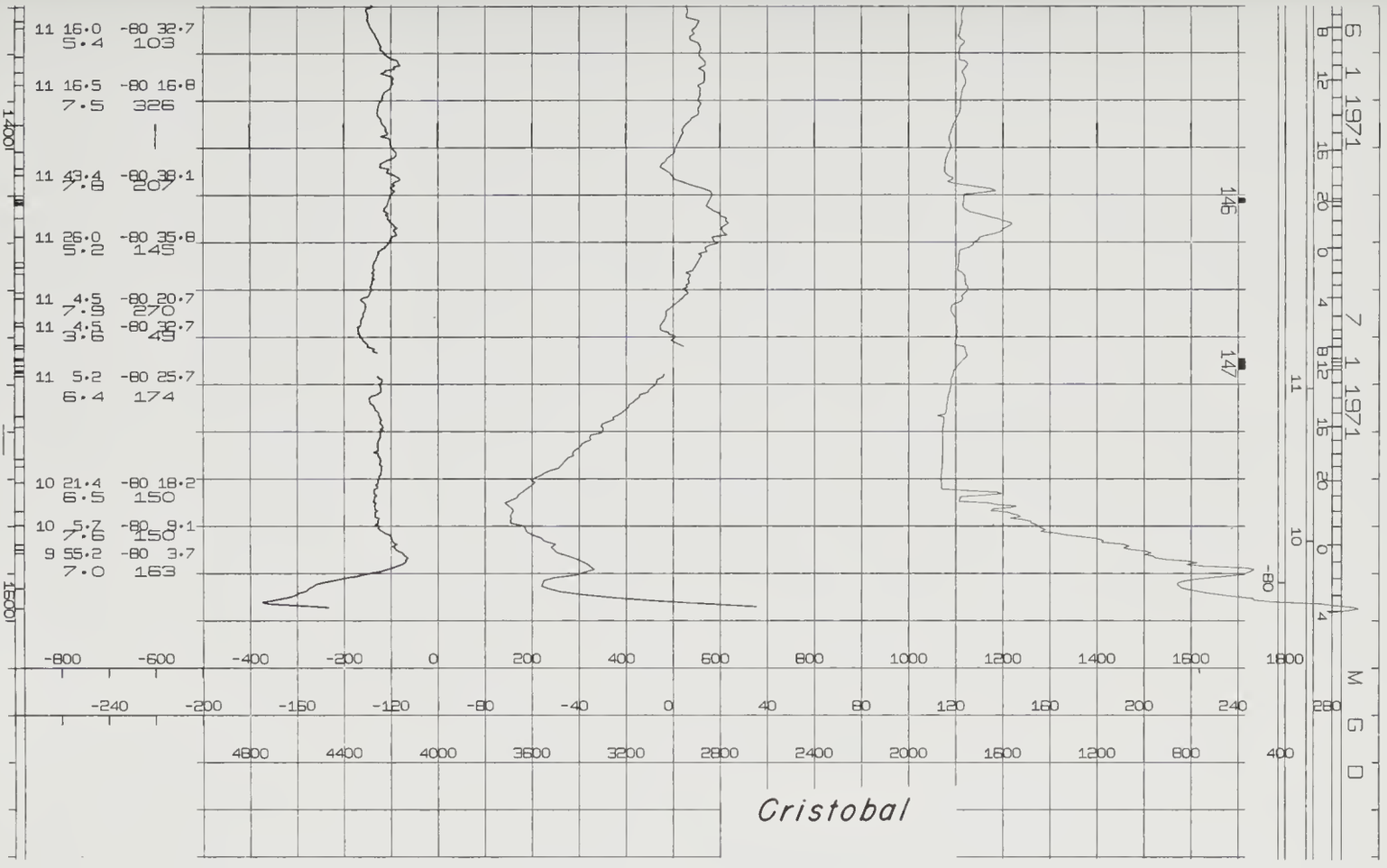

10 12 1970
11 12 1970
12 12 1970
13 12 1970
14 12 1970
130
131
132
133
3200
3400
3600
3800

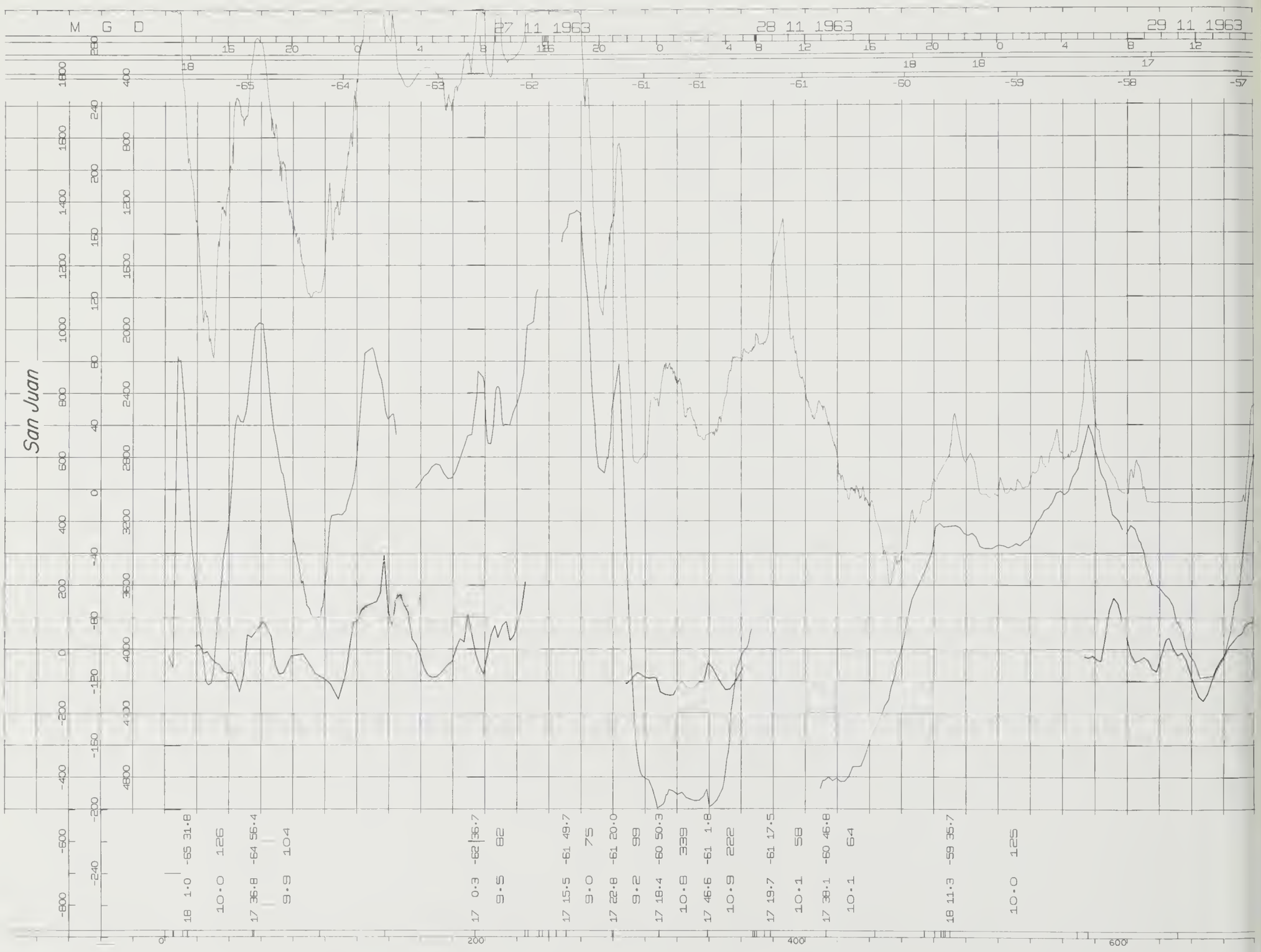

15 12 1970
16 12 1970
17 12 1970
18 12 1970
19 12 1970
134
135
136
4000
4200
4400
4600

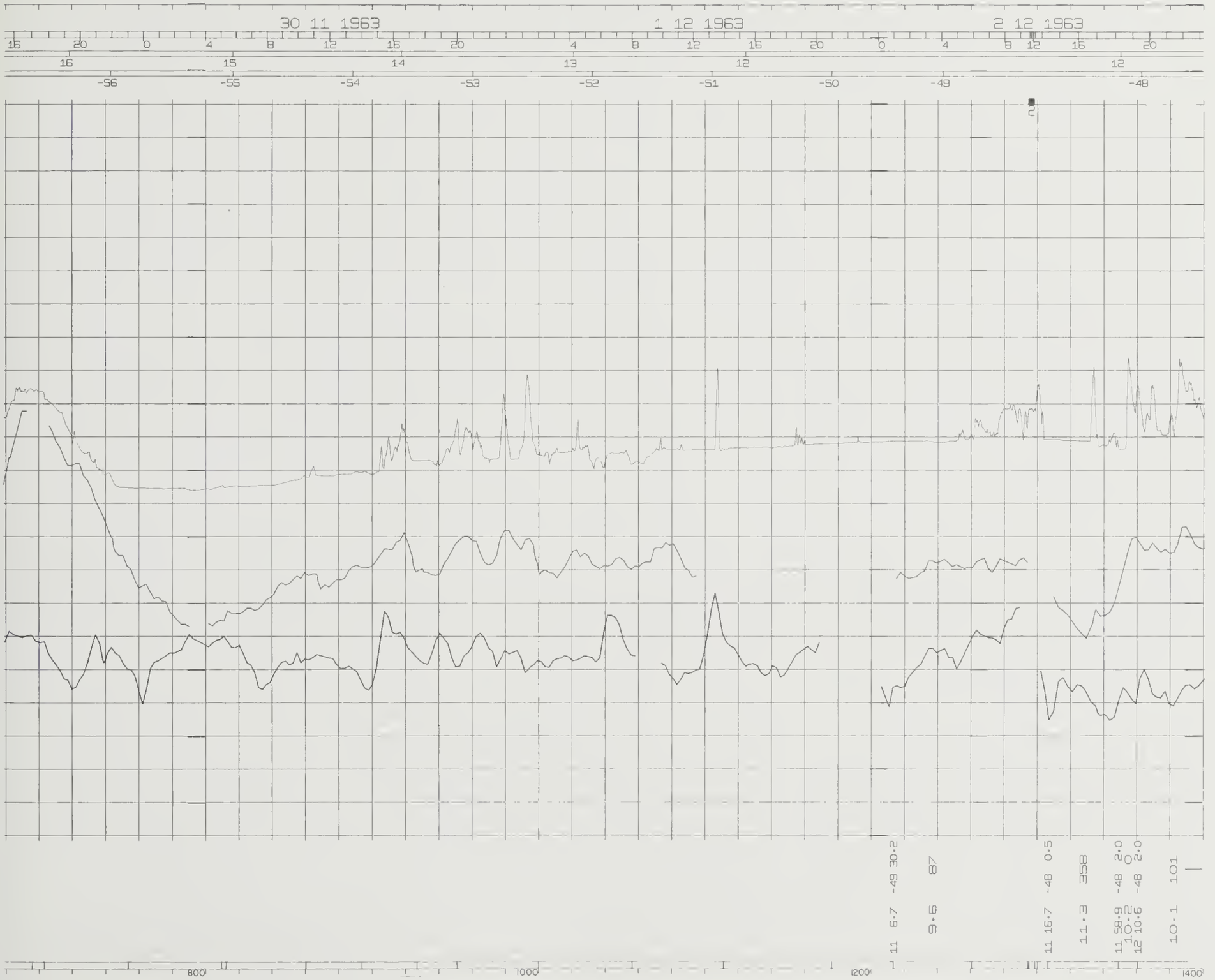

20 12 1970
21 12 1970
22 12 1970
M G D
Kingston

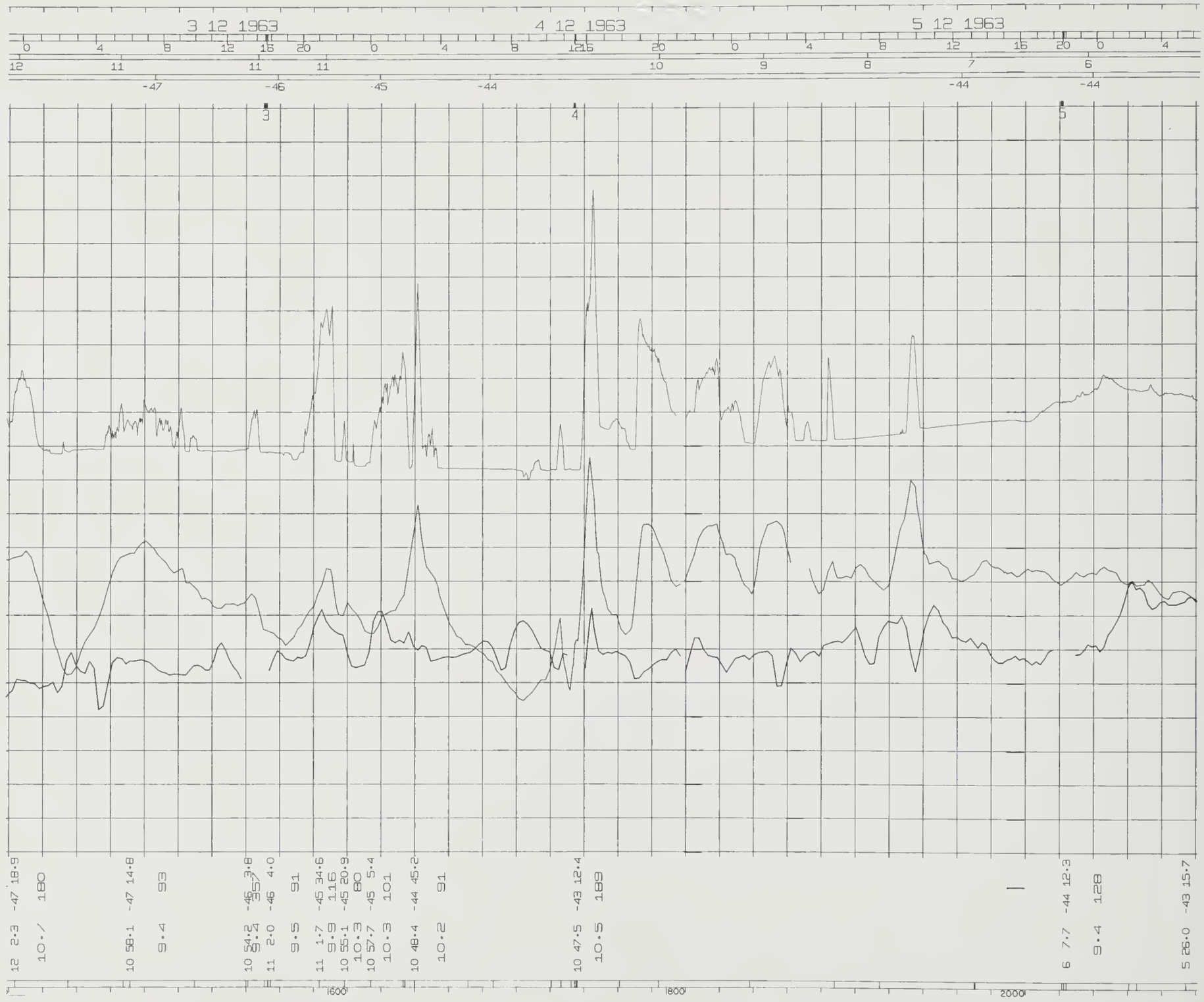

M G D
29 12 1970
30 12 1970
31 12 1970
1 1 1971
Kingston
138
139
140
141

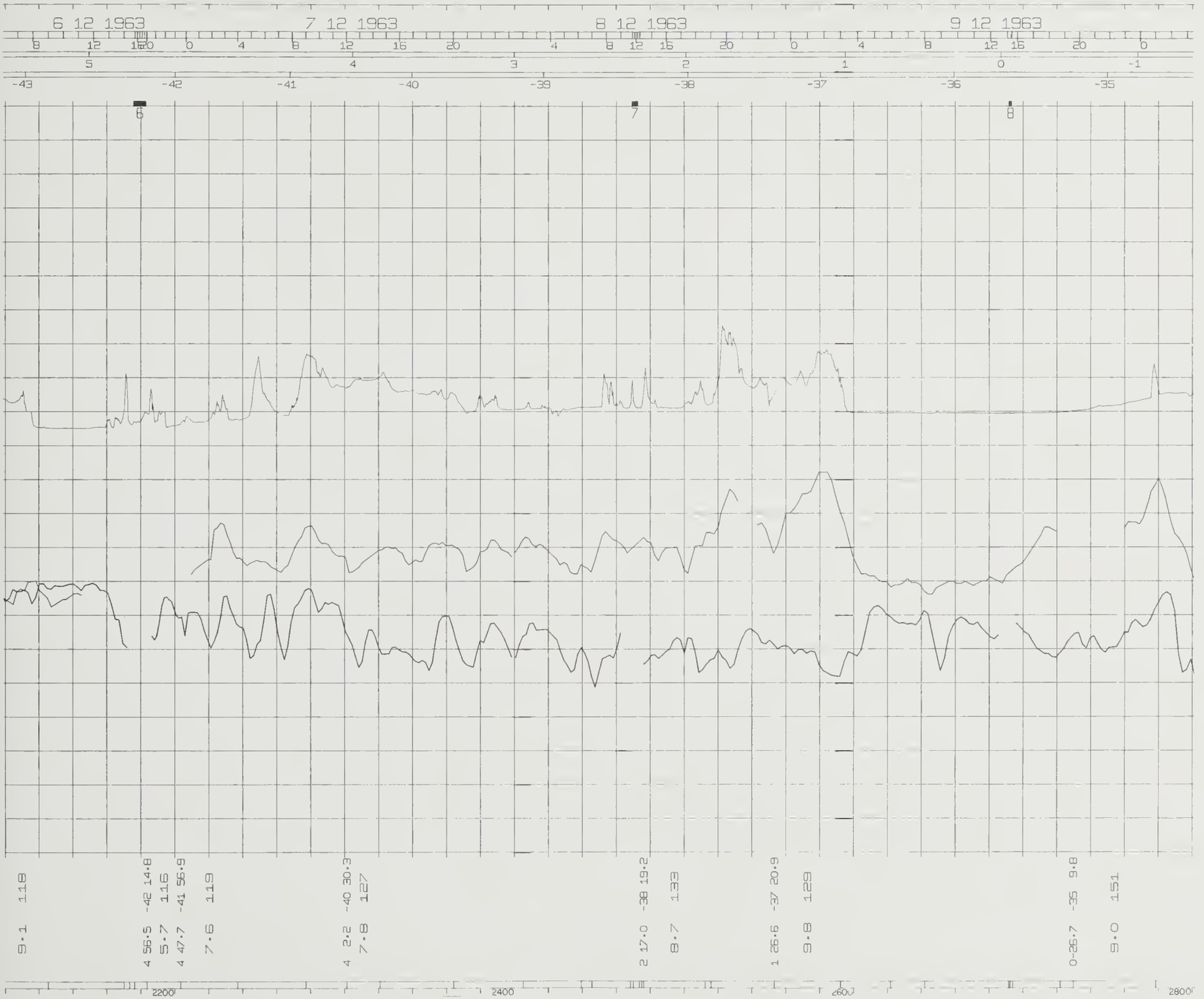

2 1 1971
3 1 1971
4 1 1971
5 1 1971
142
143
144
145
800
1000
1200


11 16.0 -80 32.7
5.4 103
11 16.5 -80 16.8
7.5 326
11 43.4 -80 38.1
7.8 207
11 26.0 -80 35.8
5.2 145
11 4.5 -80 20.7
7.9 270
11 4.5 -80 32.7
3.6 45
11 5.2 -80 25.7
6.4 174
10 21.4 -80 18.2
6.5 150
10 5.7 -80 9.1
7.6 150
9 55.2 -80 3.7
7.0 163
146
147
6 1 1971
7 1 1971
-800 -600 -400 -200 0 200 400 600 800 1000 1200 1400 1600 1800
-240 -200 -160 -120 -80 -40 0 40 80 120 160 200 240 280
4800 4400 4000 3600 3200 2800 2400 2000 1600 1200 800 400
Cristobal

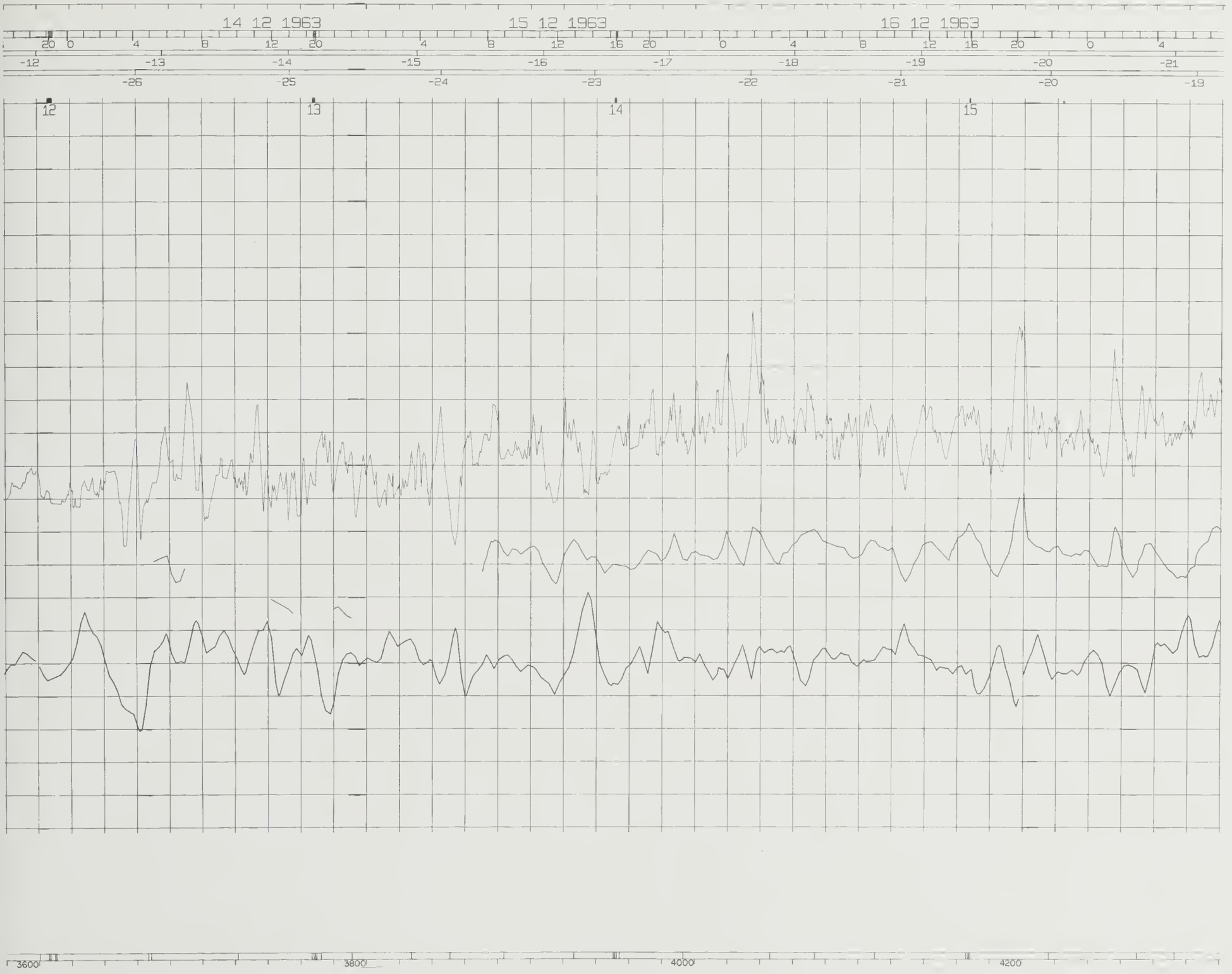

M G D
27 11 1963
28 11 1963
29 11 1963
San Juan

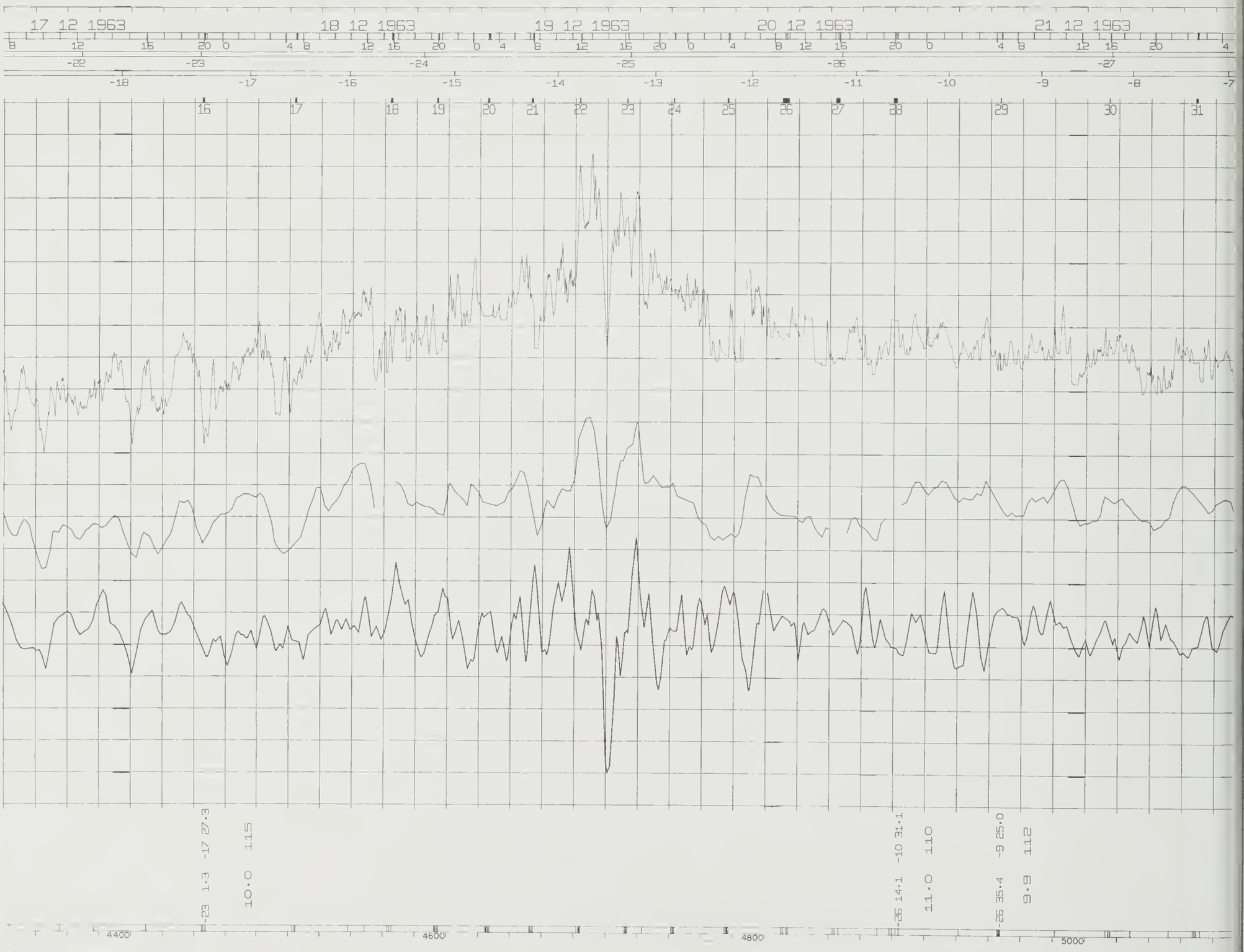

30 11 1963
1 12 1963
2 12 1963
15 20 0 4 8 12 16 20 4 8 12 16 20 0 4 8 12 16 20
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800 1000 1200 1400

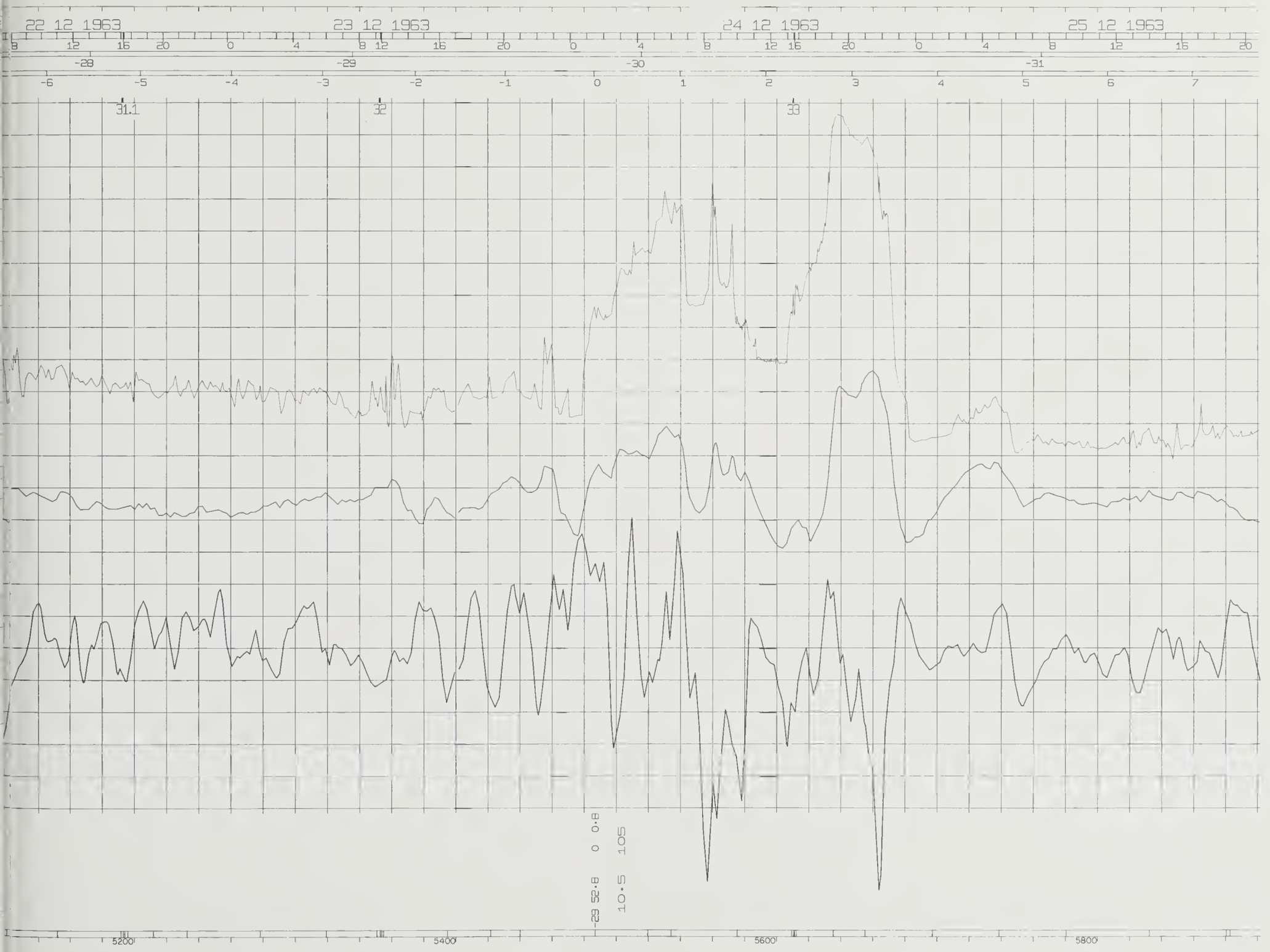

3 12 1963
4 12 1963
5 12 1963
0 4 8 12 16 20 0 4 8 12 16 20 0 4 8 12 16 20 0 4
12 11 11 11 10 9 8 7 6
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5
1600
1800
2000

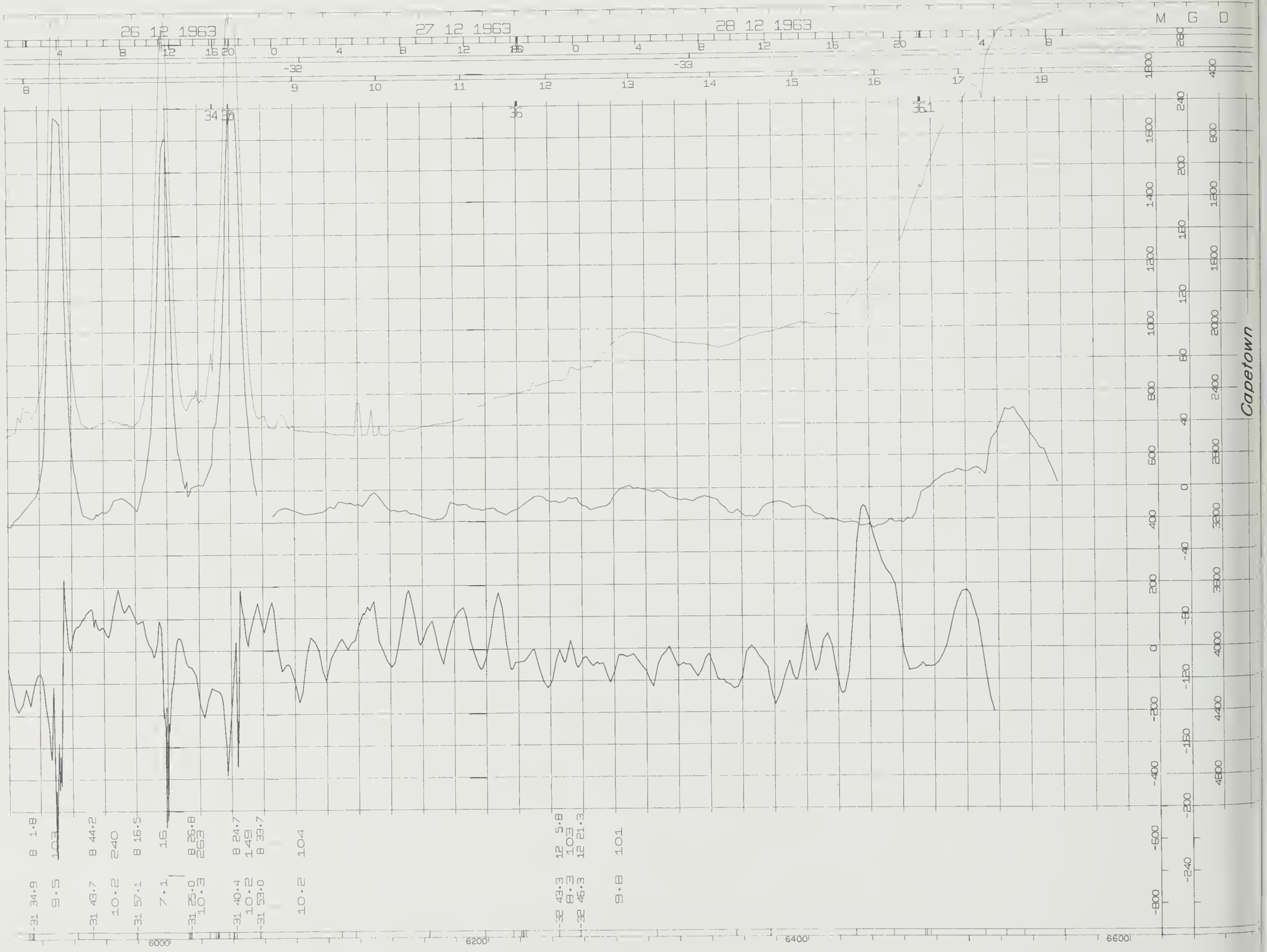

6 12 1963
7 12 1963
8 12 1963
9 12 1963
6
7
8
9·1 118
4 56·5 -42 14·8
5·7 116
4 47·7 -41 56·9
7·6 119
4 2·2 -40 30·3
7·8 127
2 17·0 -38 19·2
8·7 133
1 26·6 -37 20·9
9·8 129
0-26·7 -35 9·8
9·0 151
2200
2400
2600
2800


10 12 1963
11 12 1963
12 12 1963
13 12 1963
9
10
11
-1 47·0 -34 25·0
10·1 1·49
-3 32·4 -33 18·4
9·9 1·42
-8 31·2 -29 21·3
11·3 1·41
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8·3 1·43
-11 19·3 -27 4·0
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3000
3200
3400

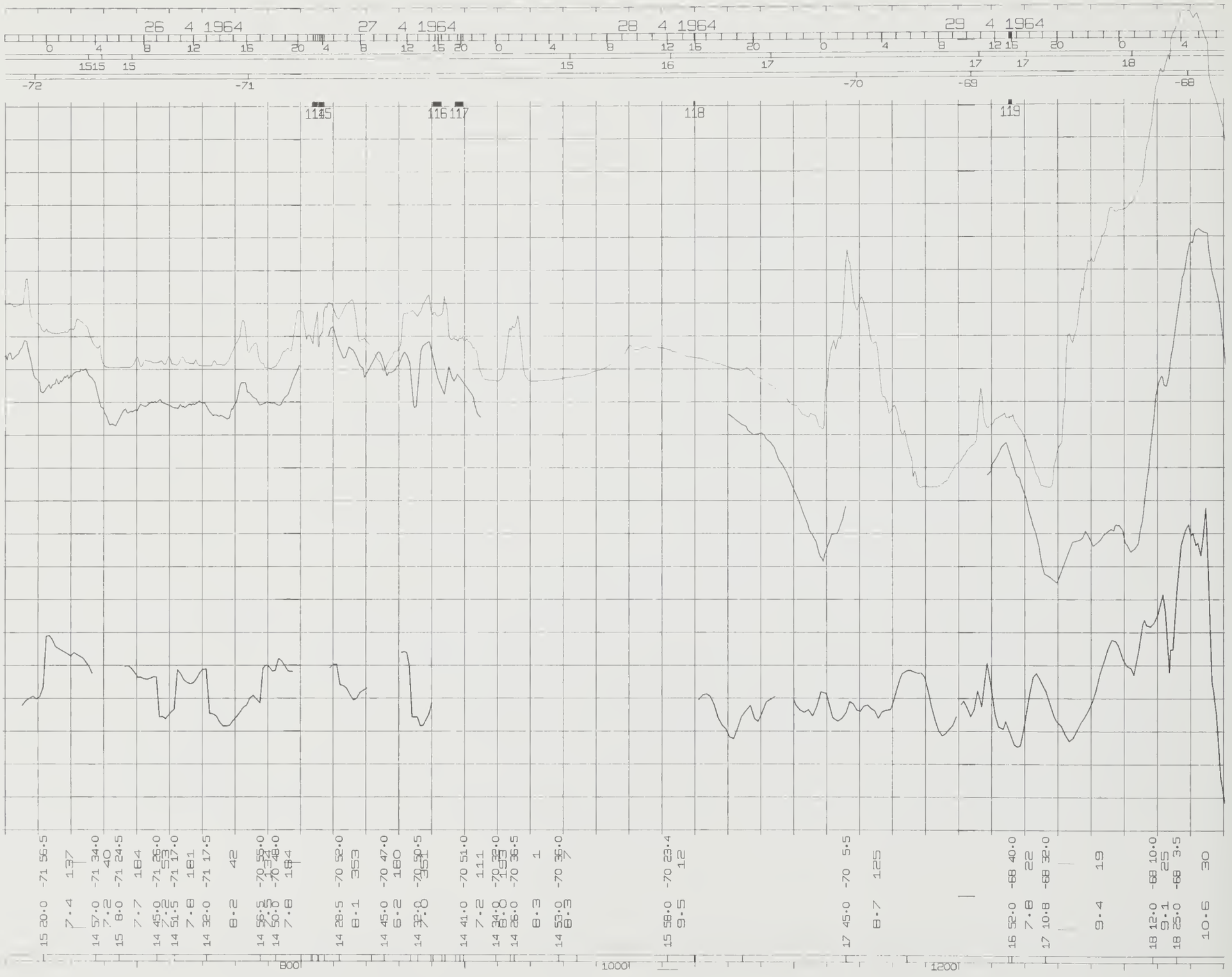

14 12 1963
15 12 1963
16 12 1963
20 0 4 8 12 20 4 8 12 16 20 0 4 8 12 16 20 0 4
-12 -13 -14 -15 -16 -17 -18 -19 -20 -21
-26 -25 -24 -23 -22 -21 -20 -19
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13
14
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3800
4000
4200

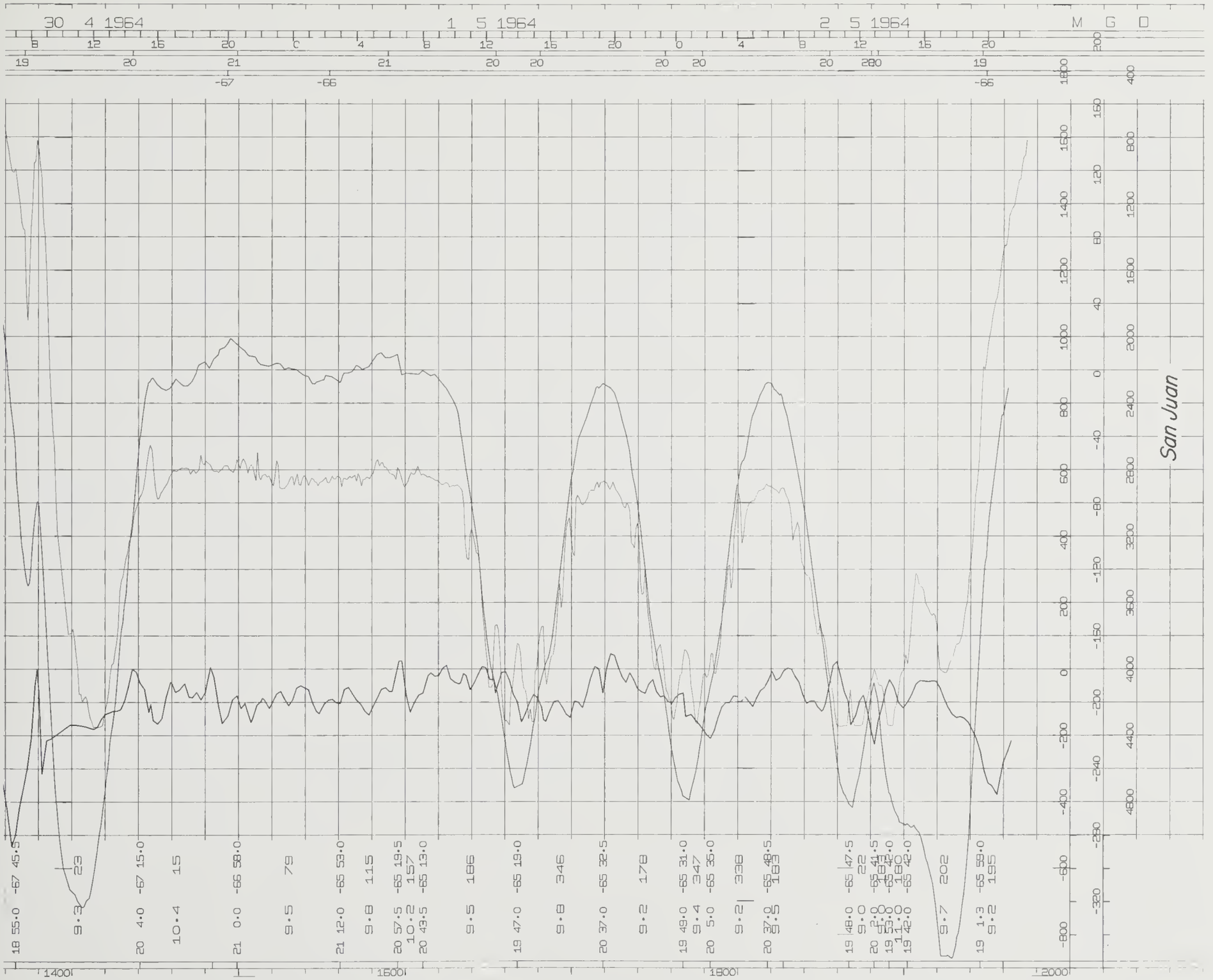

17 12 1963
18 12 1963
19 12 1963
20 12 1963
21 12 1963
-23 1.3 -17 27.3
10.0 115
-26 14.1 -10 31.1
11.0 110
-26 35.4 -9 25.0
9.9 112
4400
4600
4800
5000

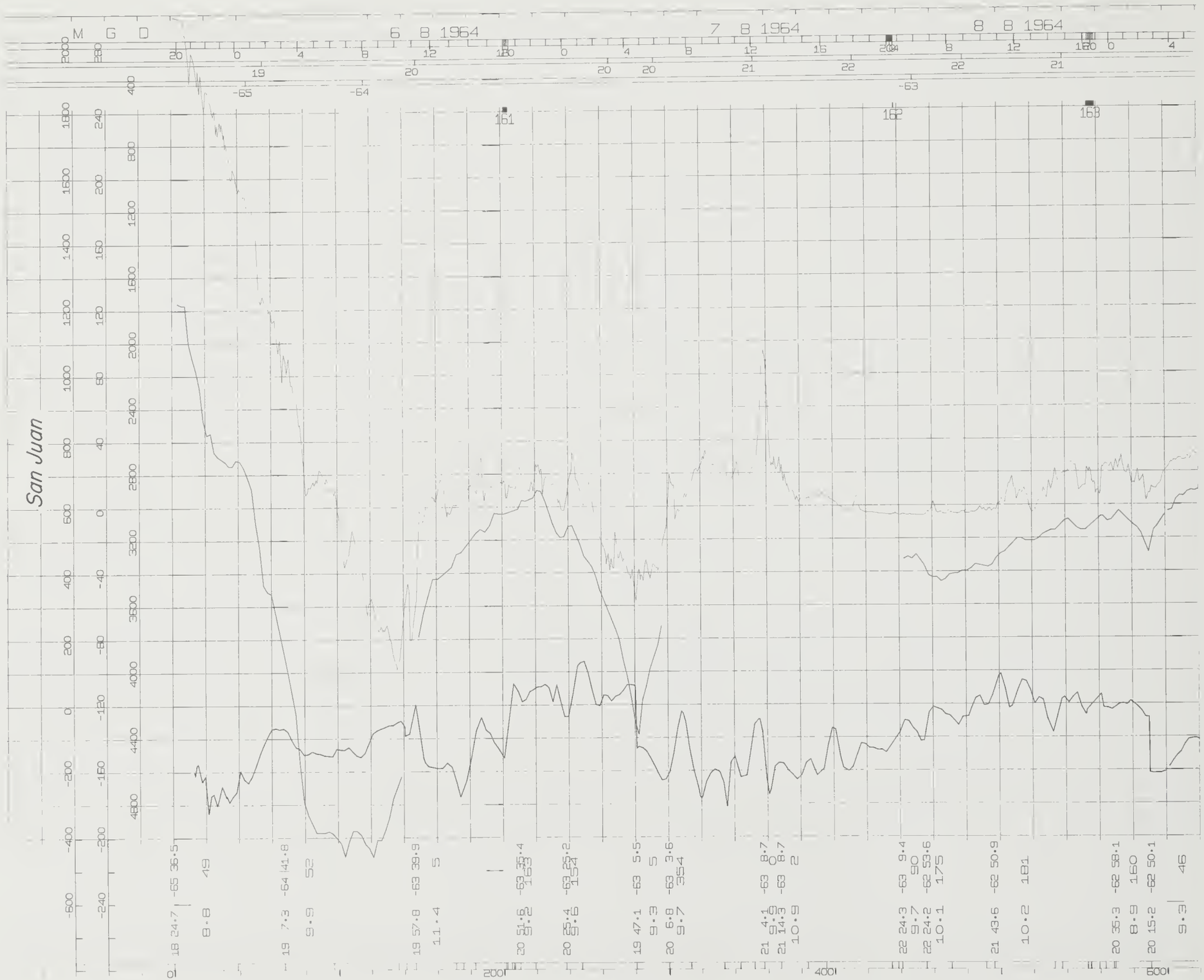

22 12 1963
23 12 1963
24 12 1963
25 12 1963
8 12 16 20 0 4 8 12 16 20 0 4 8 12 16 20 0 4 8 12 16 20
-28
-29
-30
-31
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7
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32
33
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10·5 105
5200
5400
5600
5800

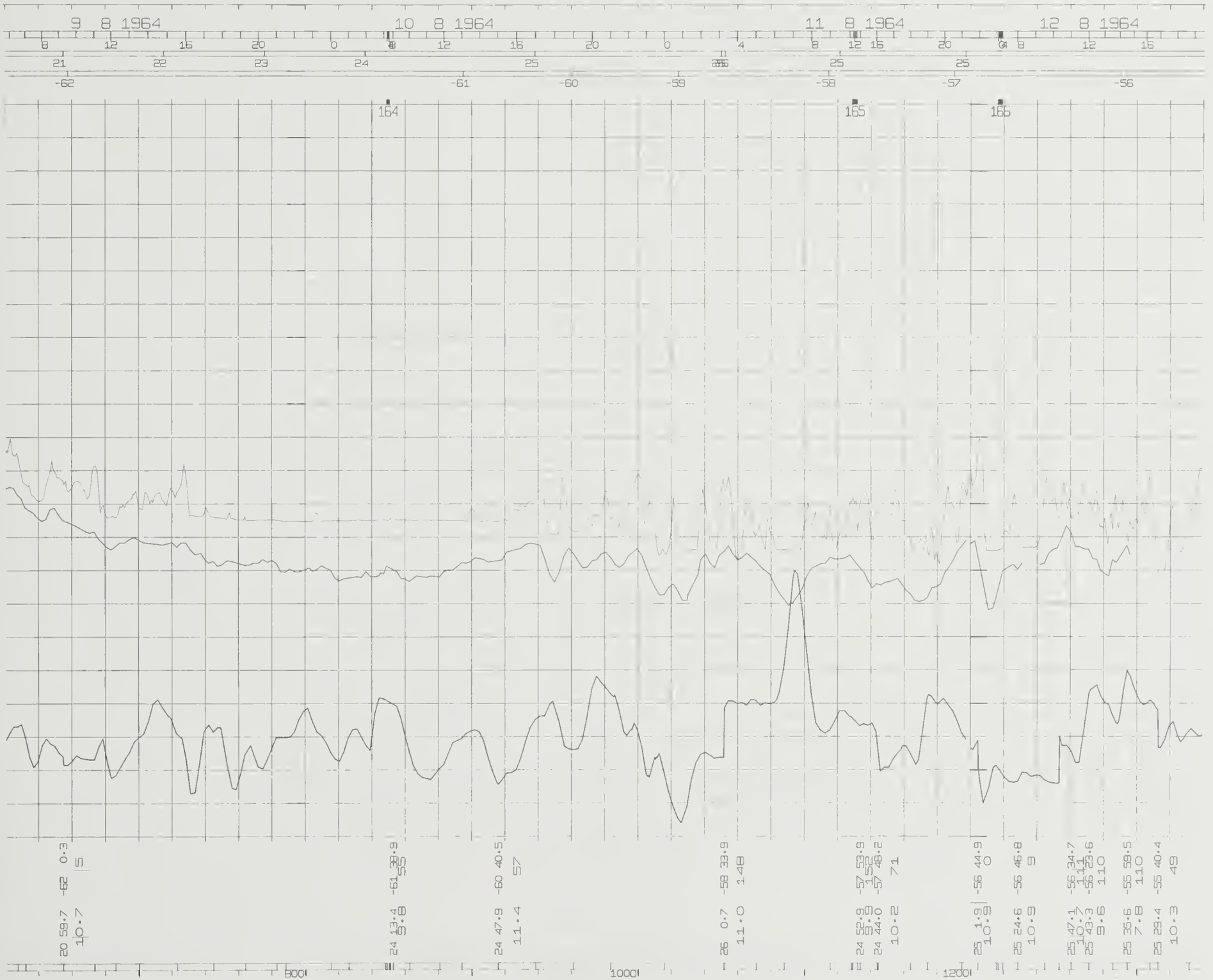

26 12 1963
27 12 1963
28 12 1963
M G D
Capetown
34
35
36
36.1
8 1·8
103
8 44·2
240
8 16·5
16
8 26·8
263
8 24·7
149
8 33·7
104
12 5·8
103
12 21·3
101
-31 34·9
9·5
-31 43·7
10·2
-31 57·1
7·1
-31 25·0
10·3
-31 40·4
10·2
-31 53·0
10·2
-32 43·3
8·3
-32 46·3
9·8
6000
6200
6400
6600

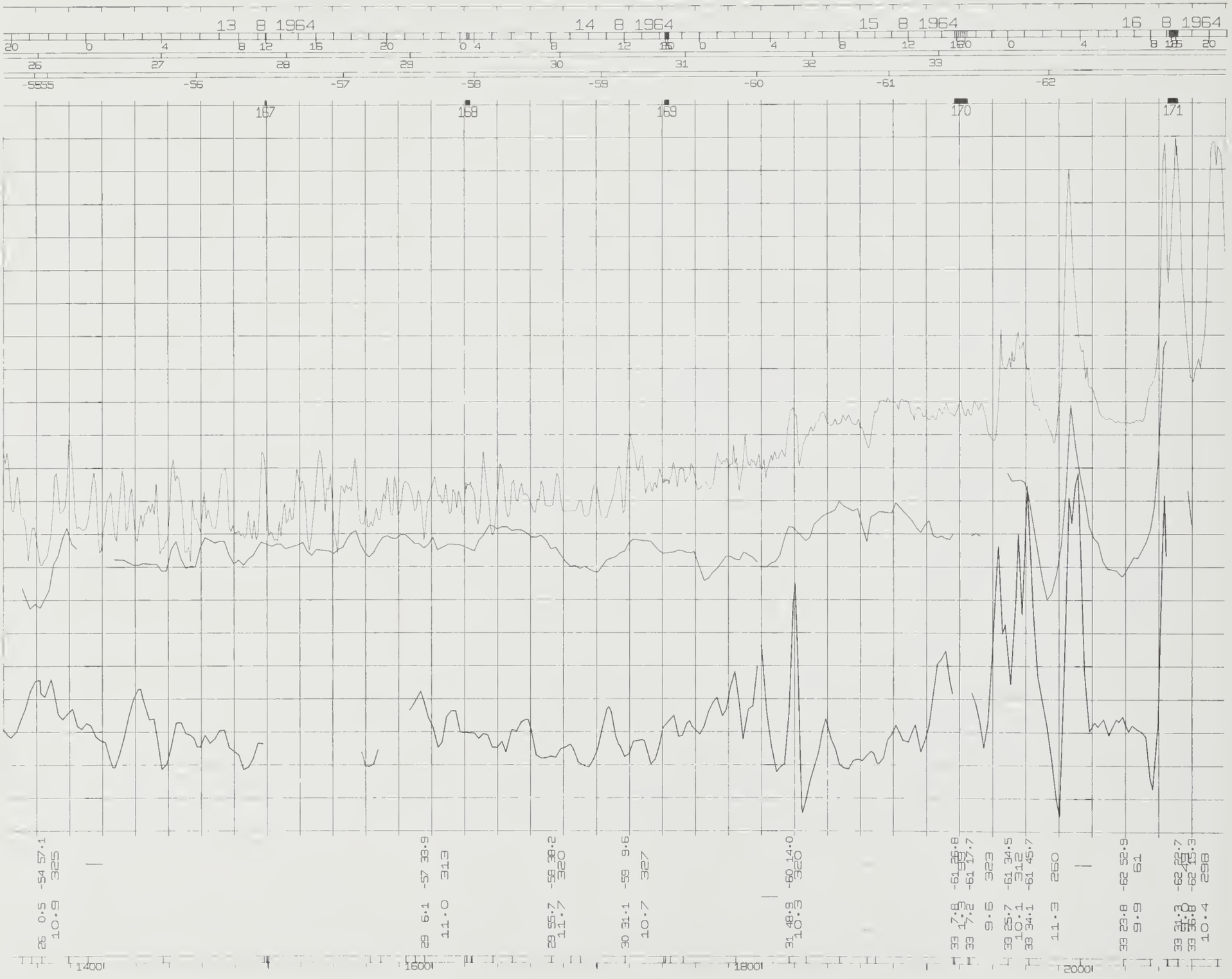

M G D
22 4 1964
23 4 1964
24 4 1964
25 4 1964
Cristobal
110
111
112
113

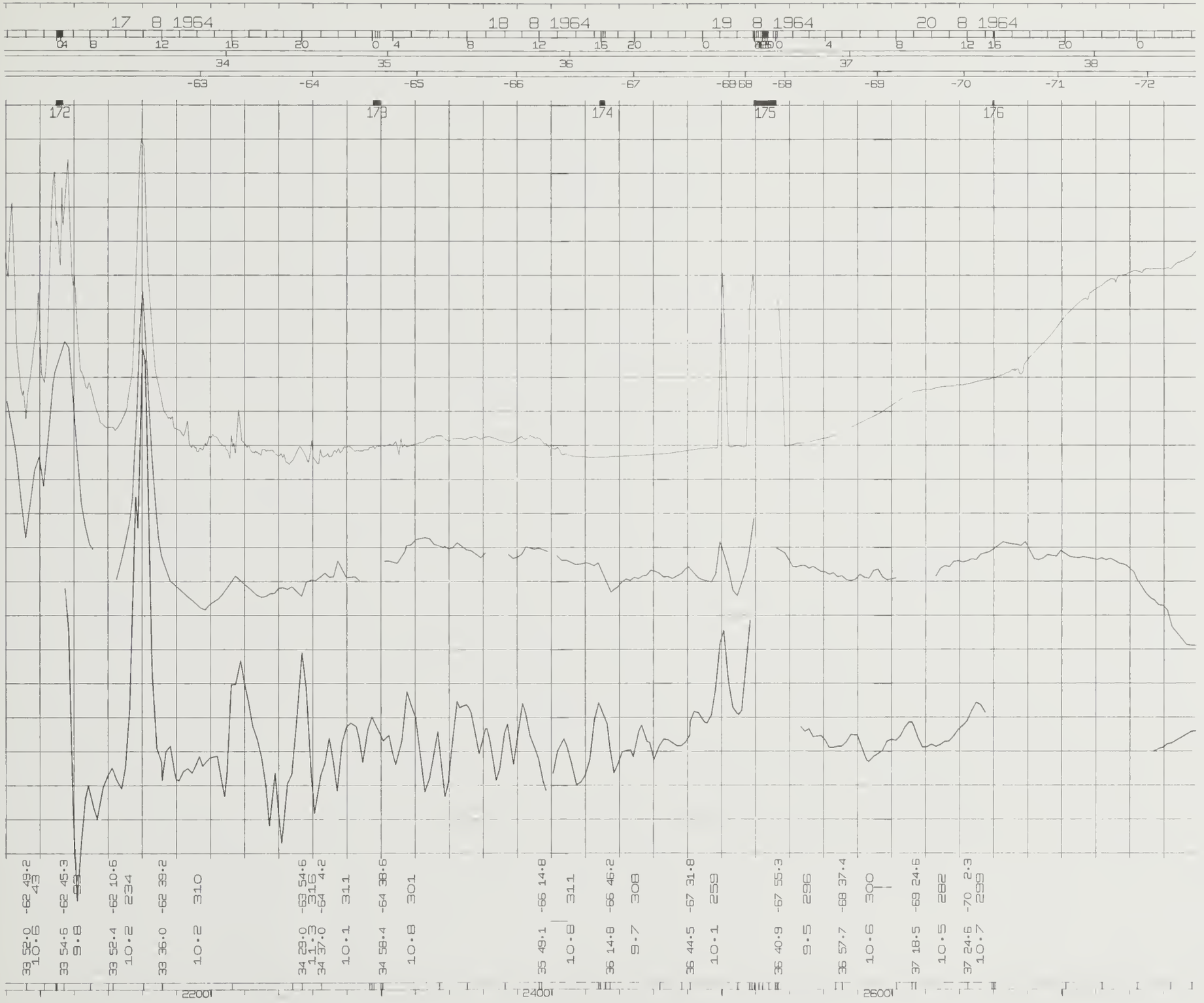

26 4 1964
27 4 1964
28 4 1964
29 4 1964
115
116
117
118
119
800
1000
1200


30 4 1964
1 5 1964
2 5 1964
M G D
San Juan


M G D
6 8 1964
7 8 1964
8 8 1964
San Juan

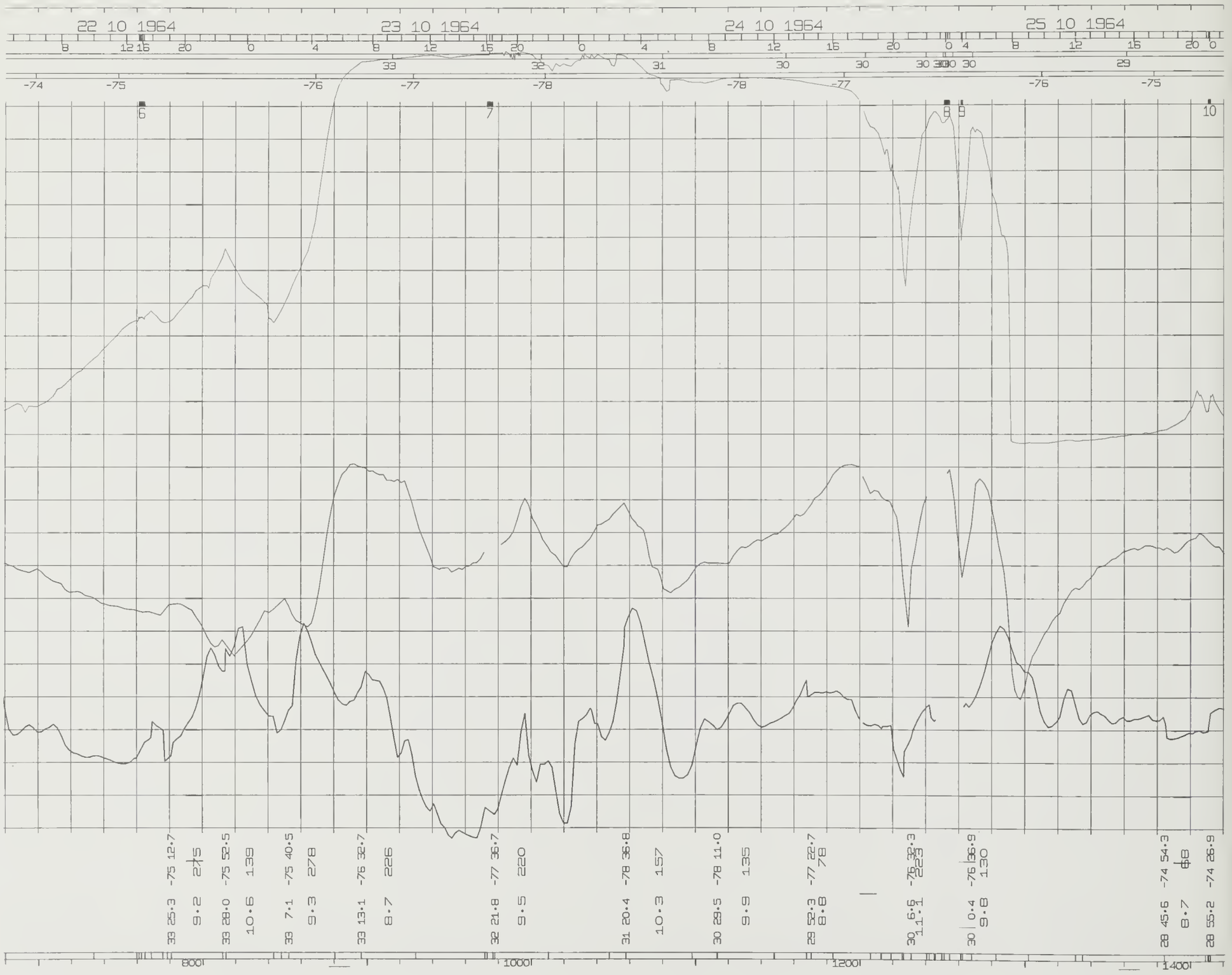

9 8 1964
10 8 1964
11 8 1964
12 8 1964
164
165
166
800
1000
1200

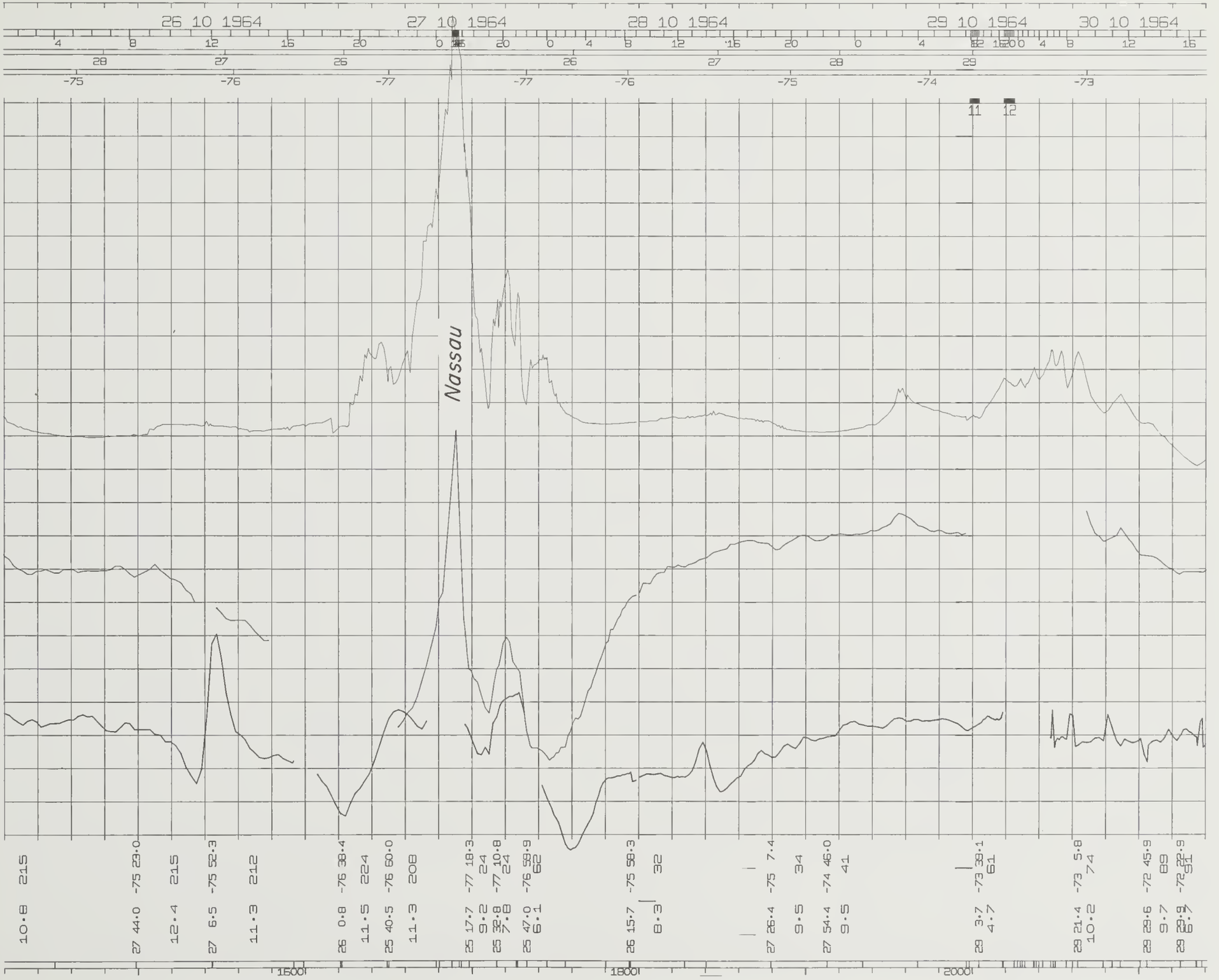

13 8 1964
14 8 1964
15 8 1964
16 8 1964
167
168
169
170
171
1400
1600
1800
2000

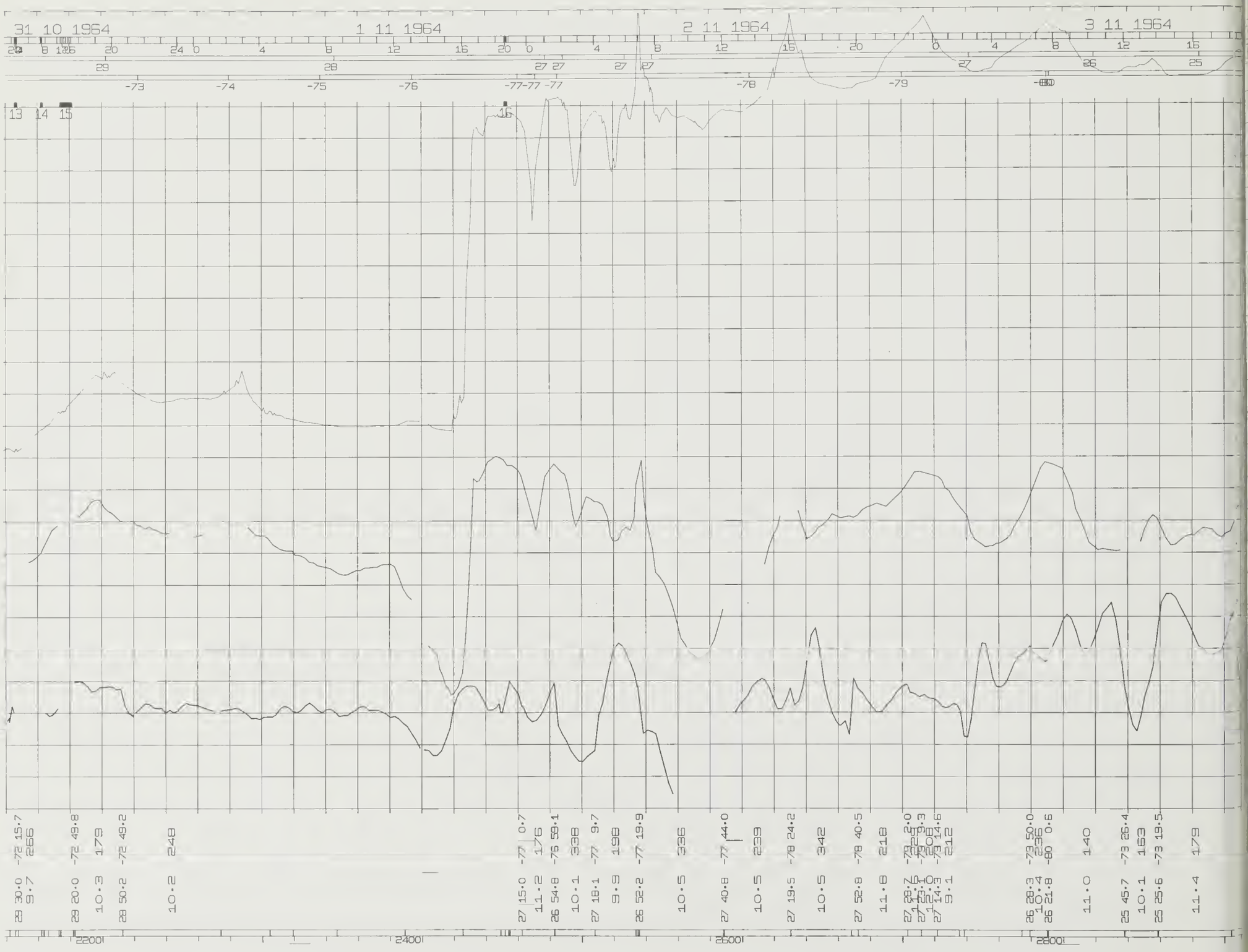

17 8 1964
18 8 1964
19 8 1964
20 8 1964
172
173
174
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176
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-72
22001
24001
26001

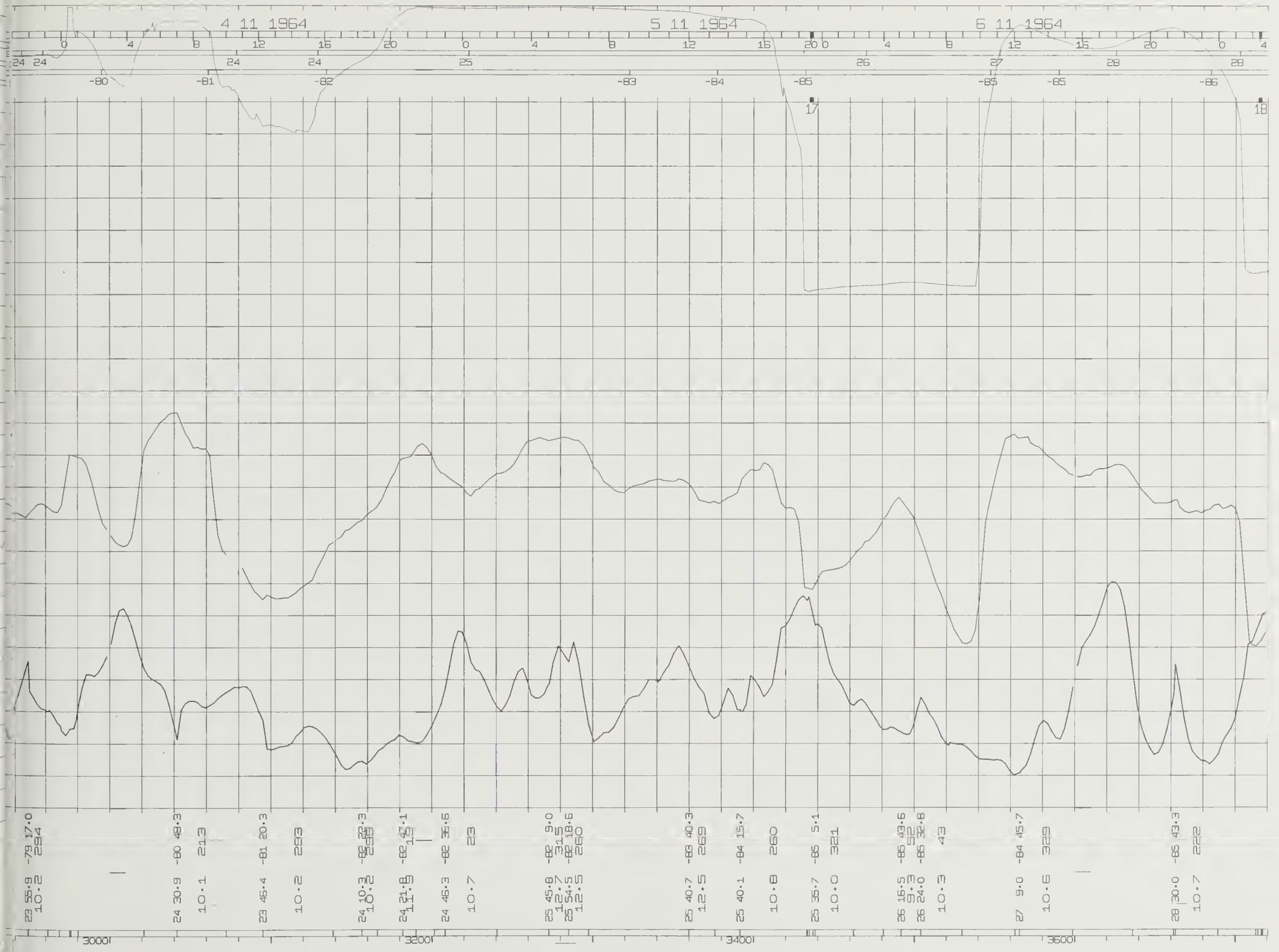
21 8 1964
M G D
177
New York
38 38.8 -73 12.4
10.6 90
38 38.5 -72 28.8
8.7 304
38 55.1 -72 59.1
9.0 333
39 20.1 -73 14.7
8.1 339
38 56.0 -73 32.6
6.9 338

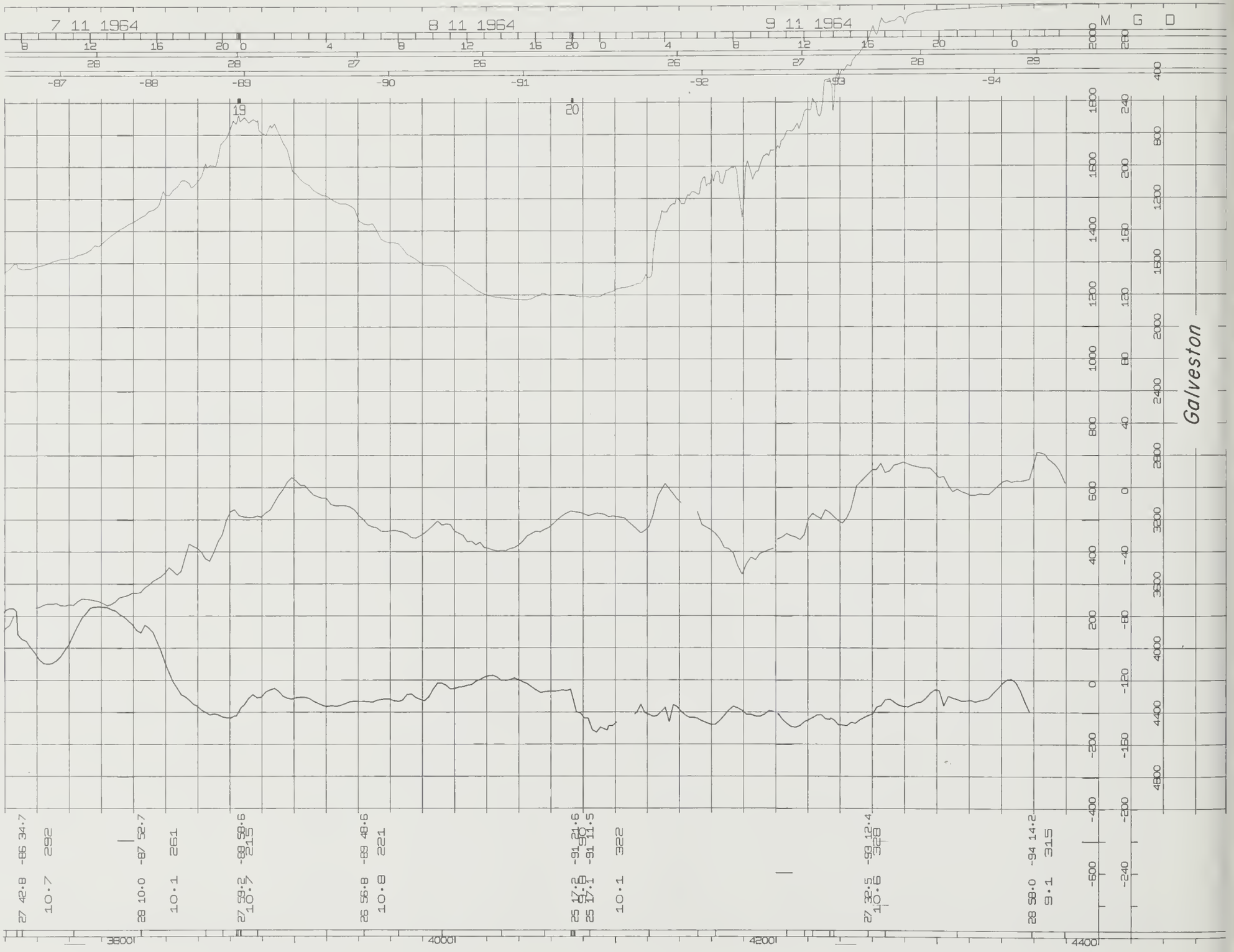

M G D
18 10 1964
19 10 1964
20 10 1964
21 10 1964
New York

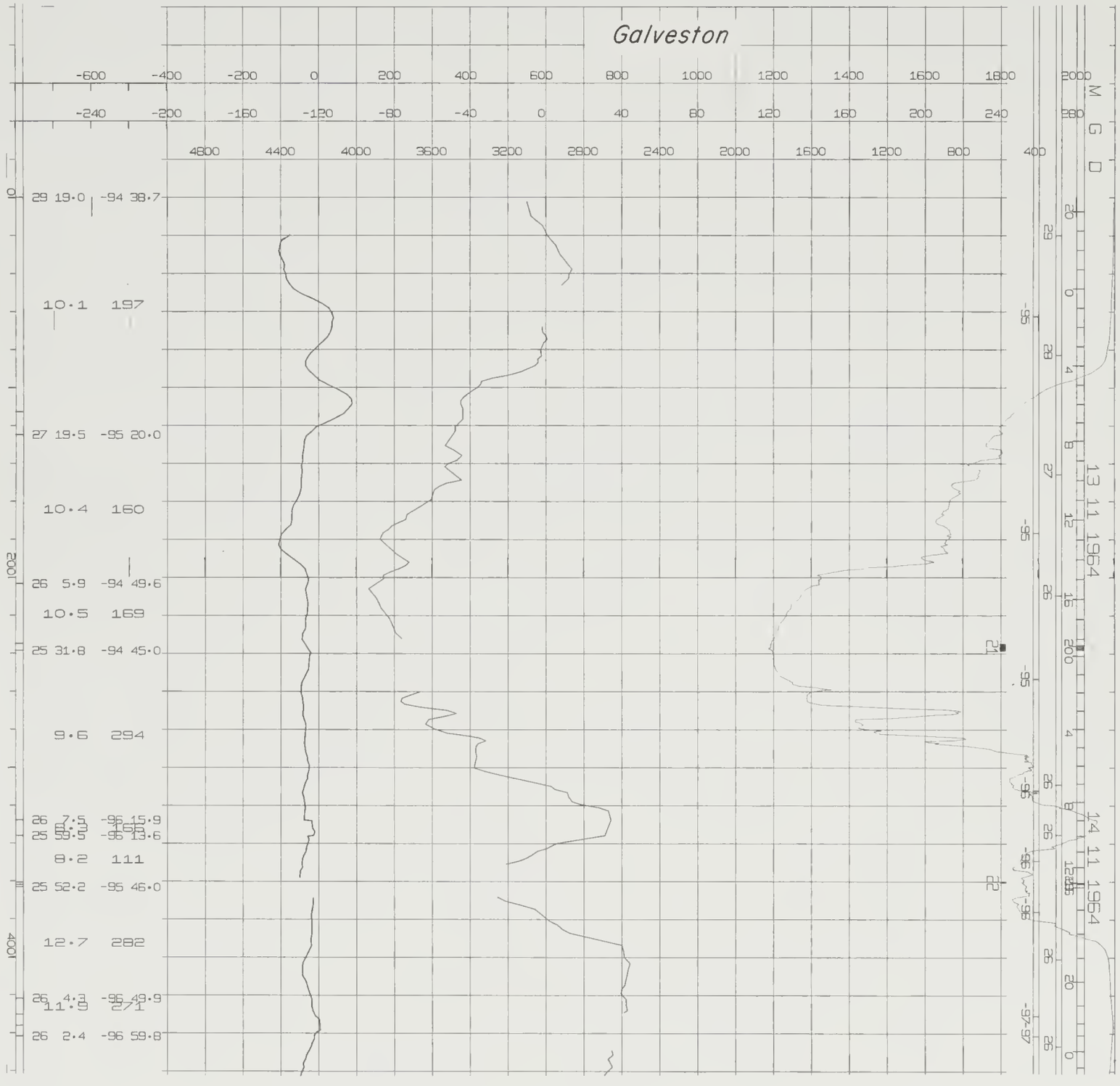

22 10 1964
23 10 1964
24 10 1964
25 10 1964
6
7
8
9
10
800
1000
1200
1400


26 10 1964
27 10 1964
28 10 1964
29 10 1964
30 10 1964
Nassau
11
12


31 10 1964
1 11 1964
2 11 1964
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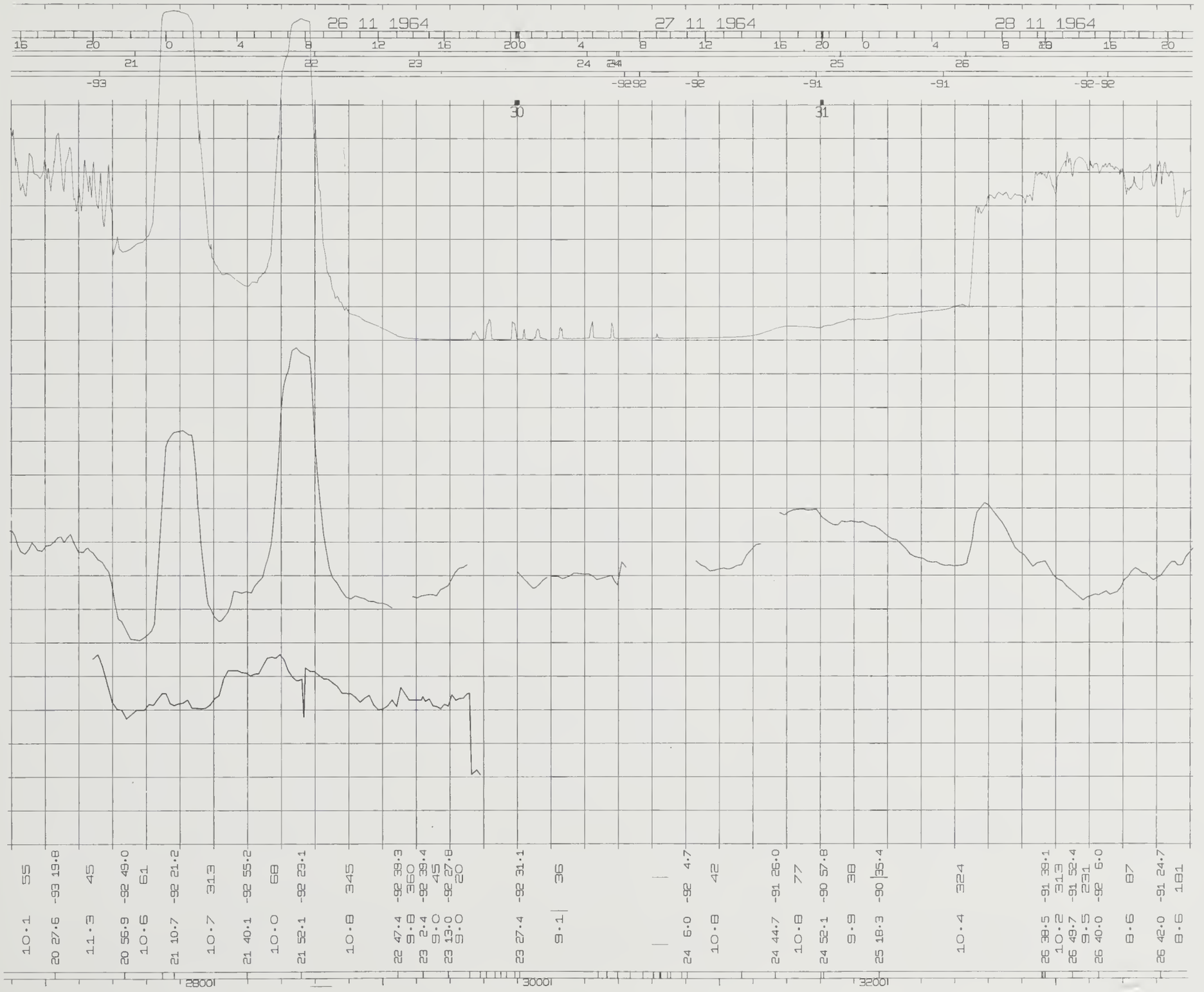

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9 11 1964
M G D
Galveston

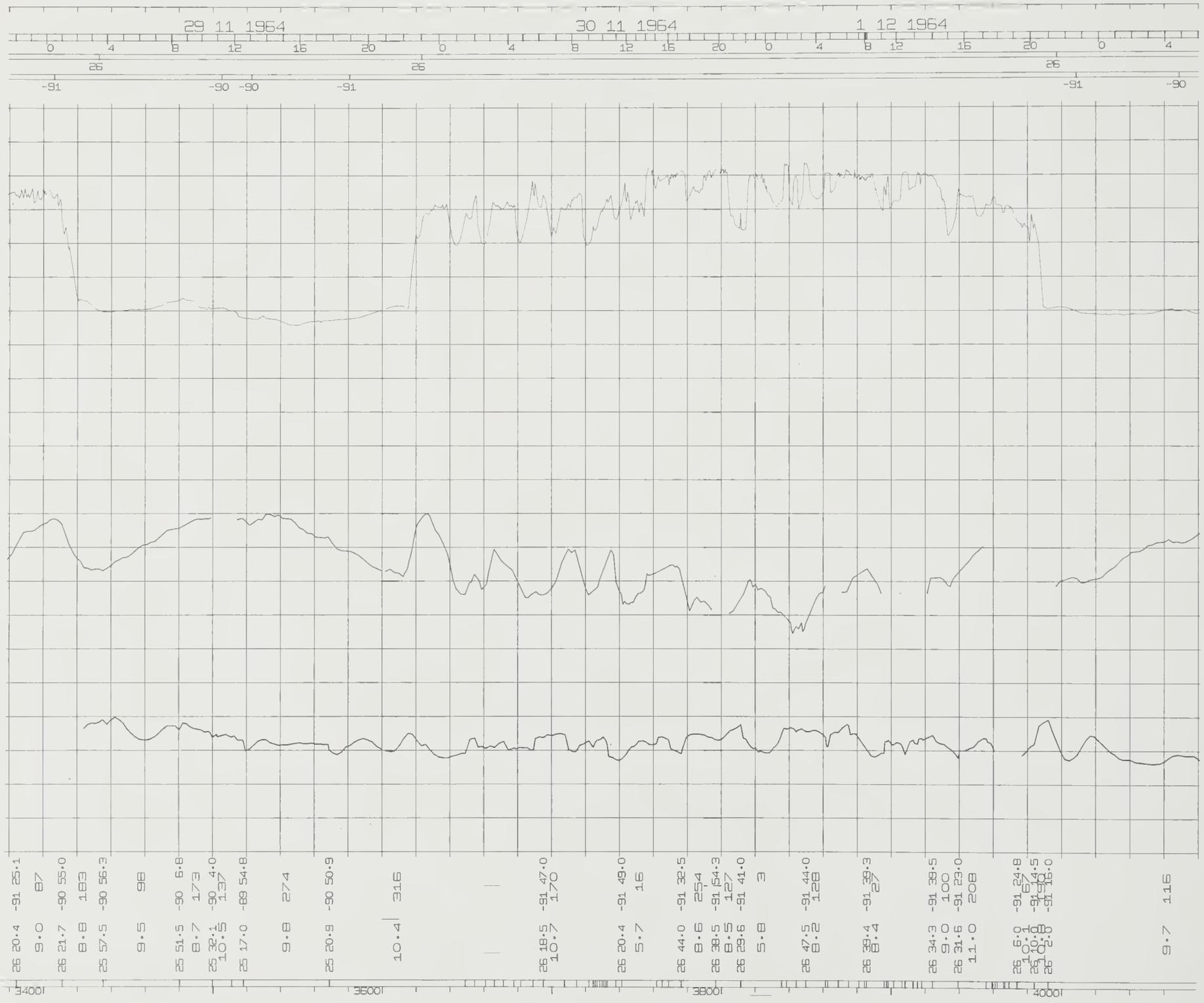

Galveston
-600 -400 -200 0 200 400 600 800 1000 1200 1400 1600 1800
-240 -200 -160 -120 -80 -40 0 40 80 120 160 200 240
4800 4400 4000 3600 3200 2800 2400 2000 1600 1200 800 400
2000 280
M G D
29 19.0 -94 38.7
10.1 197
27 19.5 -95 20.0
10.4 160
26 5.9 -94 49.6
10.5 169
25 31.8 -94 45.0
9.6 294
26 7.5 -96 15.9
25 59.5 -96 13.6
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11.9 271
26 2.4 -96 59.8
13 11 1964
14 11 1964

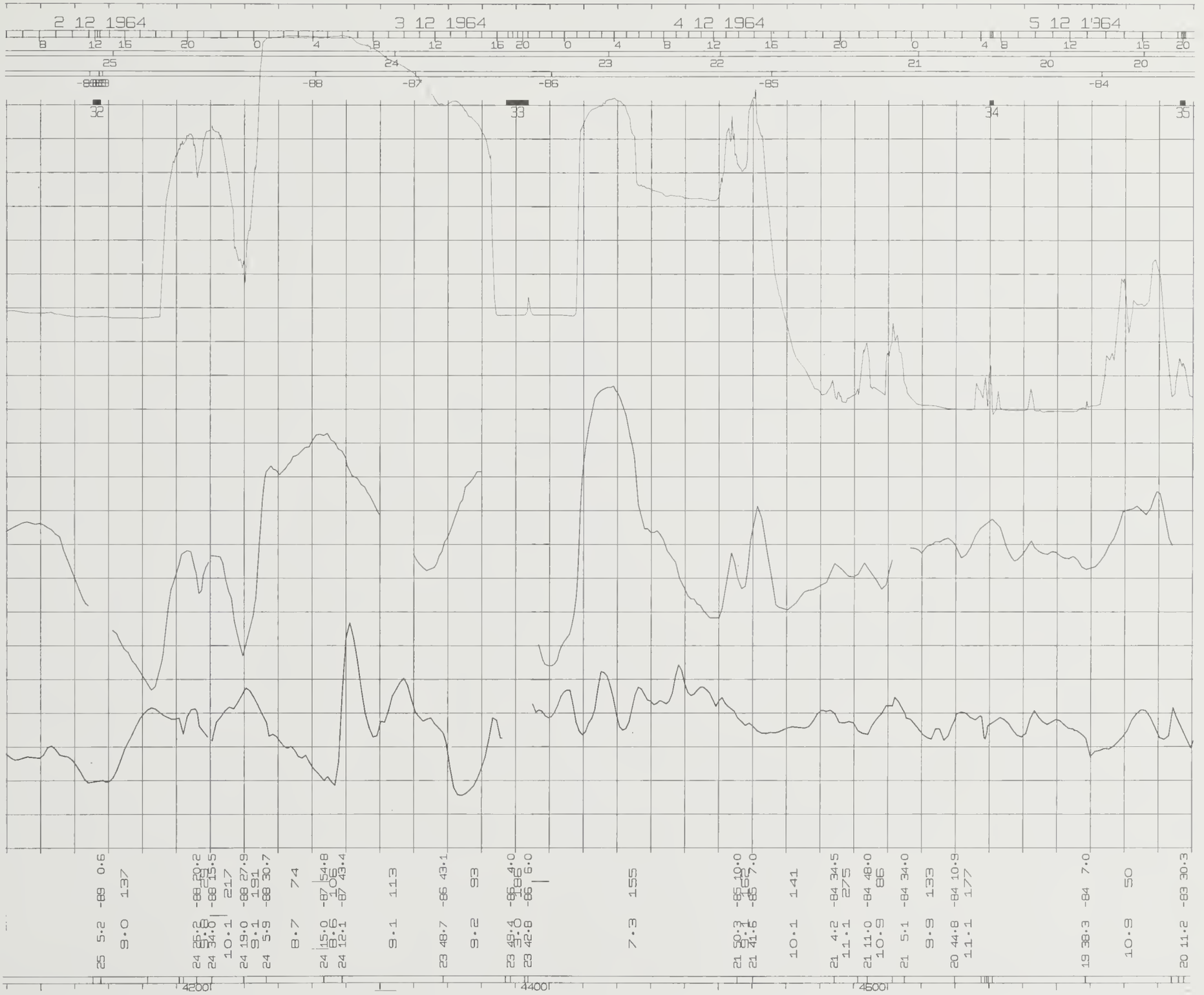

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26 26 26 26
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25 33·2 -95 58·8
9·9 124
25 16·0 -95 28·9
9·9 328
25 56·0 -95 57·1
10·1 115
25 47·4 -95 36·9
25 56·7 -95 31·8
10·5 255
25 50·2 -95 58·0
25 39·6 -95 55·0
9·8 30
26 0·7 -95 41·2
10·4 300
26 5·5 -95 50·6
9·6 166
25 41·7 -95 44·1
25 52·5 -95 46·0
25 56·4 -95 57·7
9·4 94
25 52·1 -95 46·8
7·1 132
25 39·4 -95 31·1
10·0 121
25 17·7 -94 51·4
10·6 358
26 7·4 -94 53·0
11·5 312
26 56·7 -95 55·0
11·2 223
26 32·5 -96 12·5
9·9 103
26 14·2 -94 41·4
8·8 80
26 18·5 -94 18·8
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11·0 271
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500
800
1000

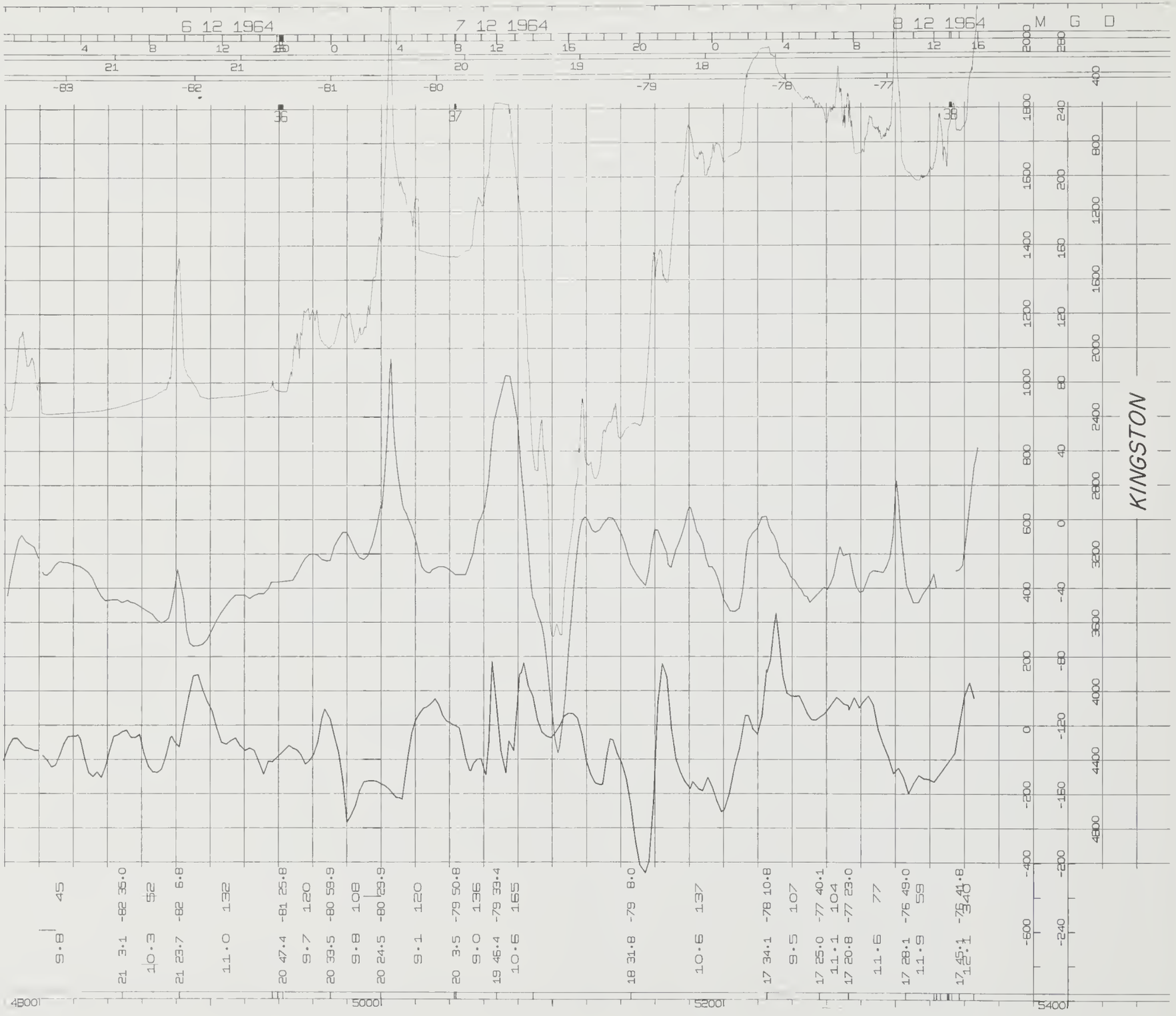

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1600
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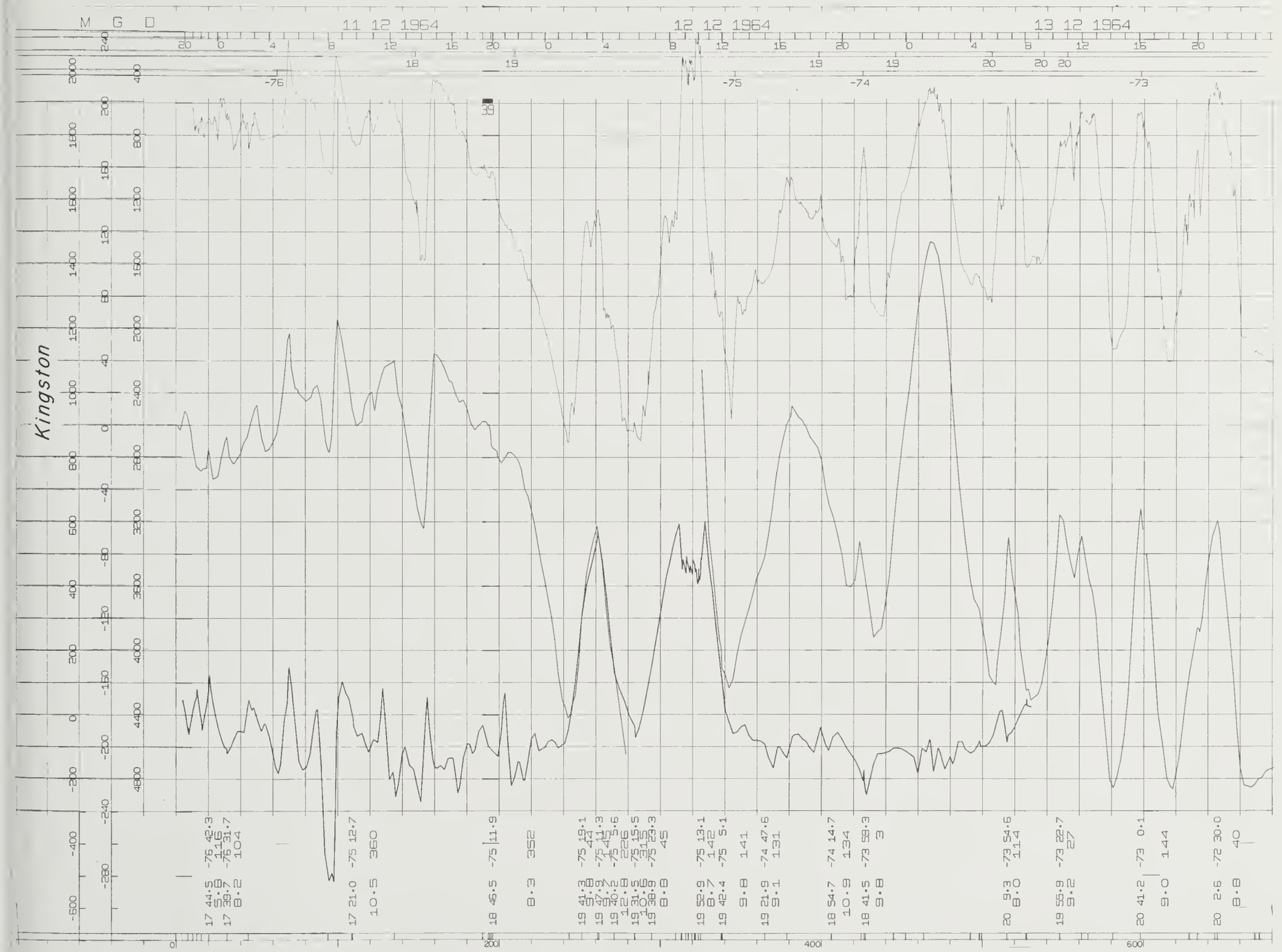

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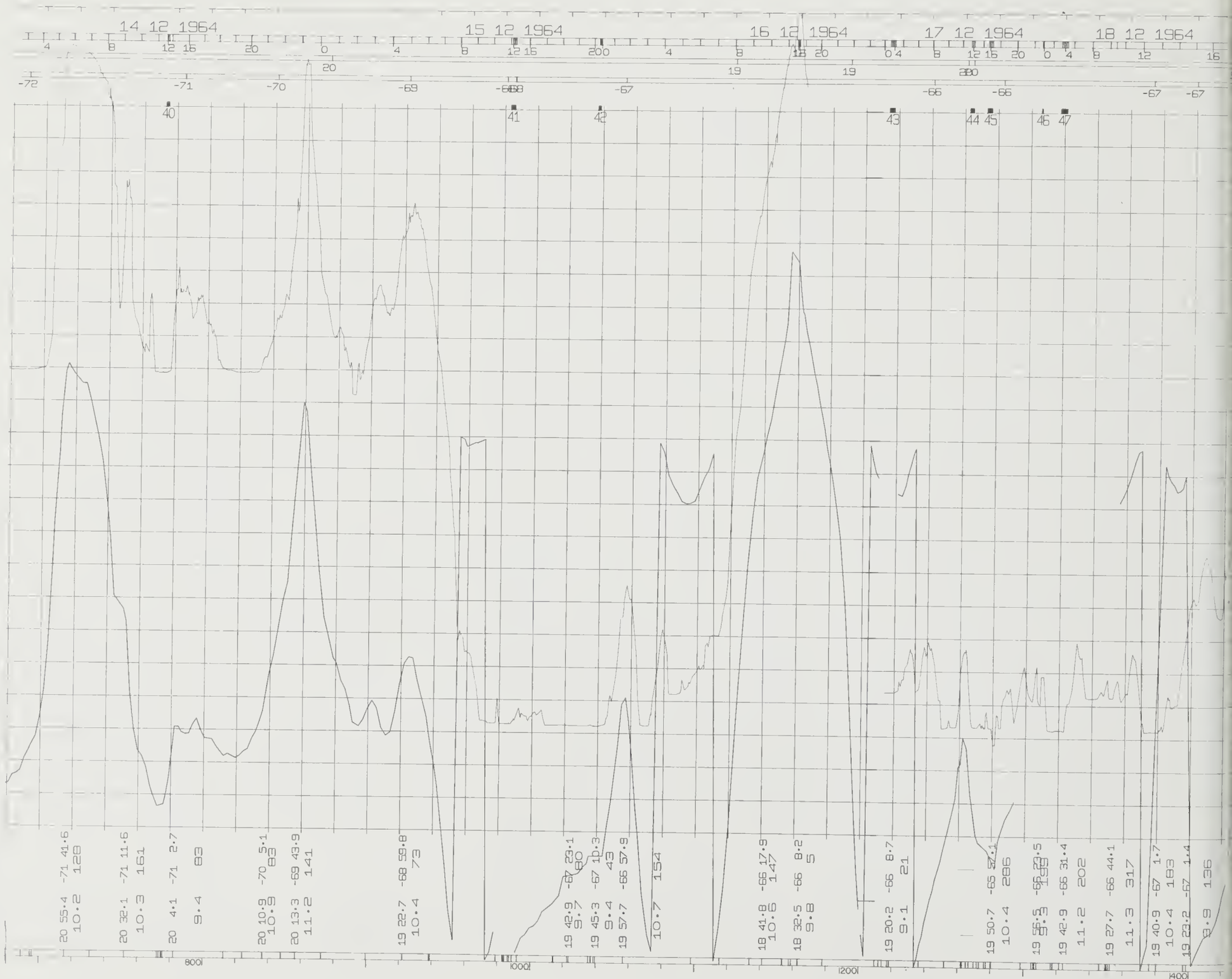

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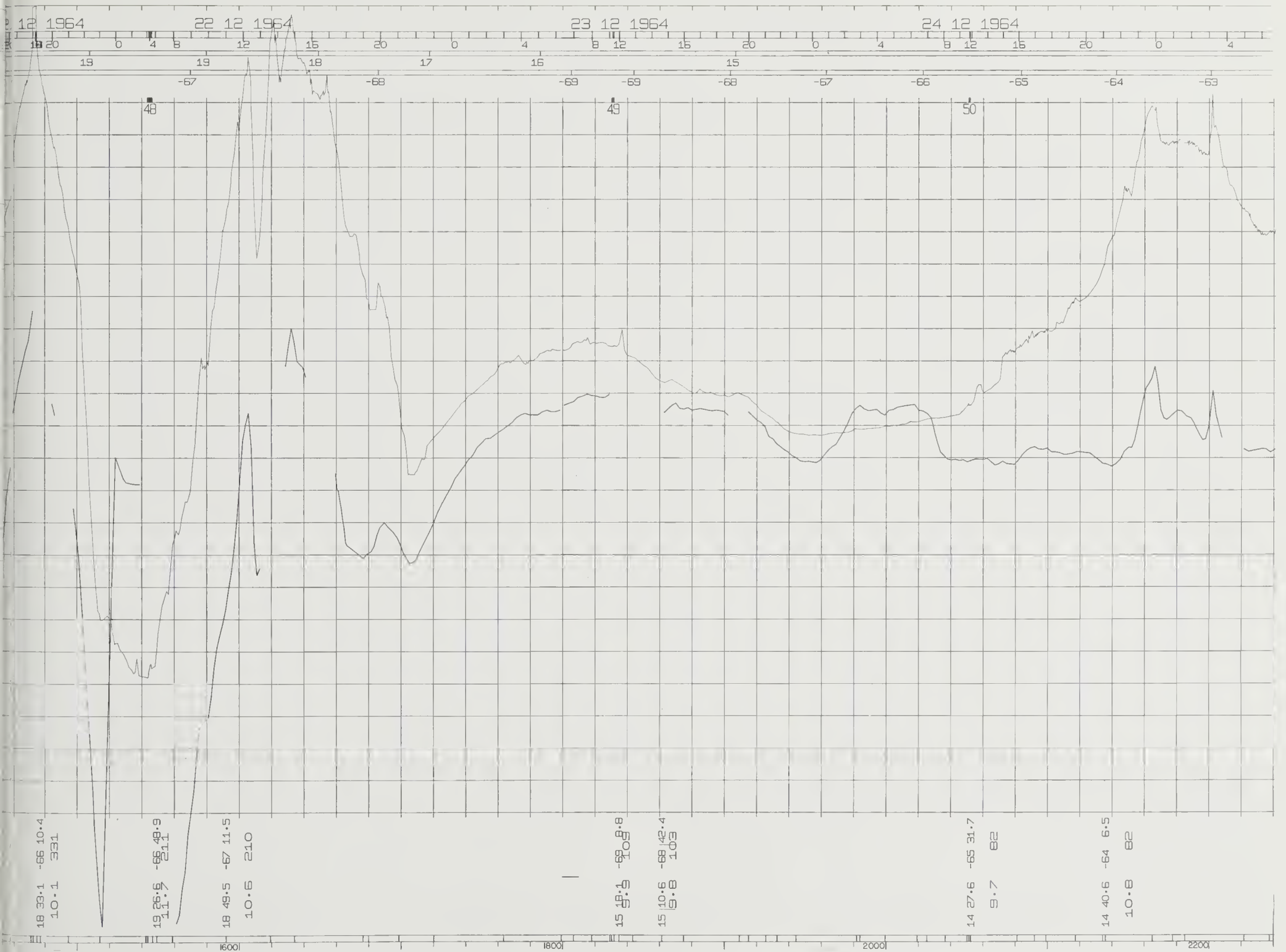

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25 57·5 -90 56·3 98
25 51·5 -90 6·8 173
25 32·1 -90 4·0 137
25 17·0 -89 54·8 274
25 20·9 -90 50·9 316
26 18·5 -91 47·0 170
26 20·4 -91 49·0 16
26 44·0 -91 32·5 254
26 38·5 -91 54·3 127
26 29·6 -91 41·0 3
26 47·5 -91 44·0 128
26 39·4 -91 39·3 27
26 34·3 -91 39·5 100
26 31·6 -91 23·0 208
26 6·0 -91 24·8
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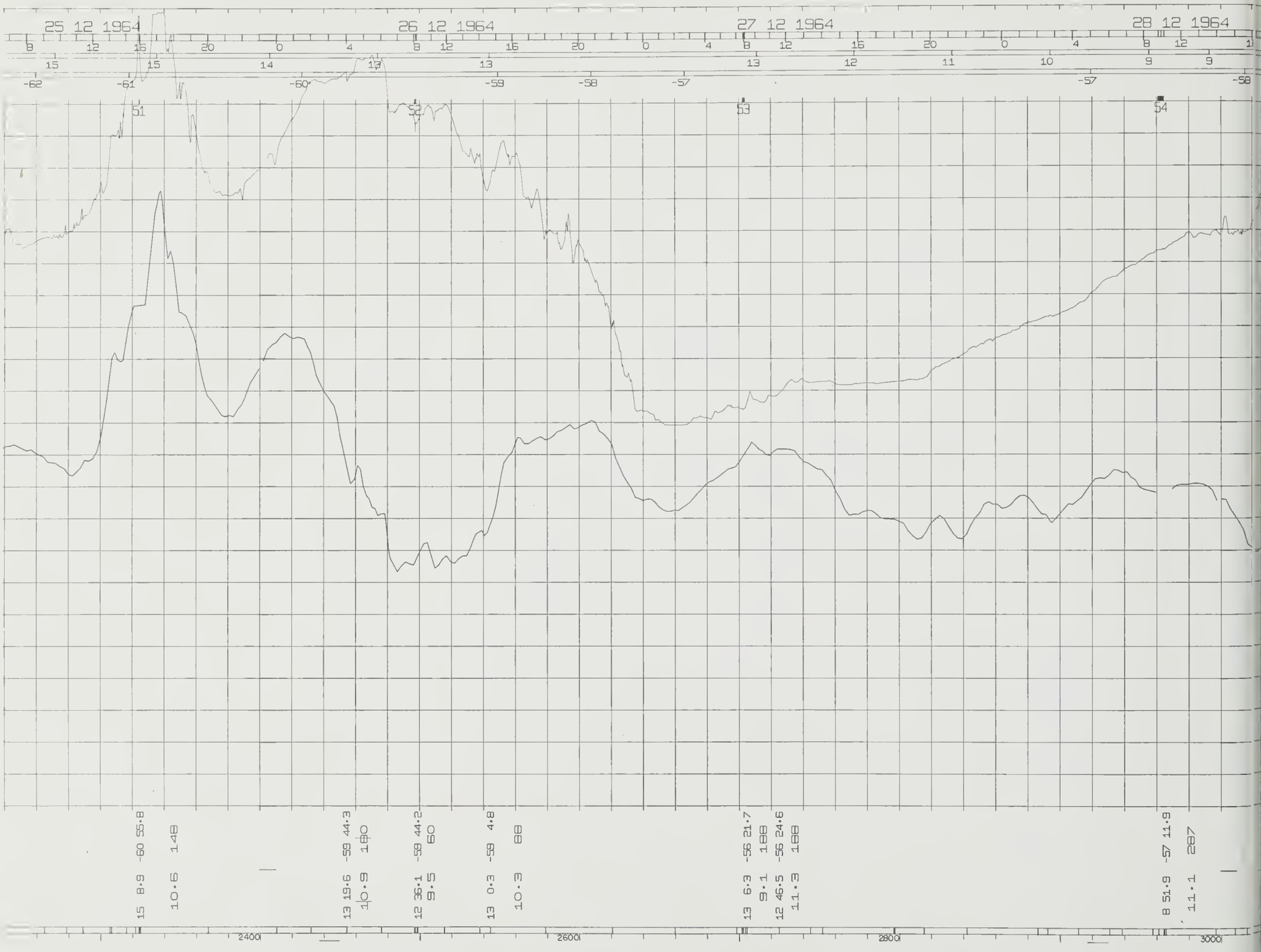

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4600

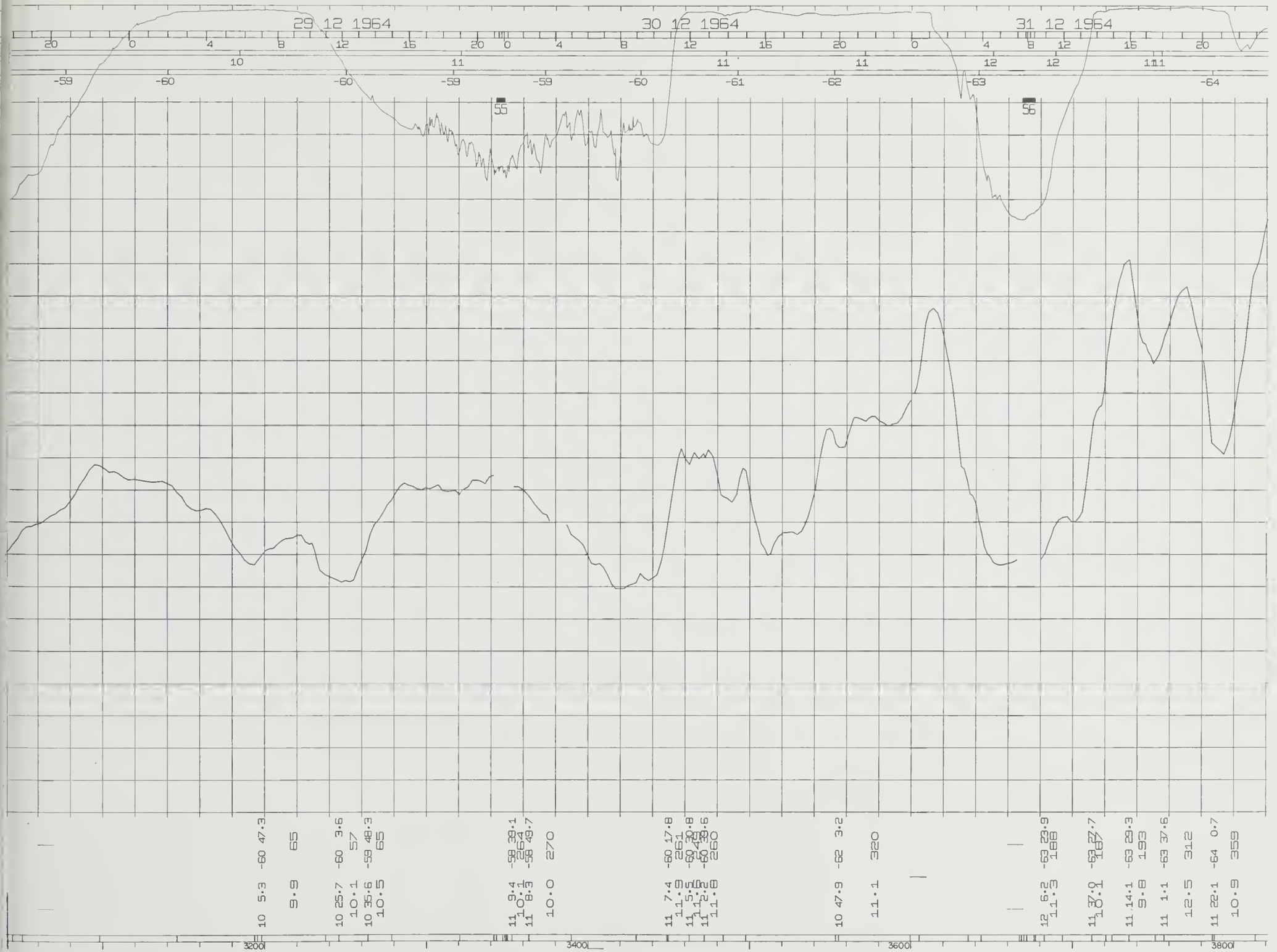

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M G D
KINGSTON

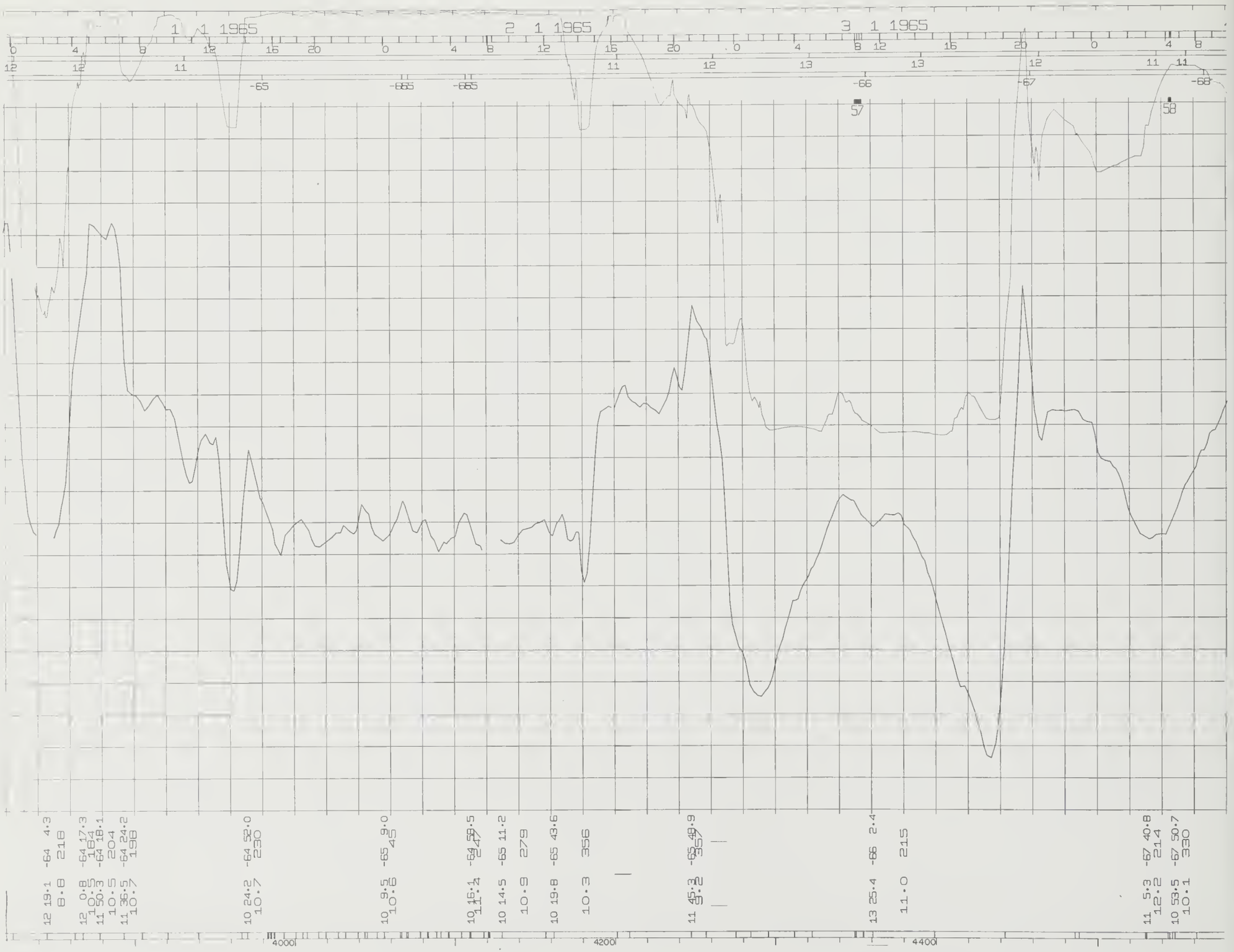

M G D
11 12 1964
12 12 1964
13 12 1964
Kingston

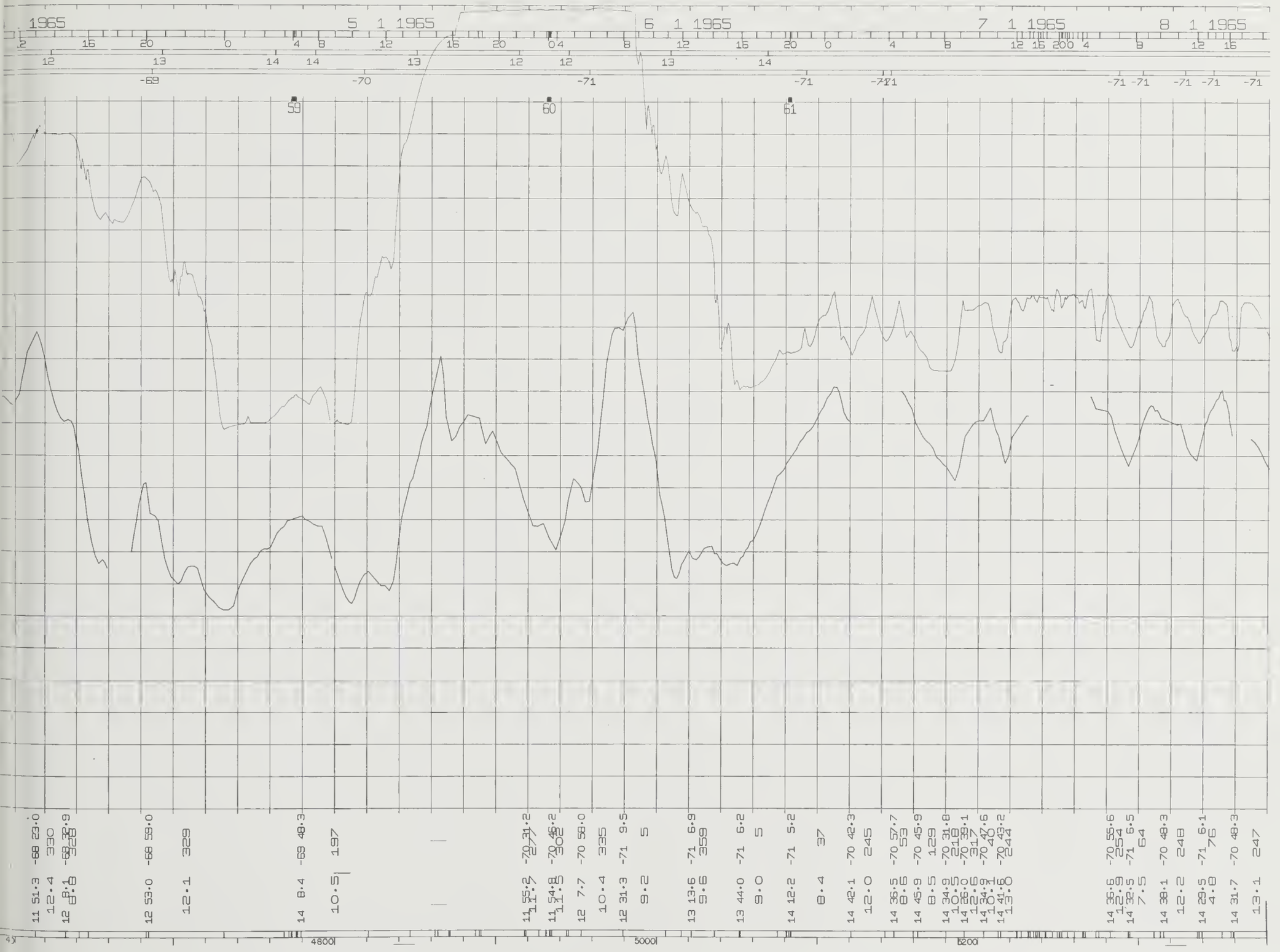

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16 12 1964
17 12 1964
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-72
-71
-70
-69
-67
-66
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42
43
44
45
46
47
20 55·4 -71 41·6
10·2 128
20 32·1 -71 11·6
10·3 161
20 4·1 -71 2·7
9·4 83
20 10·9 -70 5·1
10·9 83
20 13·3 -69 43·9
11·2 141
19 22·7 -68 59·8
10·4 73
19 42·9 -67 23·1
9·7 80
19 45·3 -67 10·3
9·4 43
19 57·7 -66 57·9
10·7 154
18 41·8 -66 17·9
10·6 147
18 32·5 -66 8·2
9·8 5
19 20·2 -66 8·7
9·1 21
19 50·7 -65 57·1
10·4 286
19 42·9 -66 31·4
11·2 202
19 27·7 -66 44·1
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19 40·9 -67 1·7
10·4 183
19 23·2 -67 1·4
9·9 136
800
1000
1200
1400

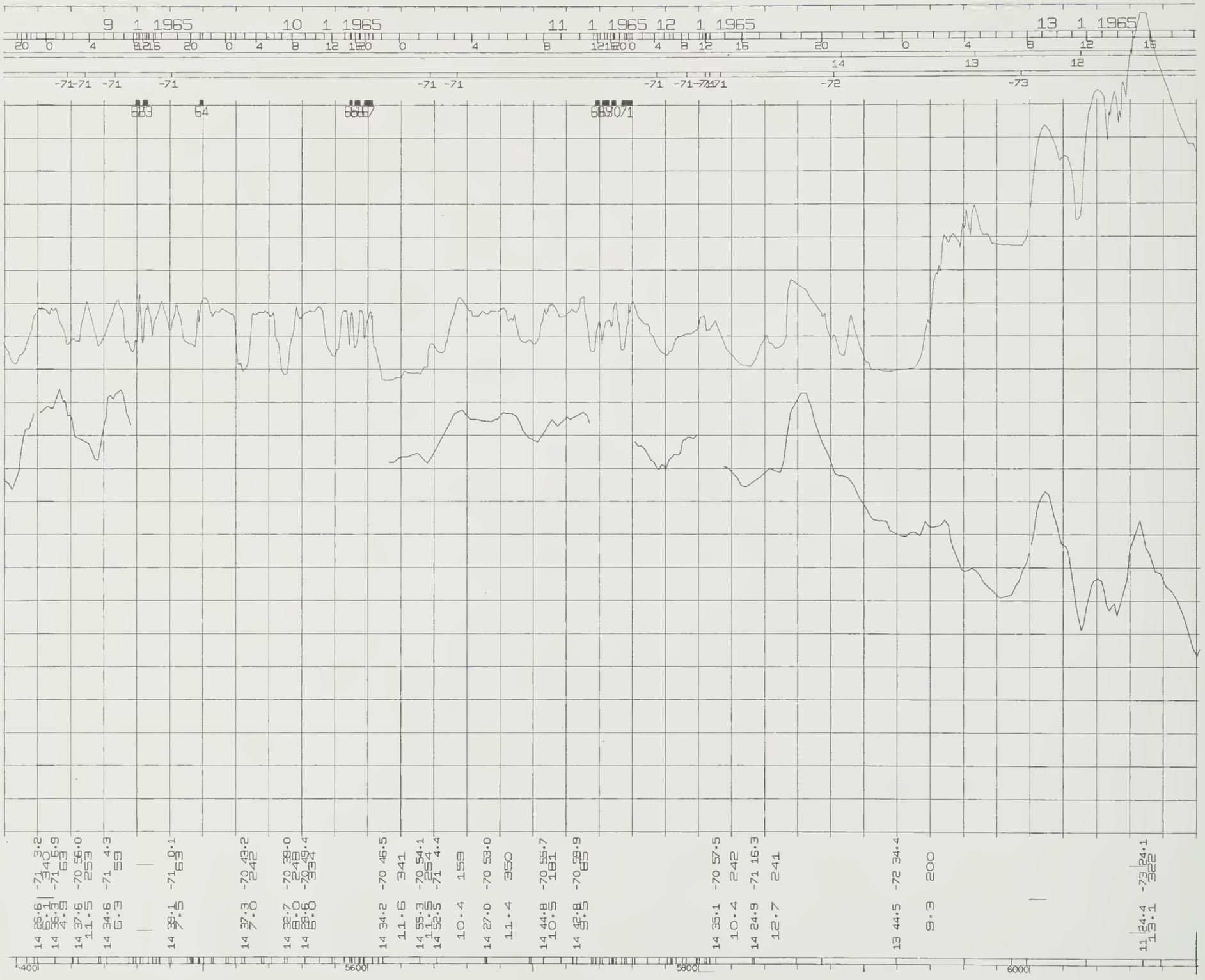

12 1964
22 12 1964
23 12 1964
24 12 1964
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49
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18 33·1 -66 10·4
10·1 331
19 26·6 -66 49·9
11·7 211
18 49·5 -67 11·5
10·6 210
15 18·1 -69 8·8
10·8 103
15 10·6 -68 42·4
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1800
2000
2200

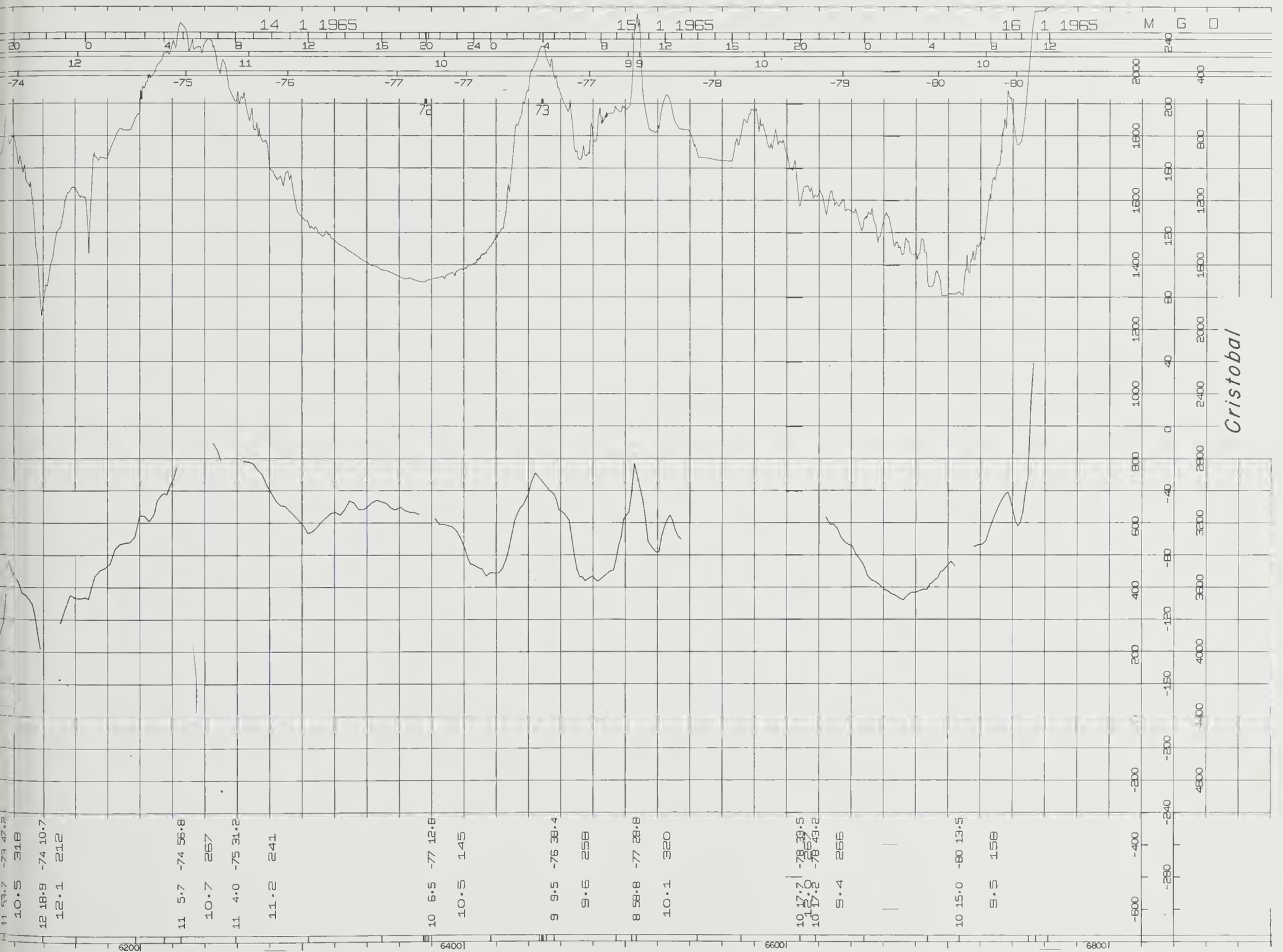

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27 12 1964
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52
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54
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10.6 148
13 19.6 -59 44.3
10.9 180
12 36.1 -59 44.2
9.5 60
13 0.3 -59 4.8
10.3 88
13 6.3 -56 21.7
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12 46.5 -56 24.6
11.3 188
8 51.9 -57 11.9
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2800
3000

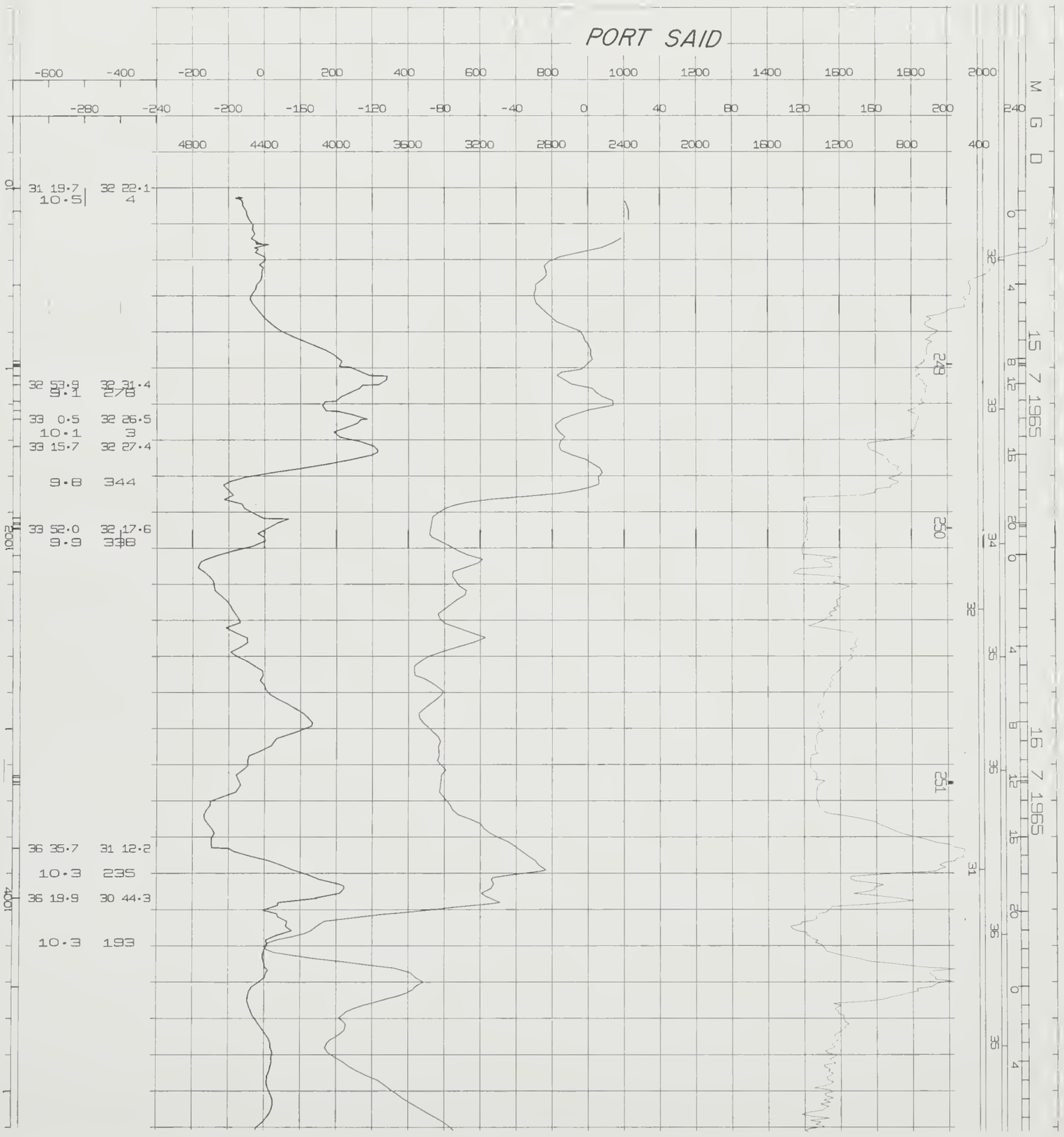

29 12 1964
30 12 1964
31 12 1964
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56
3200
3400
3600
3800


1 1 1965
2 1 1965
3 1 1965
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58
4000
4200
4400

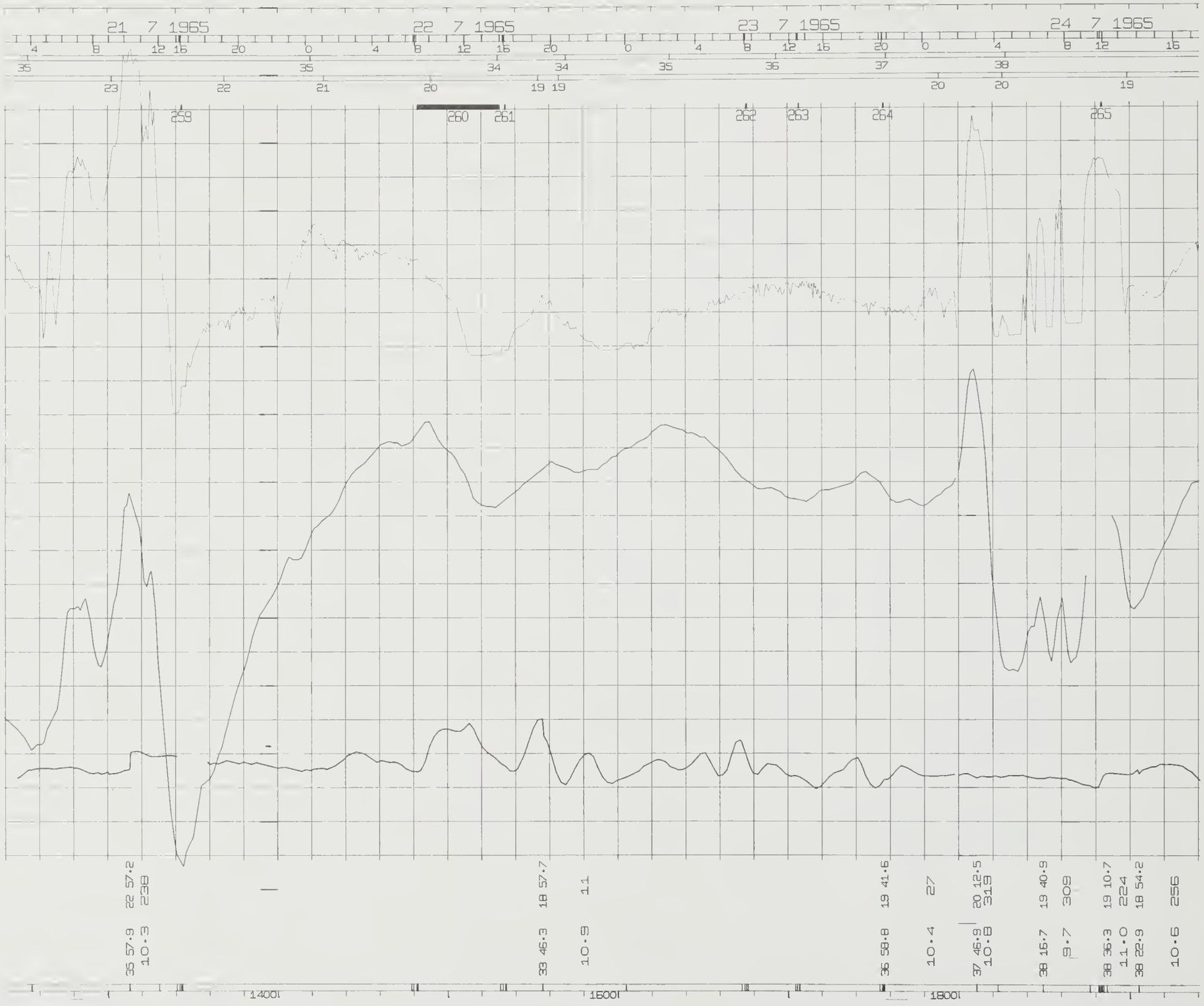

1965
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6 1 1965
7 1 1965
8 1 1965
59
60
61
4800
5000
5200

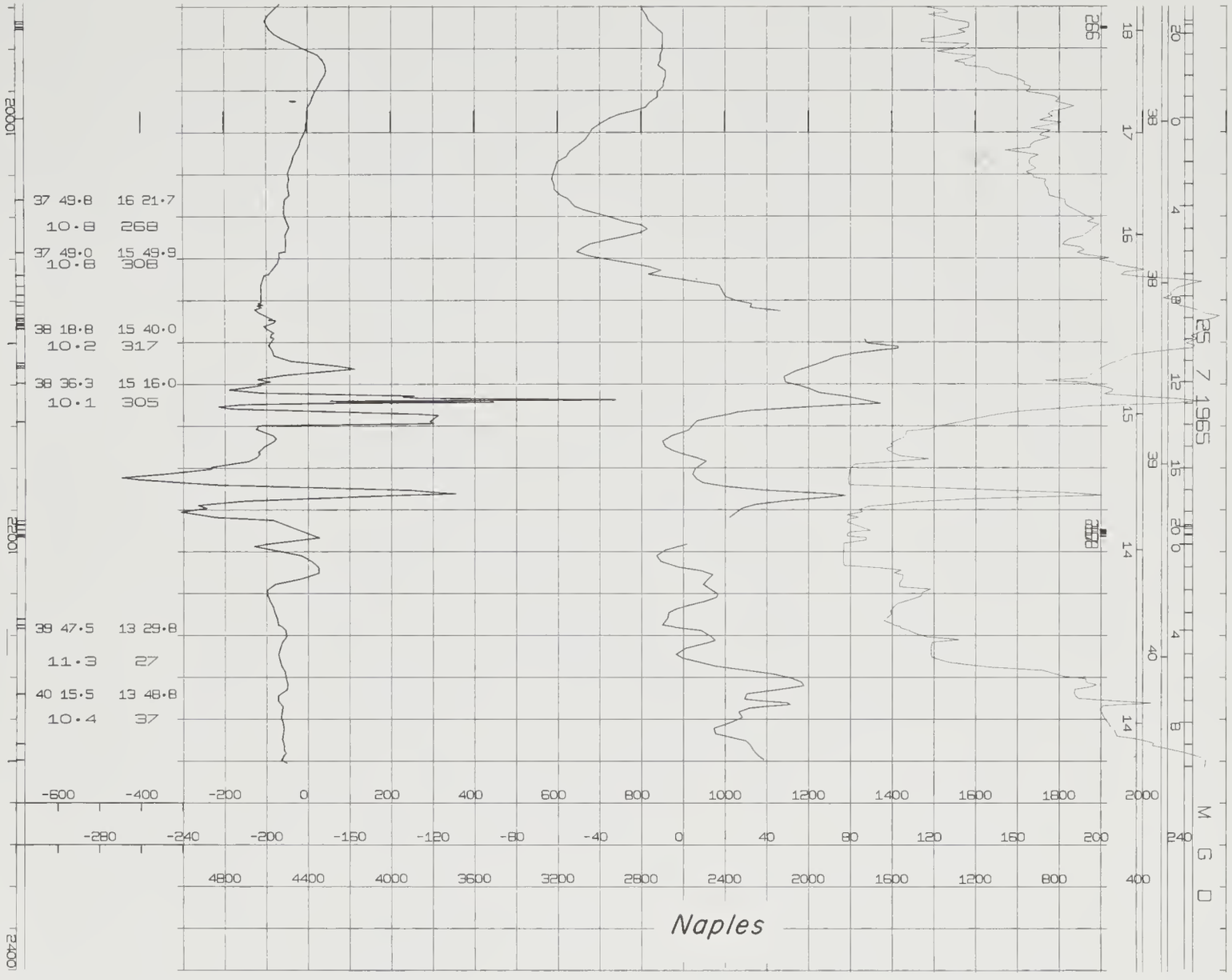

9 1 1965
10 1 1965
11 1 1965
12 1 1965
13 1 1965

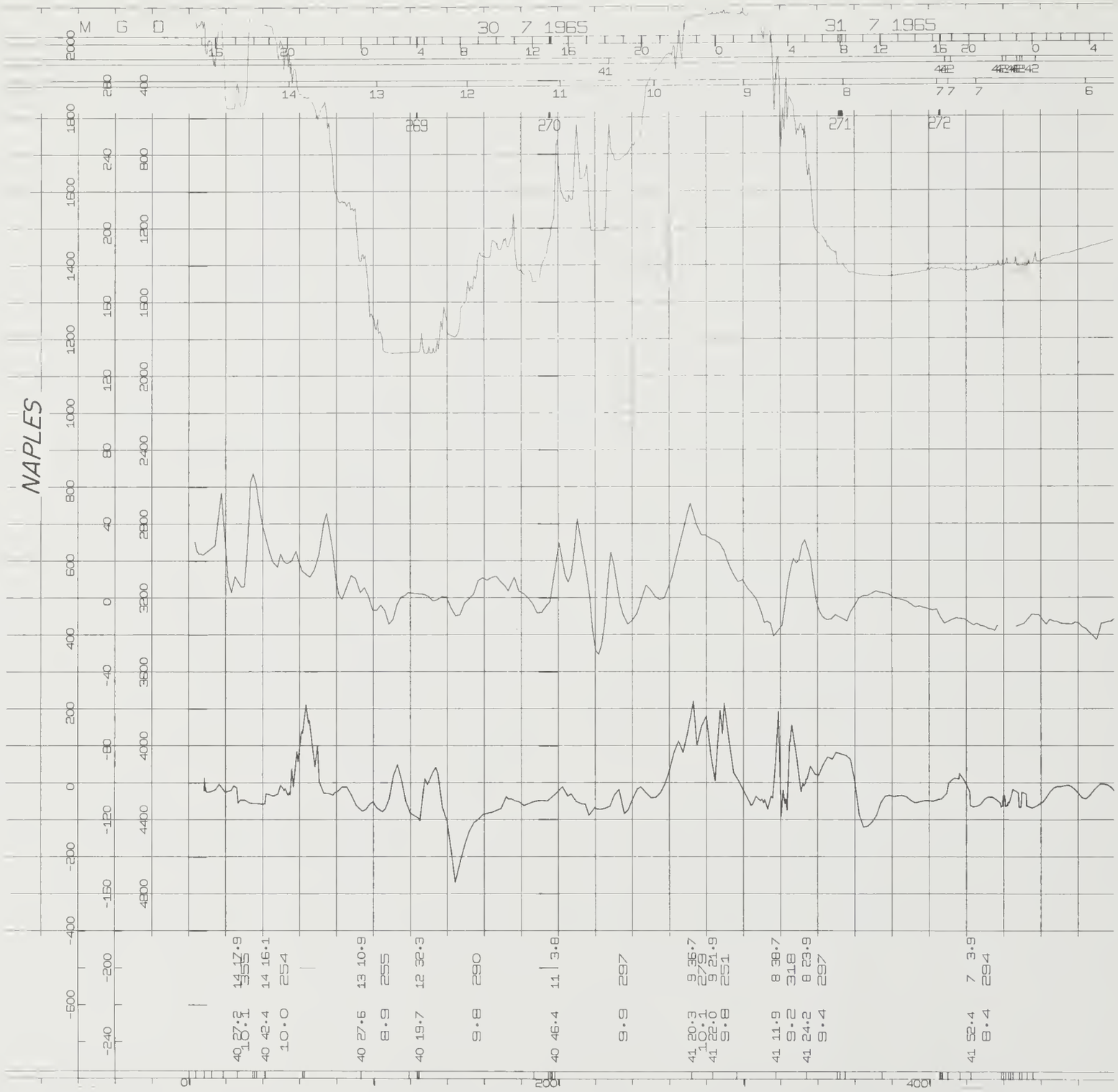

14 1 1965
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16 1 1965
M G D
Cristobal

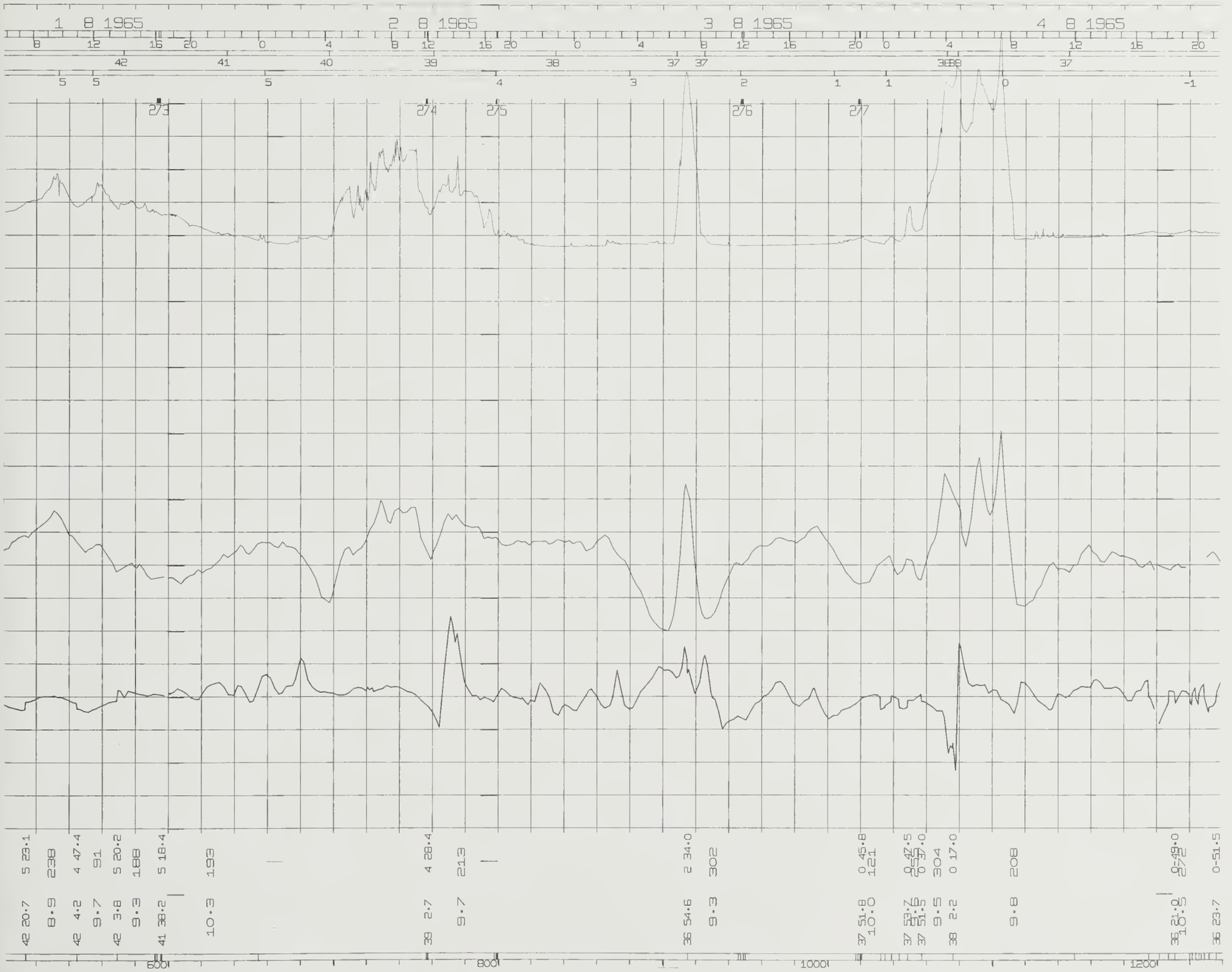

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-280 -240 -200 -150 -120 -80 -40 0 40 80 120 160 200 240
4800 4400 4000 3600 3200 2800 2400 2000 1600 1200 800 400
31 19·7 32 22·1
10·5 4
32 53·9 32 31·4
9·1 278
33 0·5 32 26·5
10·1 3
33 15·7 32 27·4
9·8 344
33 52·0 32 17·6
9·9 338
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10·3 235
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248
250
251
15 7 1965
16 7 1965
GMD

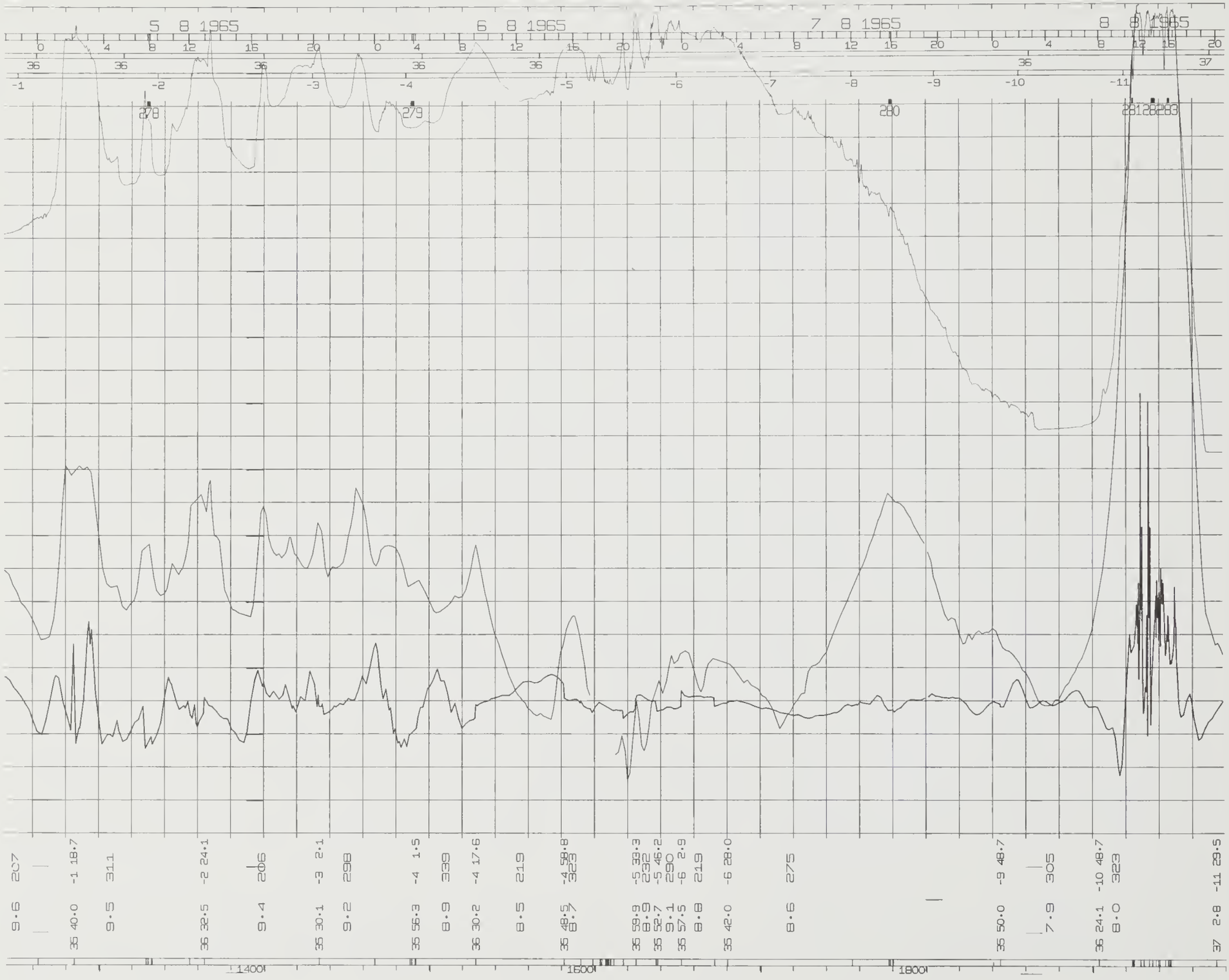

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19 7 1965
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255
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8001
10001
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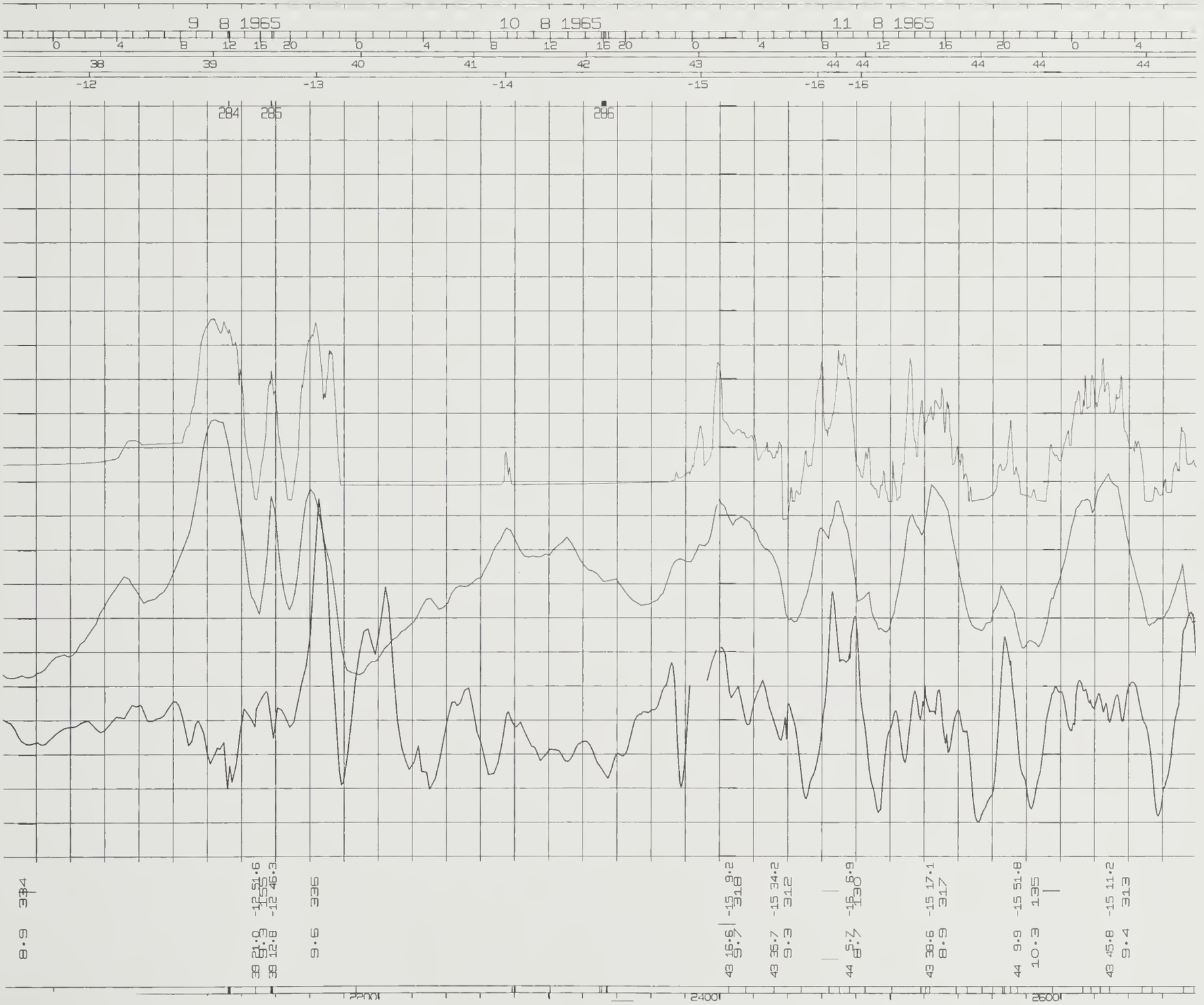

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23 7 1965
24 7 1965
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262
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264
265
1400
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1600
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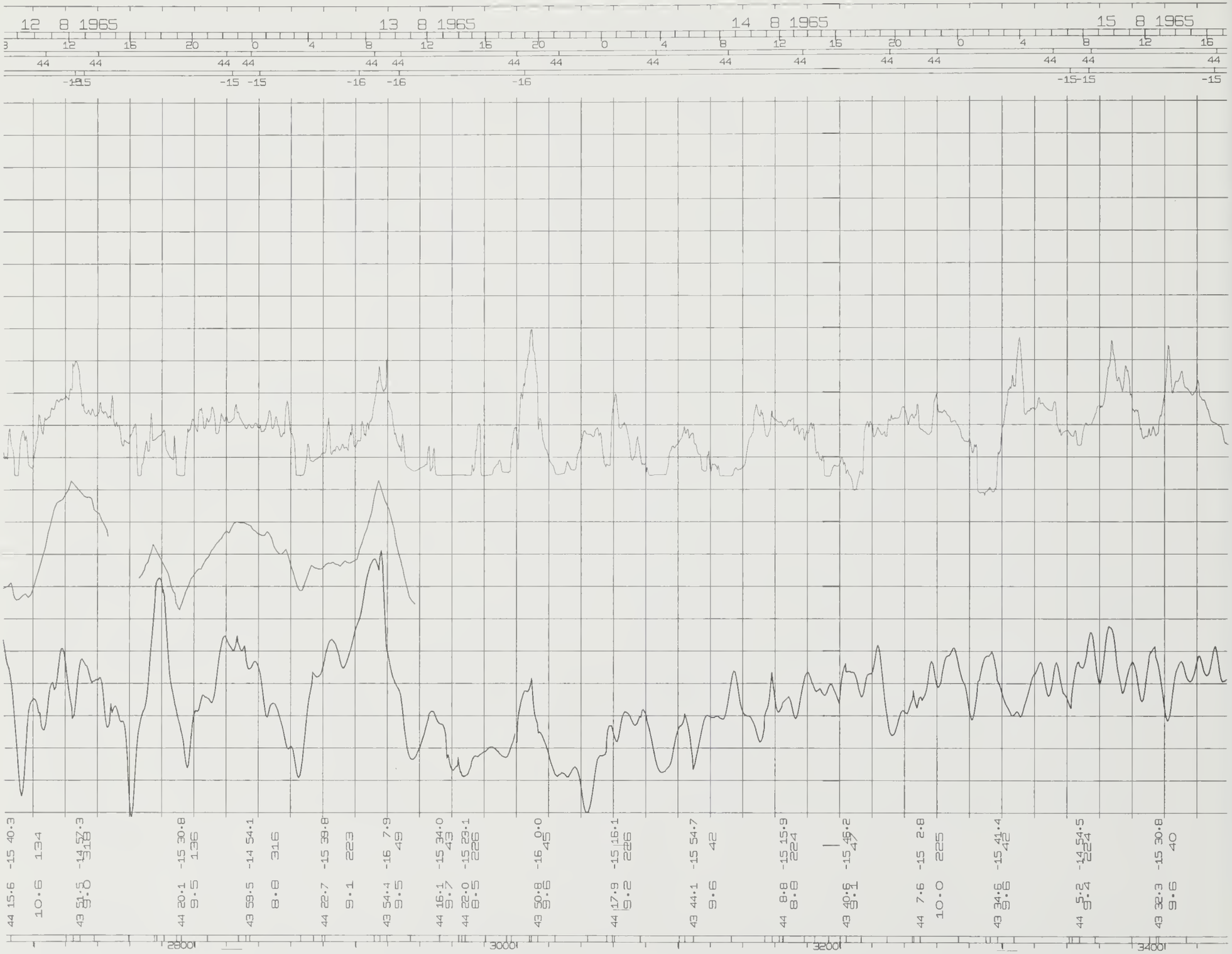

37 49·8 16 21·7
10·8 268
37 49·0 15 49·9
10·8 308
38 18·8 15 40·0
10·2 317
38 36·3 15 16·0
10·1 305
39 47·5 13 29·8
11·3 27
40 15·5 13 48·8
10·4 37
25 7 1965
Naples
M G D

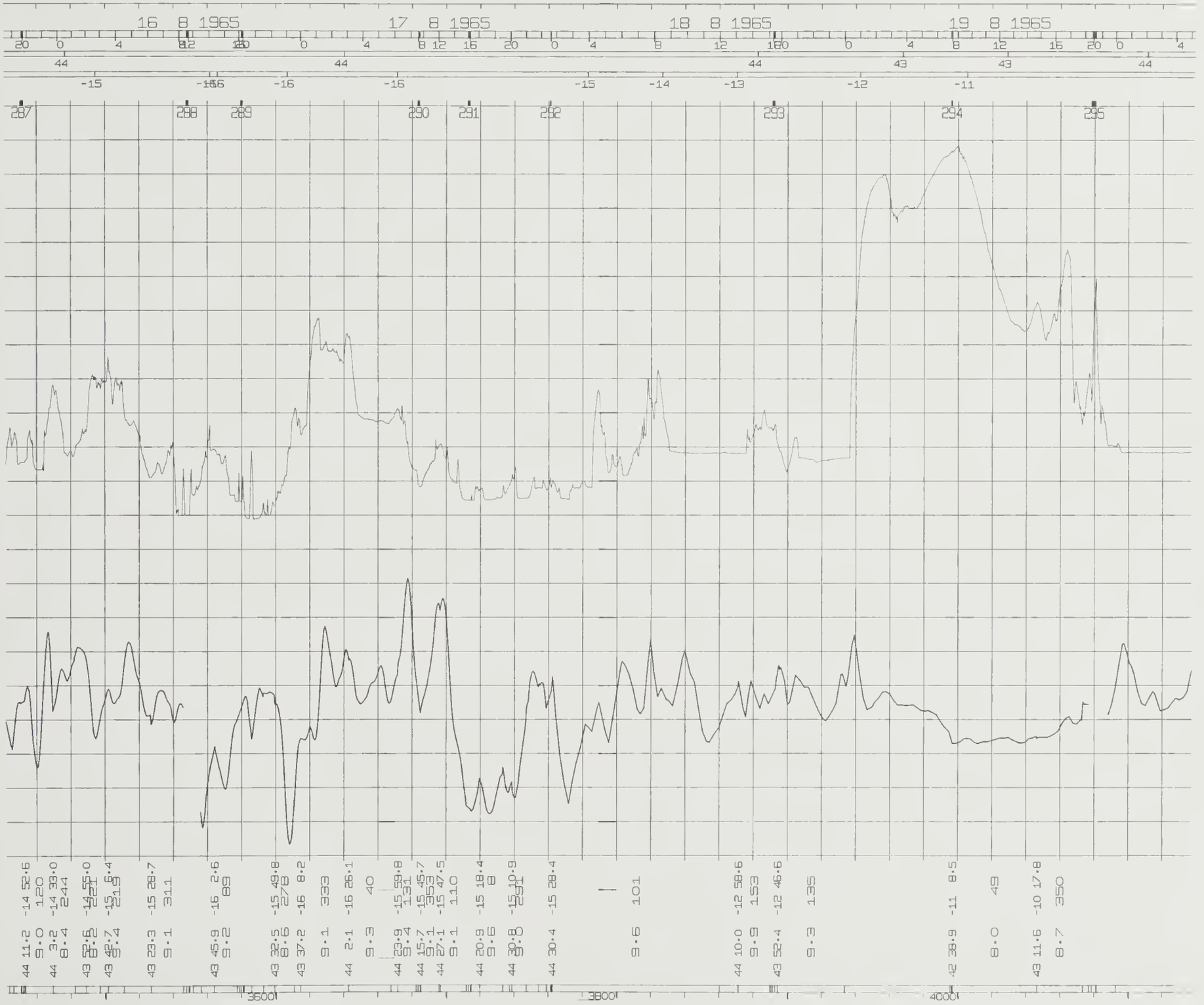

M G D
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31 7 1965
NAPLES
269
270
271
272

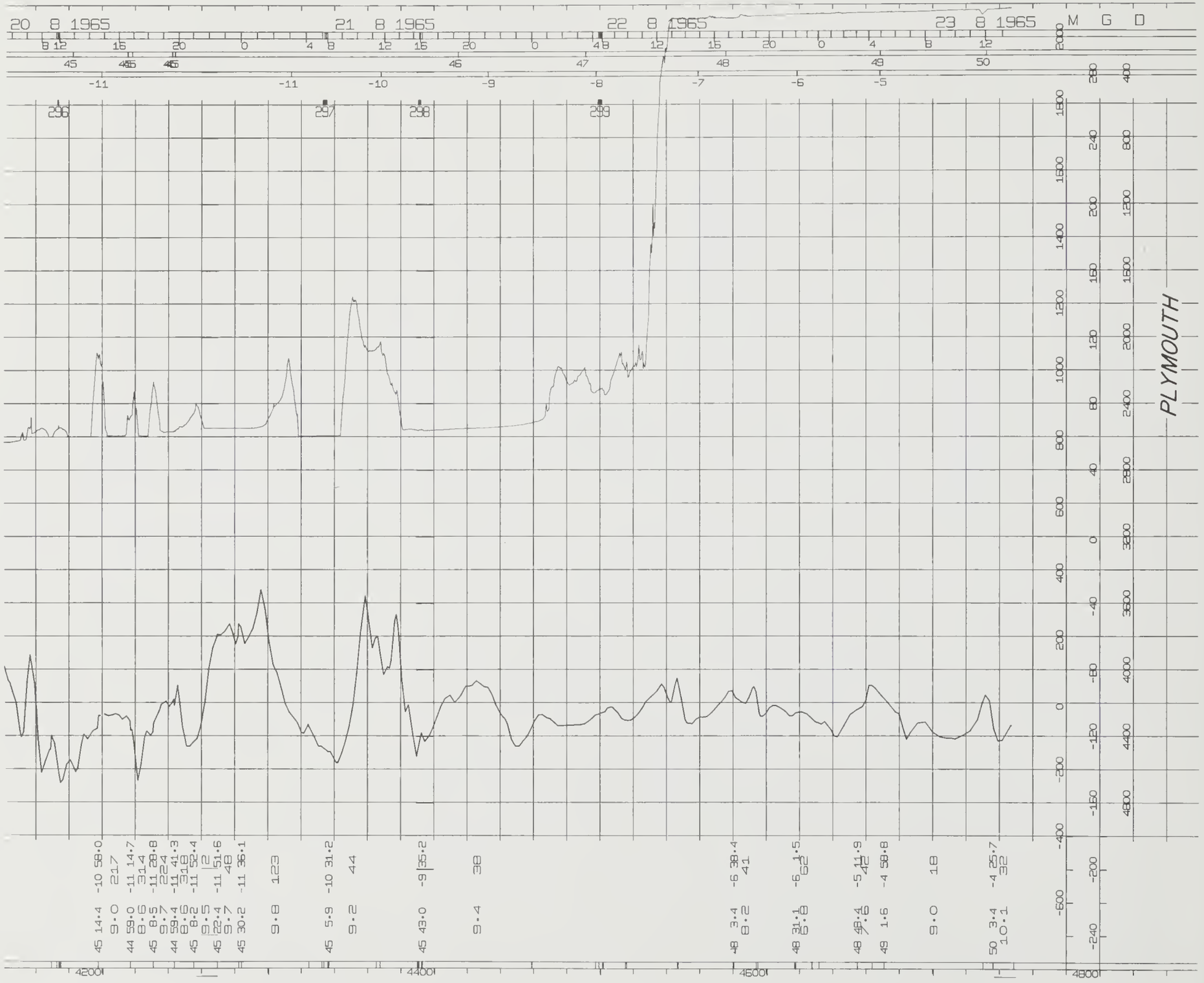

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2 8 1965
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4 8 1965
273
274
275
276
277
500
800
1000
1200

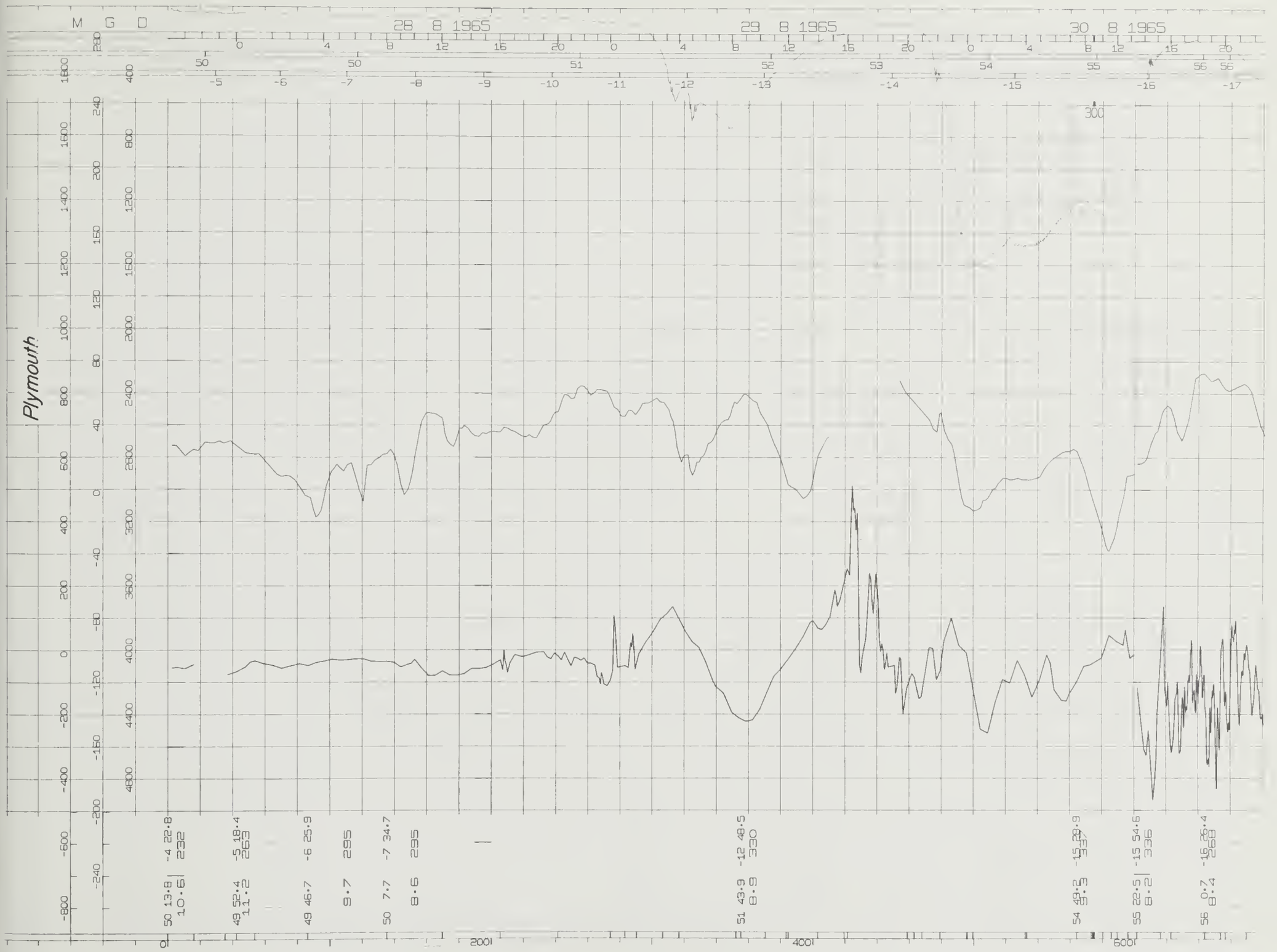

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7 8 1965
8 8 1965
278
279
280
1400
1600
1800

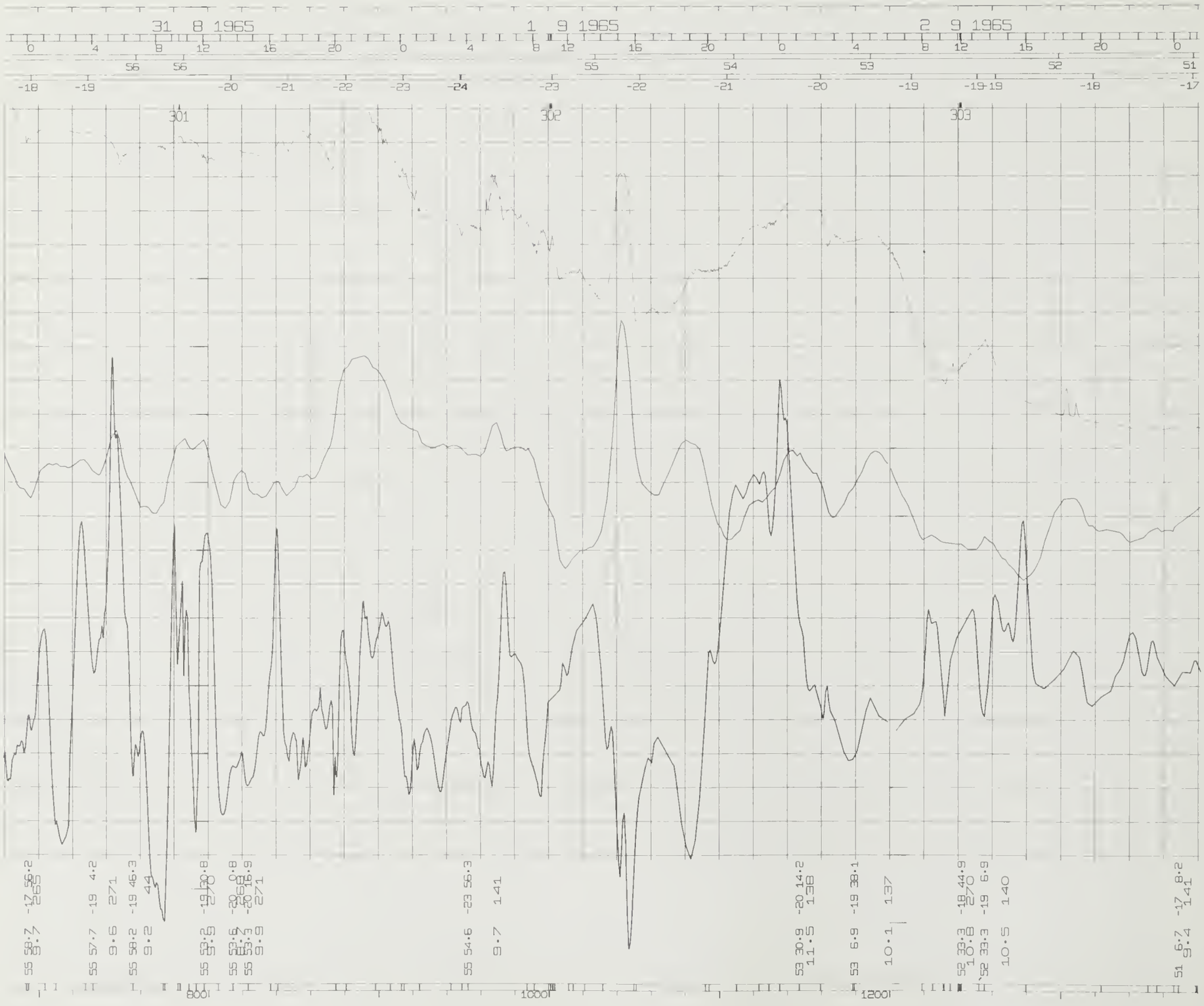

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10 8 1965
11 8 1965
284
285
286
2200
2400
2600

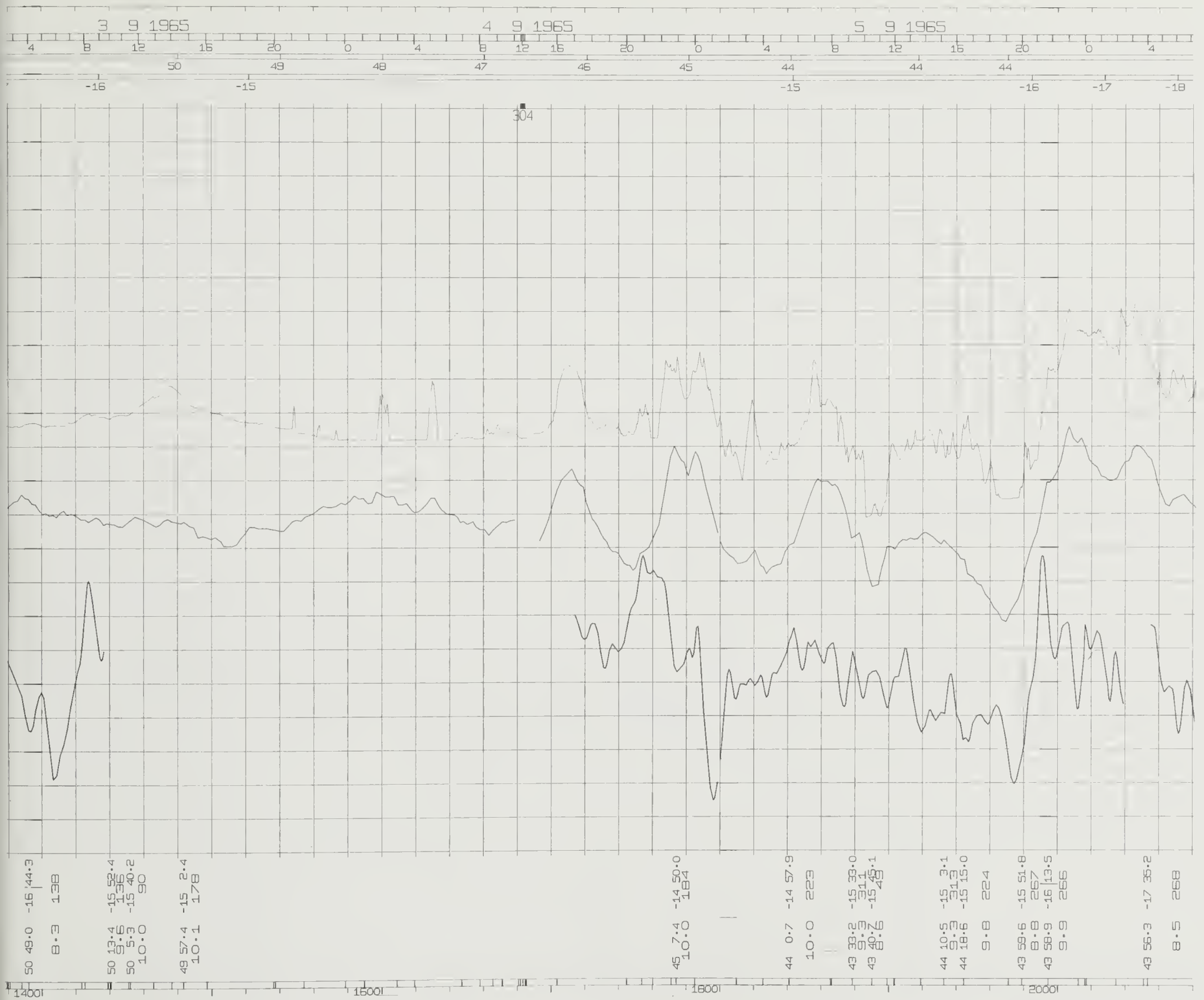

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3000
3200
3400

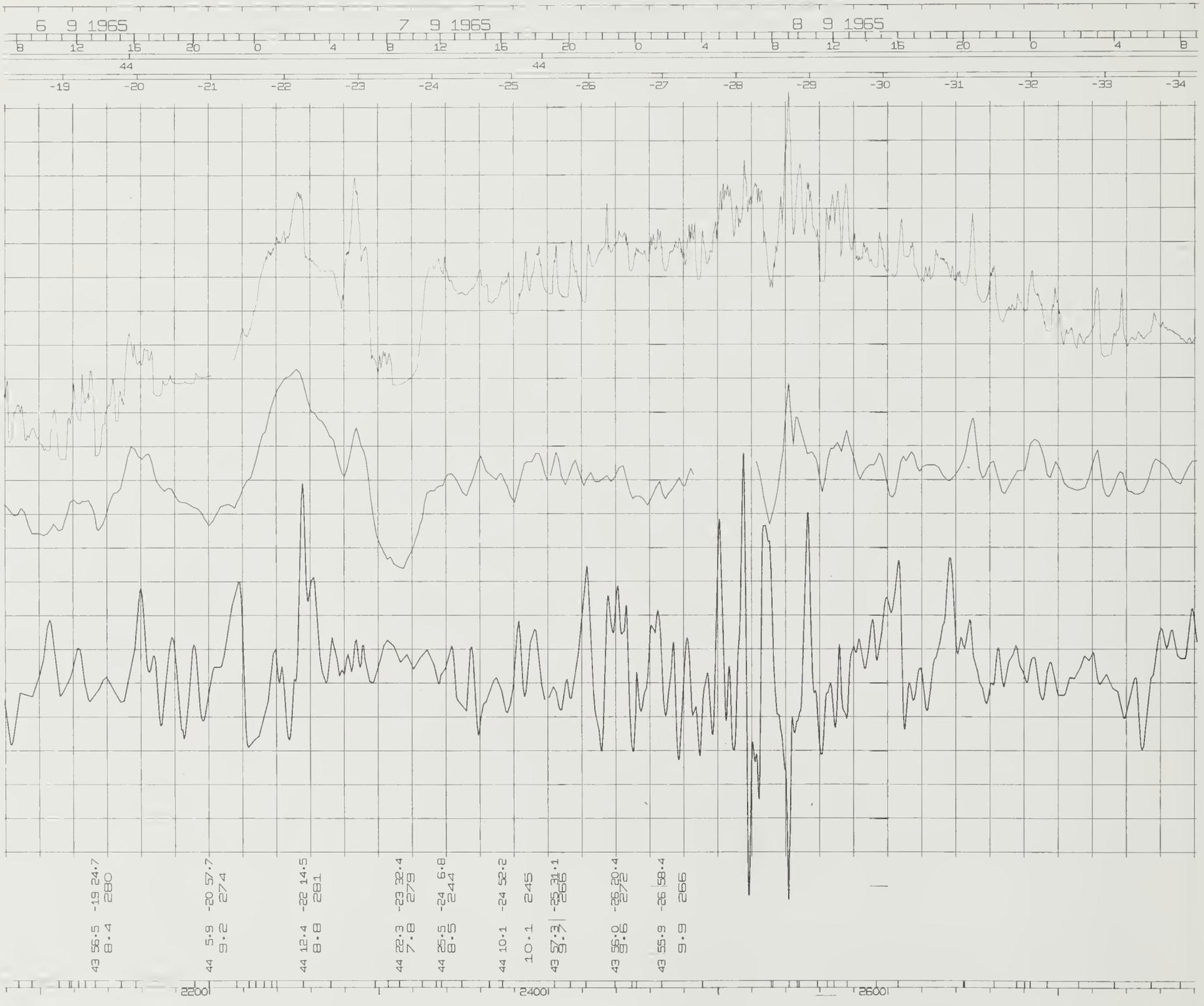

16 8 1965
17 8 1965
18 8 1965
19 8 1965
287
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289
290
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293
294
295
3600
3800
4000

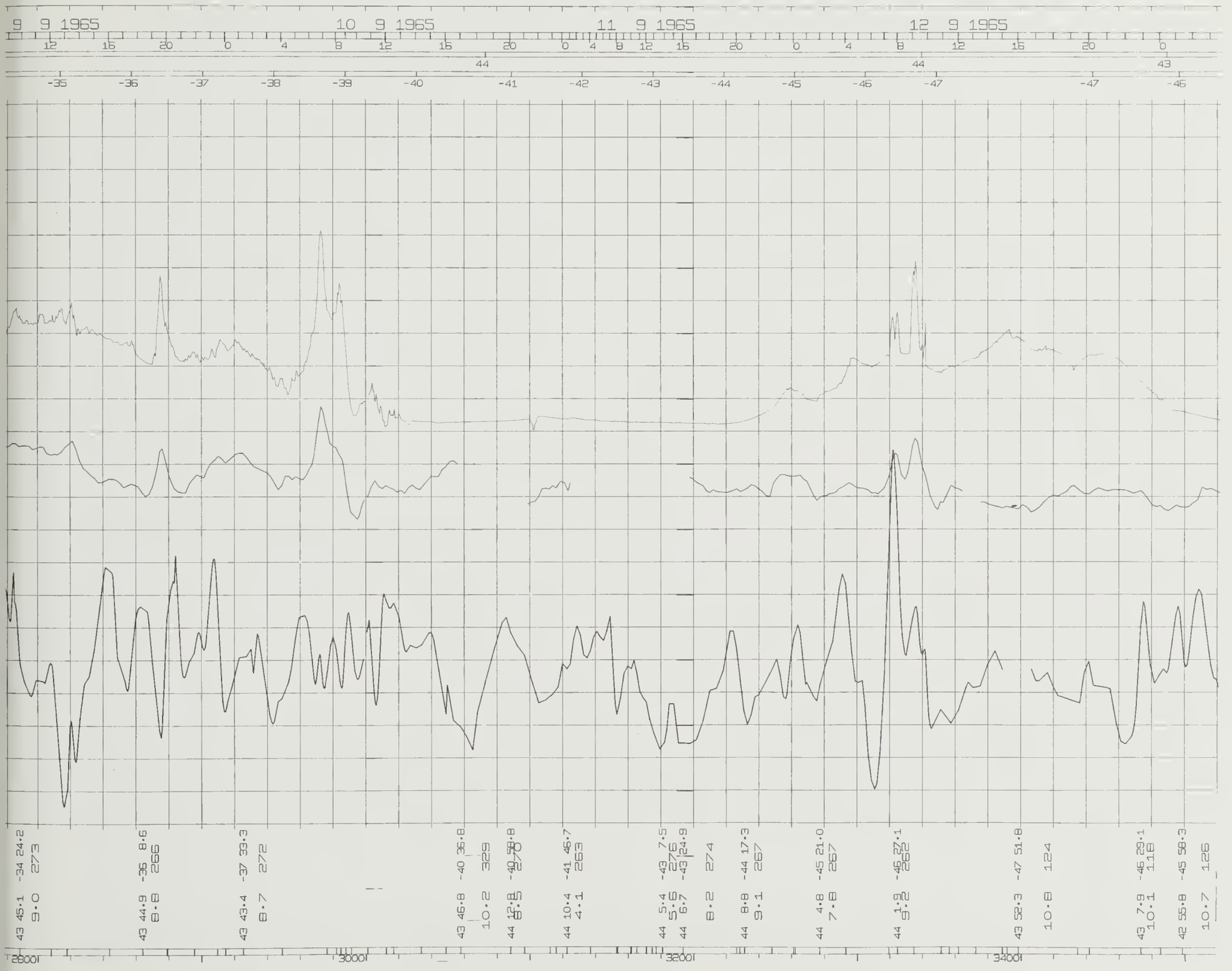

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22 8 1965
23 8 1965
M G D
PLYMOUTH

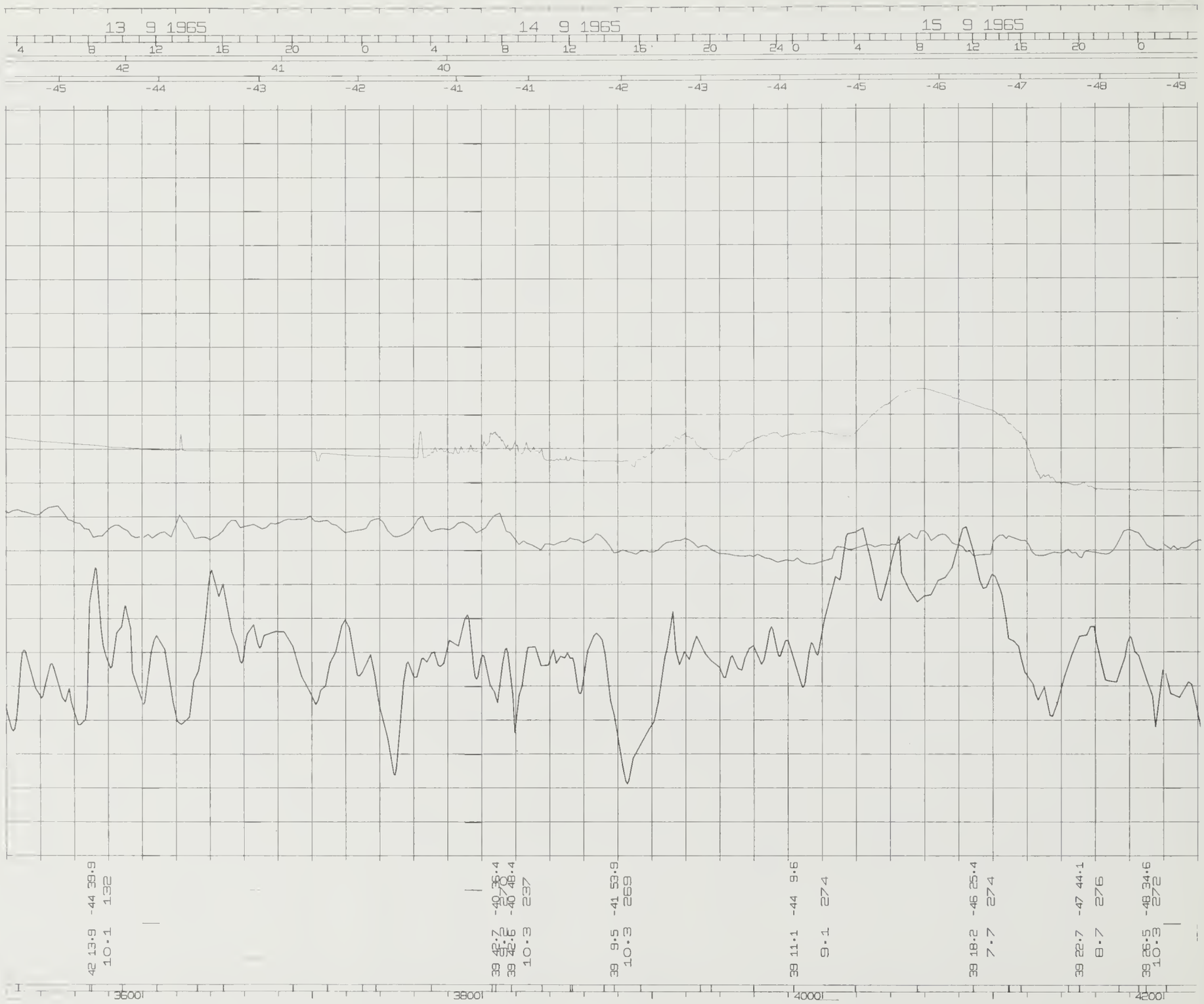

M G D
28 8 1965
29 8 1965
30 8 1965
Plymouth
300
50 13·8 -4 22·8 232
10·6
49 52·4 -5 18·4 263
11·2
49 46·7 -6 25·9
9·7 295
50 7·7 -7 34·7
8·6 295
51 43·9 -12 48·5 330
8·9
54 49·2 -15 28·9 337
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55 22·5 -15 54·6 336
8·2
56 0·7 -16 26·4 268
8·4
0
200
400
600

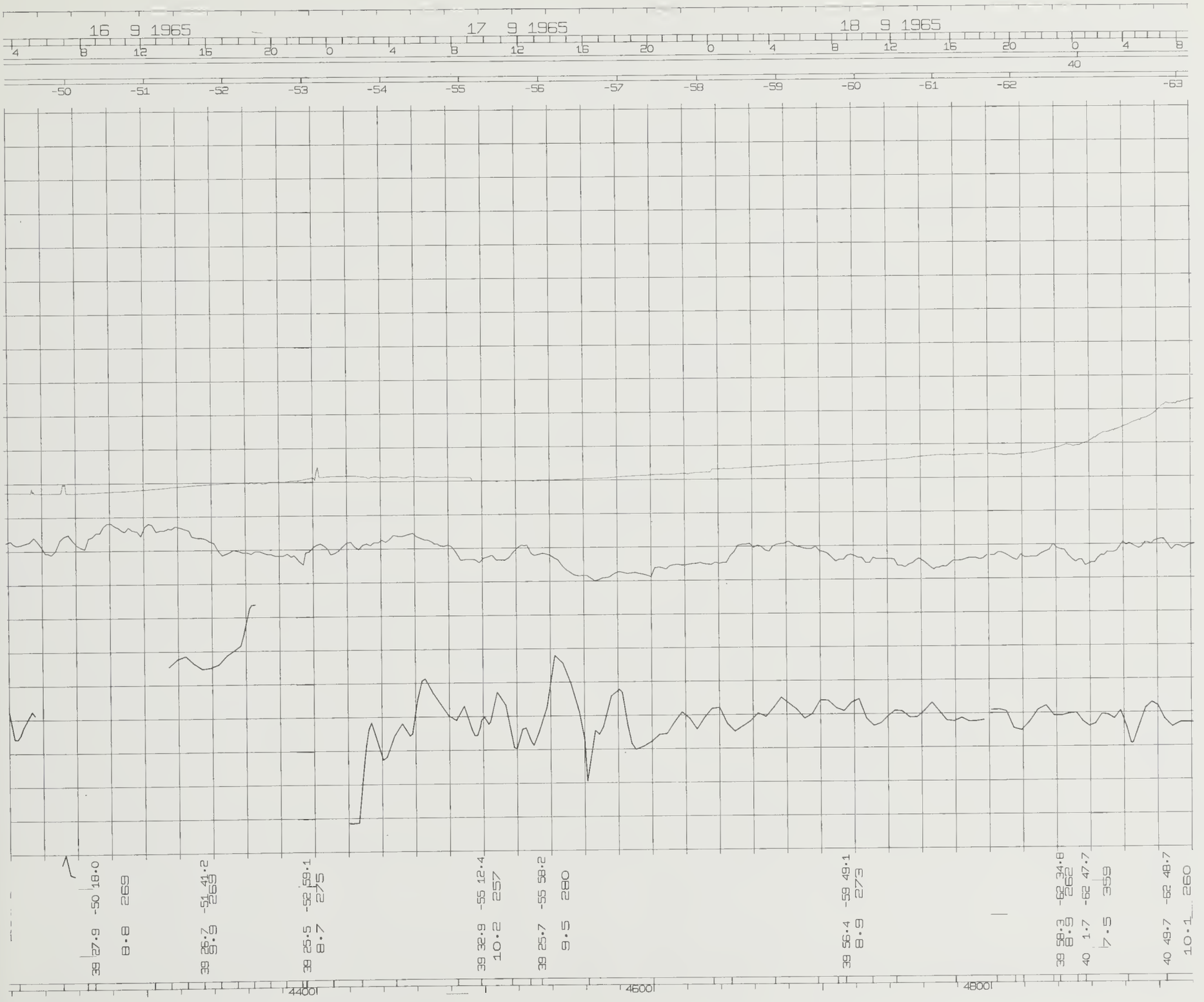

31 8 1965
1 9 1965
2 9 1965
301
302
303
800
1000
1200

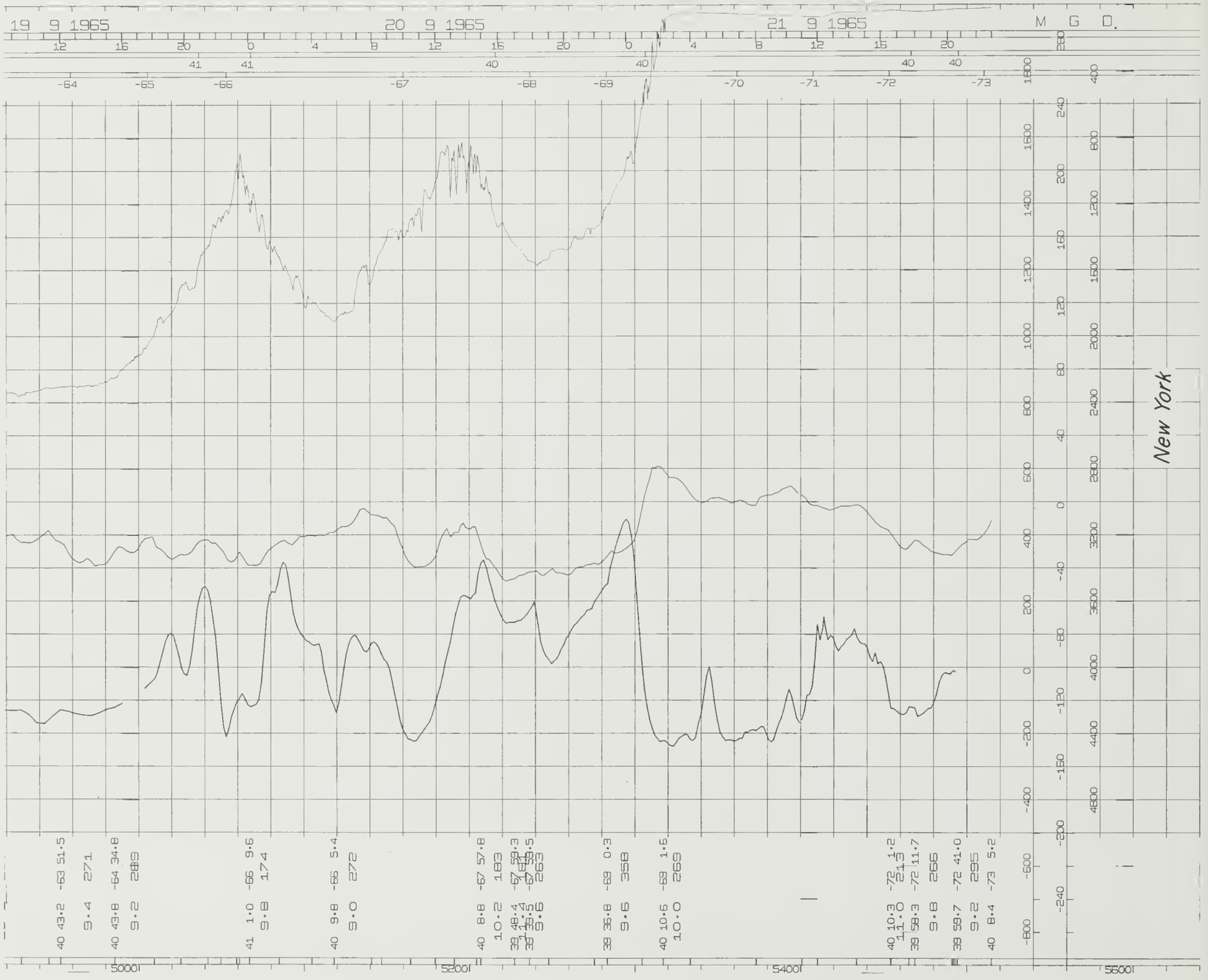

3 9 1965
4 9 1965
5 9 1965
304
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8·3 138
50 13·4 -15 52·4
9·6 136
50 5·3 -15 40·2
10·0 90
49 57·4 -15 2·4
10·1 178
45 7·4 -14 50·0
10·0 184
44 0·7 -14 57·9
10·0 223
43 33·2 -15 33·0
9·3 311
43 40·7 -15 45·1
8·6 49
44 10·5 -15 3·1
9·3 313
44 18·6 -15 15·0
9·8 224
43 59·6 -15 51·8
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1400
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1600
2000

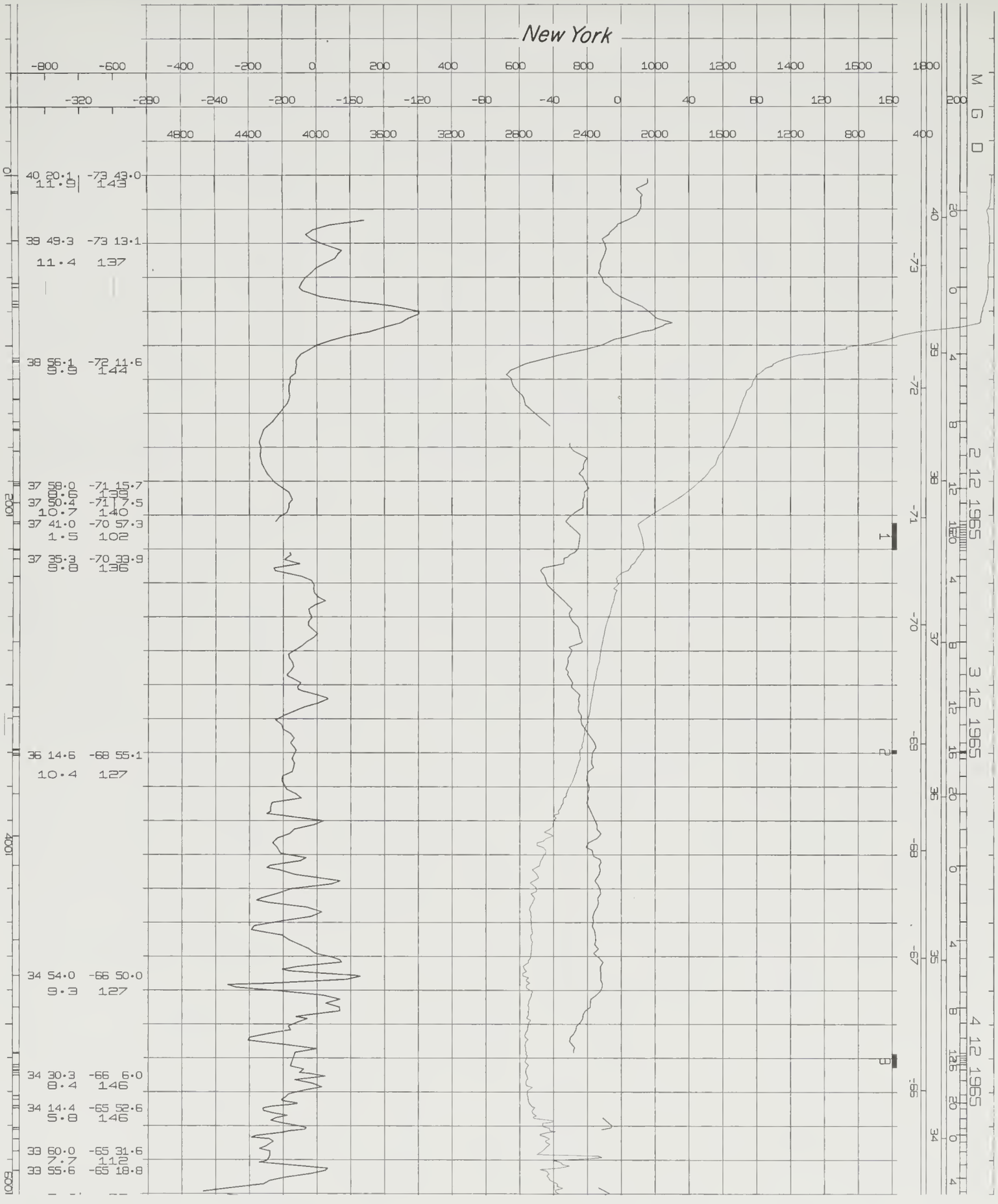

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8 9 1965
-19 24.7 280
-20 57.7 274
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-23 32.4 279
-24 6.8 244
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-25 31.1 266
-26 20.4 272
-26 58.4 266
43 56.5 8.4
44 5.9 9.2
44 12.4 8.8
44 22.3 7.8
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43 57.3 8.7
43 56.0 9.6
43 55.9 9.9
2200
2400
2600

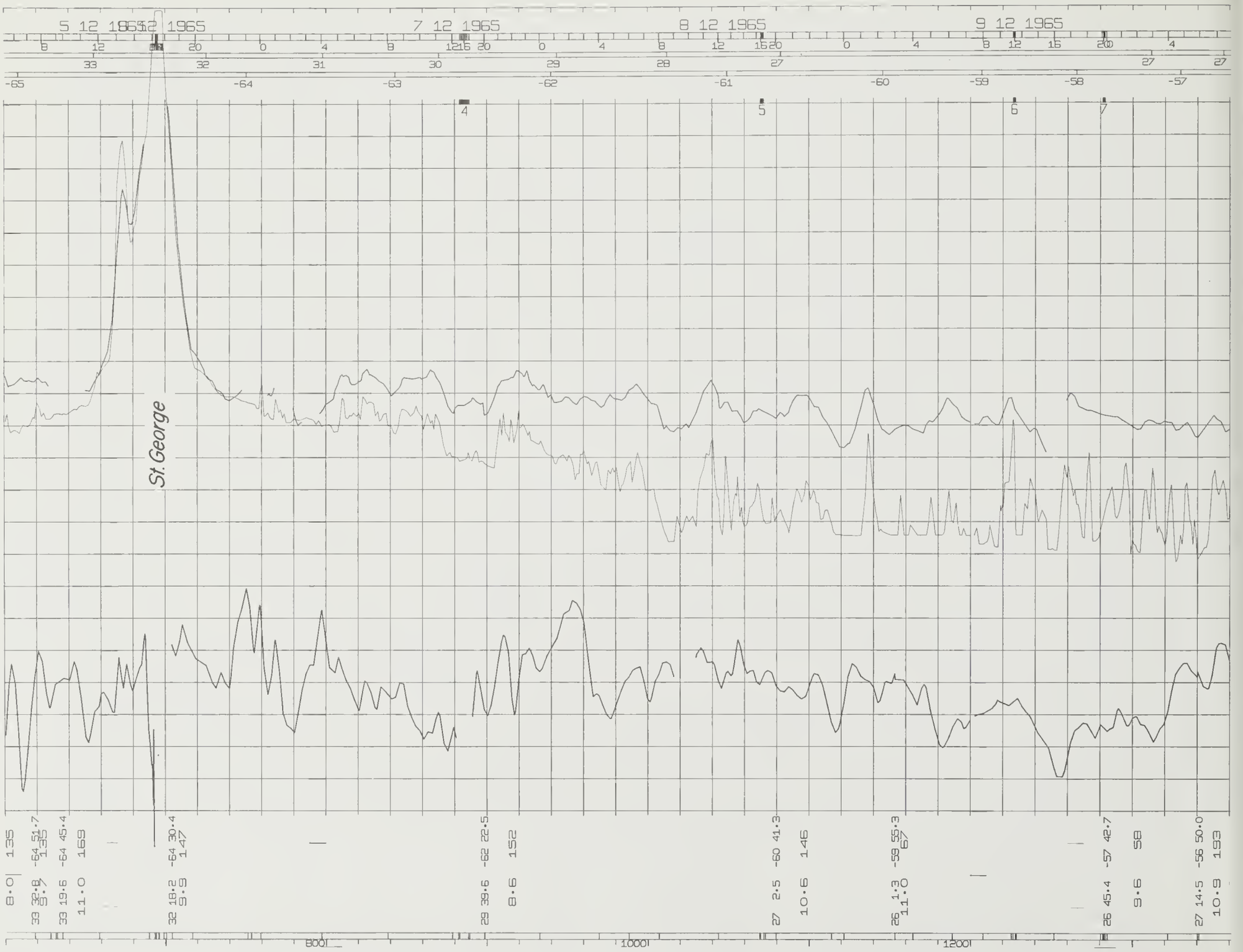

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11 9 1965
12 9 1965
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43 45·1 -34 24·2 9·0 273
43 44·9 -35 8·6 8·8 266
43 43·4 -37 33·3 8·7 272
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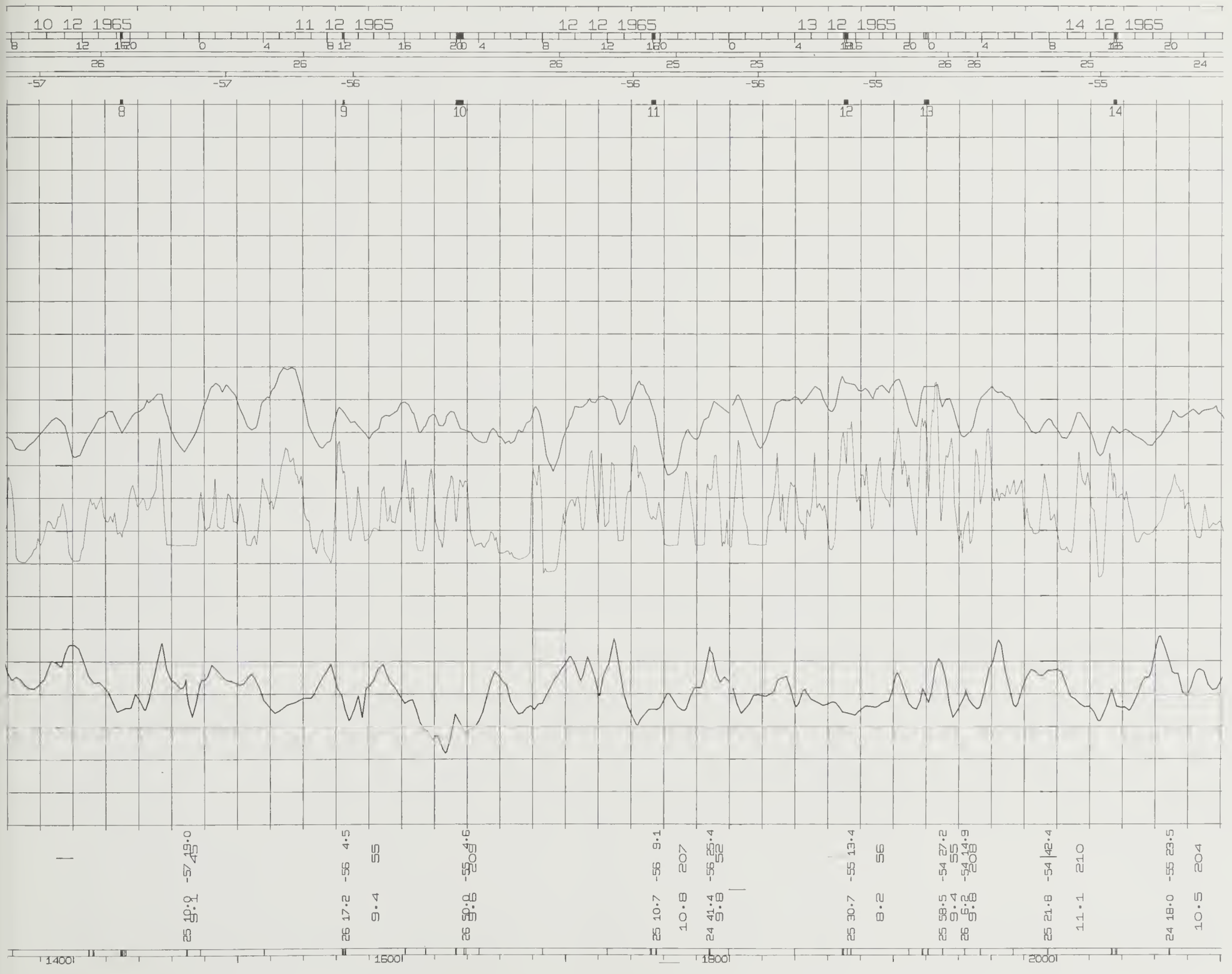

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3600
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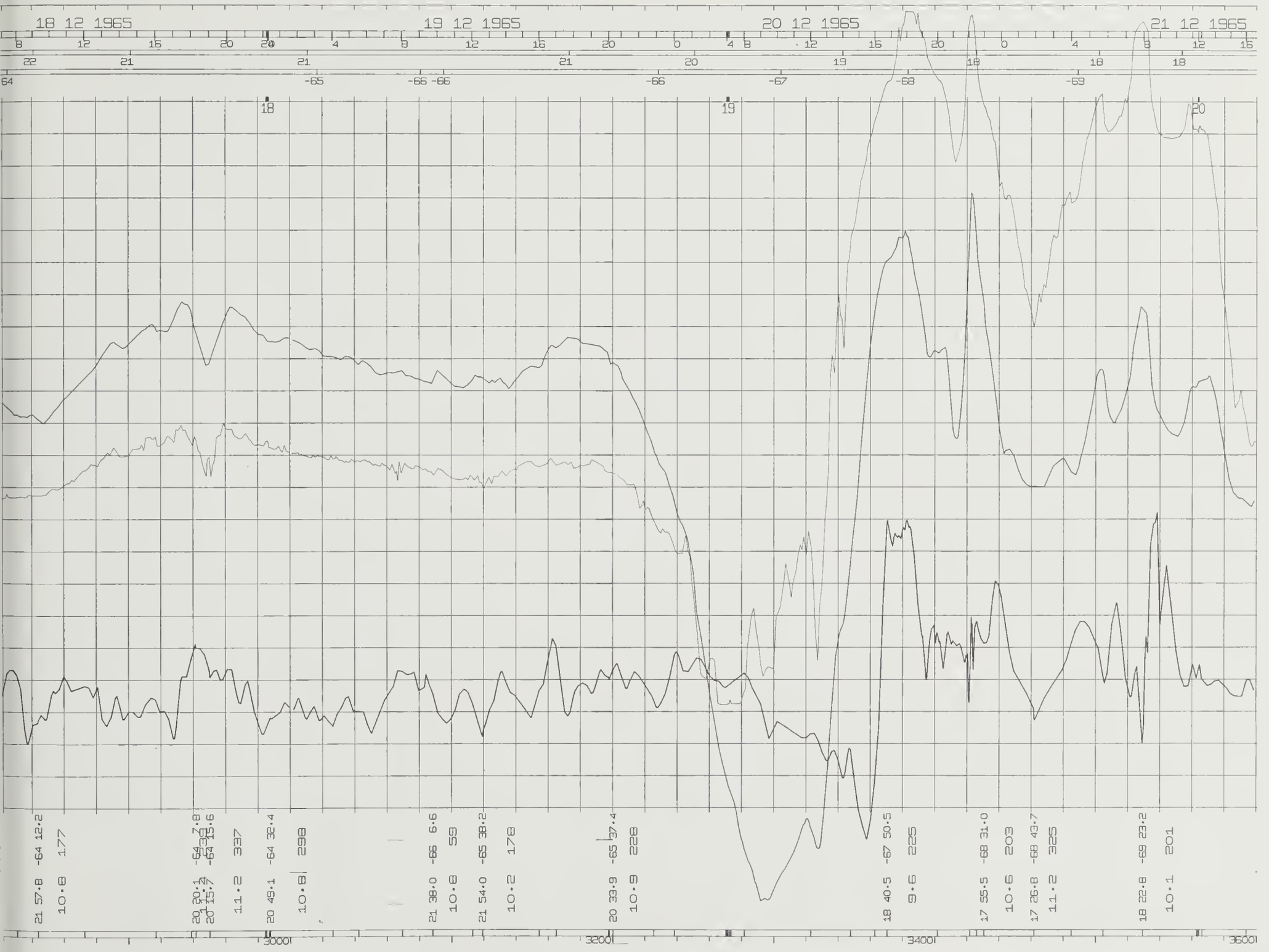

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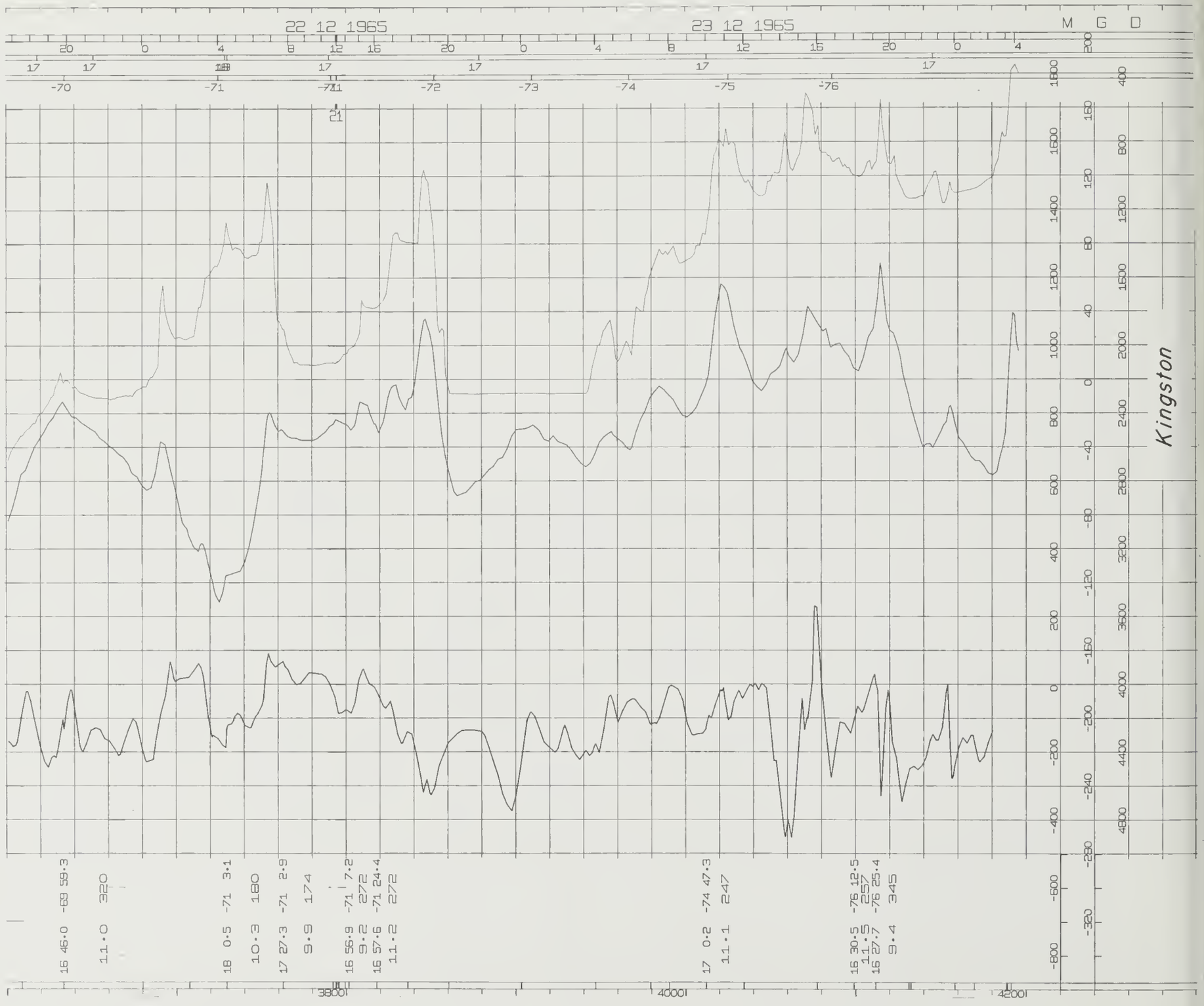

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37 35.3 -70 33.9
9.8 136
36 14.6 -68 55.1
10.4 127
34 54.0 -66 50.0
9.3 127
34 30.3 -66 6.0
8.4 146
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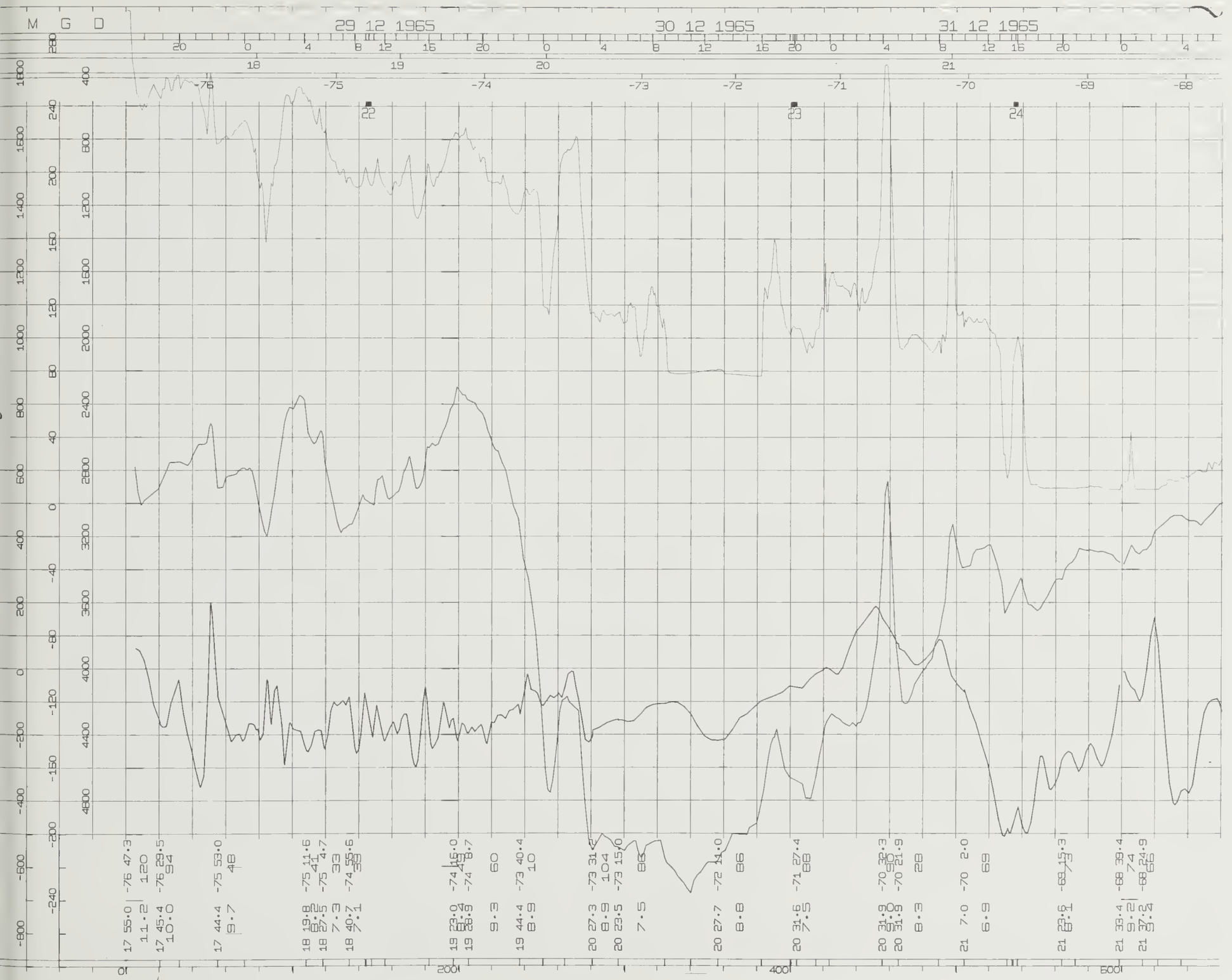

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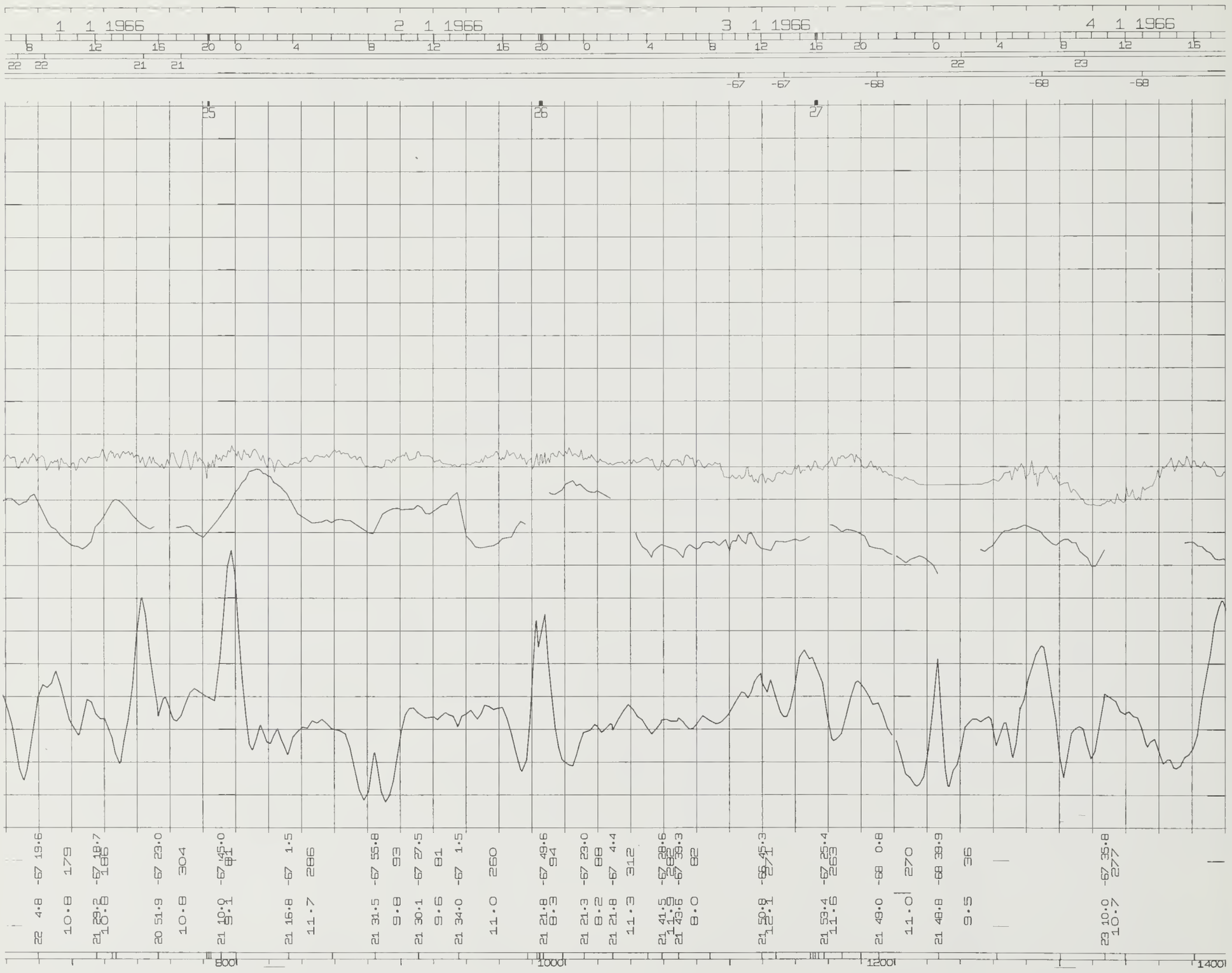

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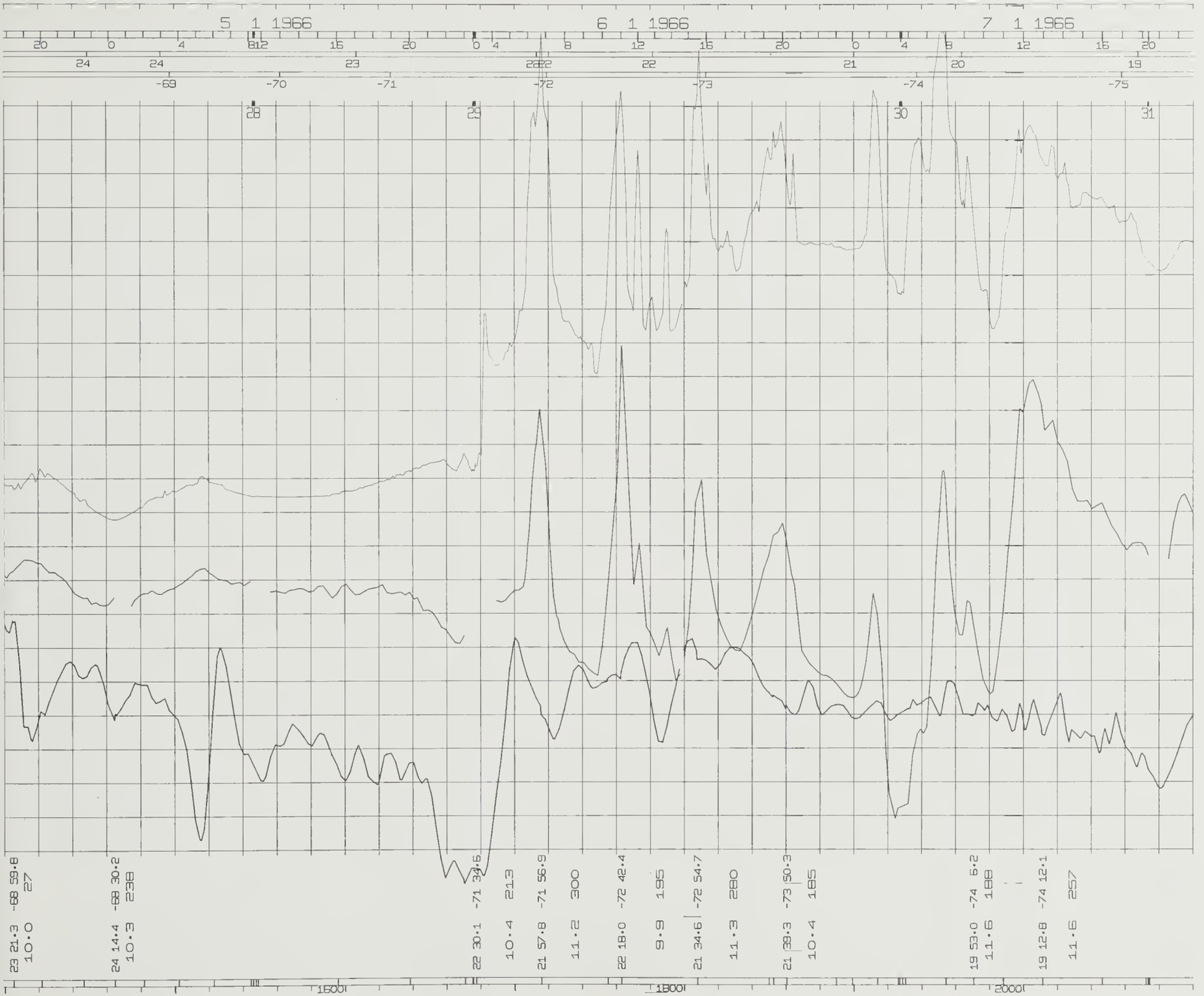

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21 52.6 -63 6.2 59 11·0
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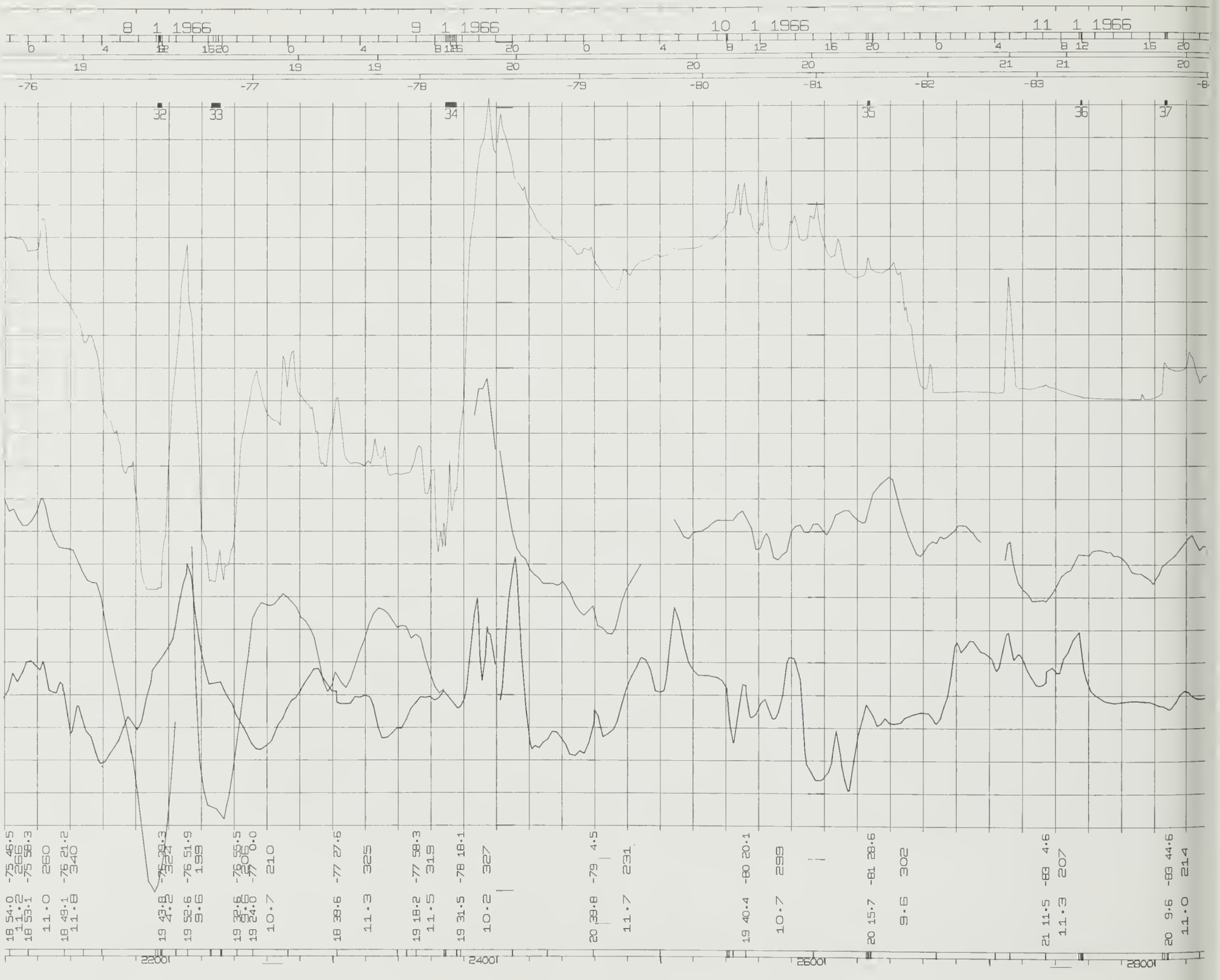

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21 54·0 -65 38·2
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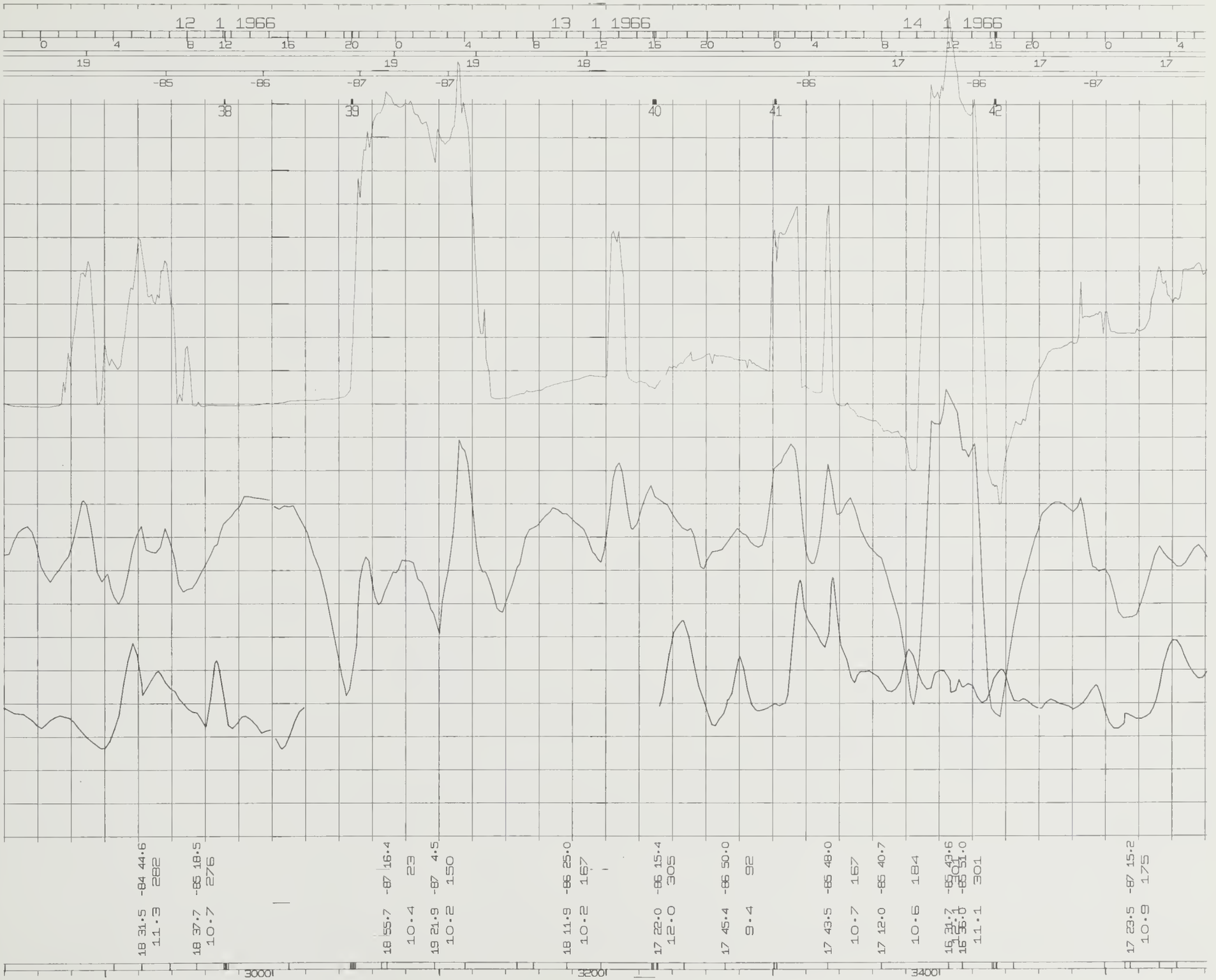

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M G D
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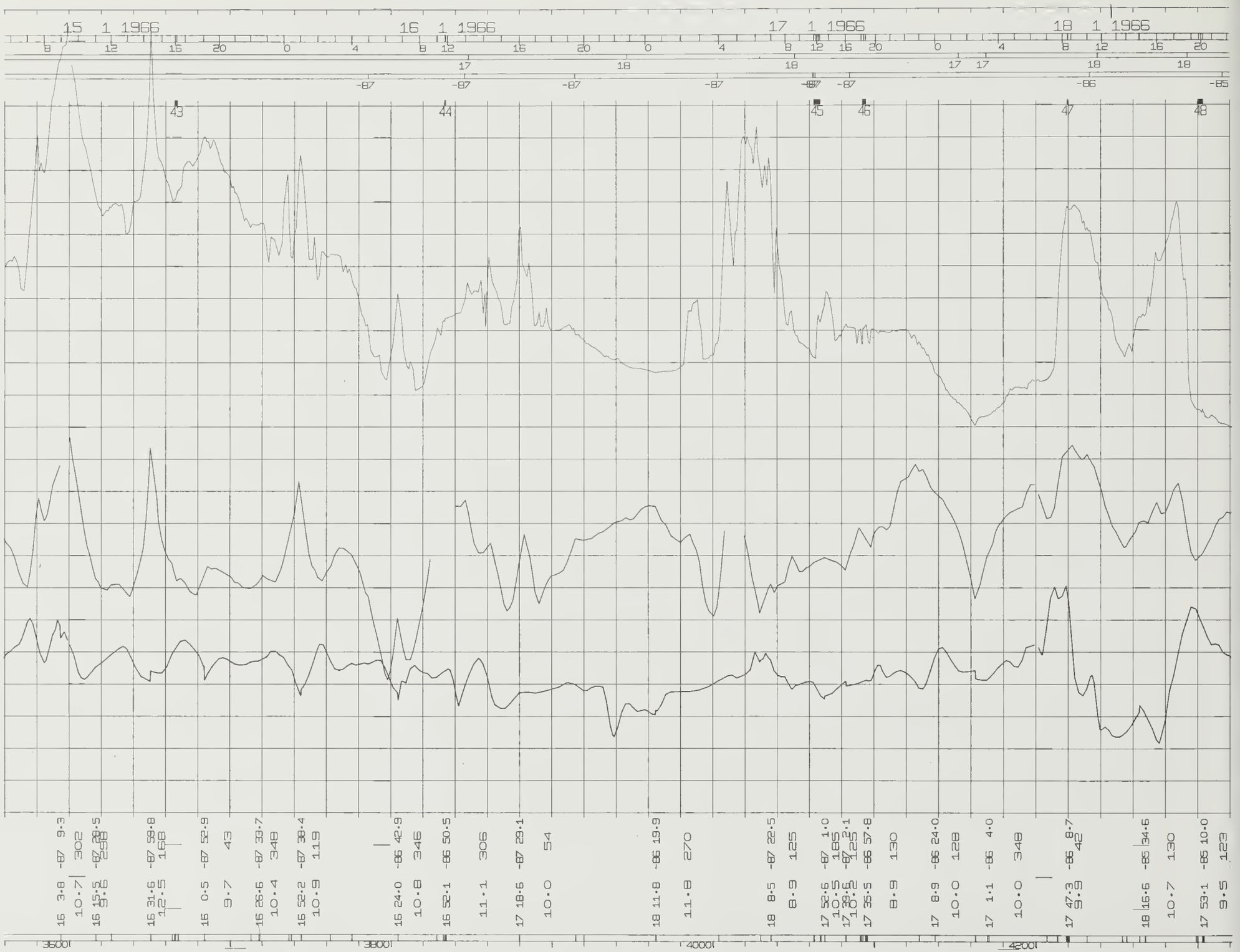

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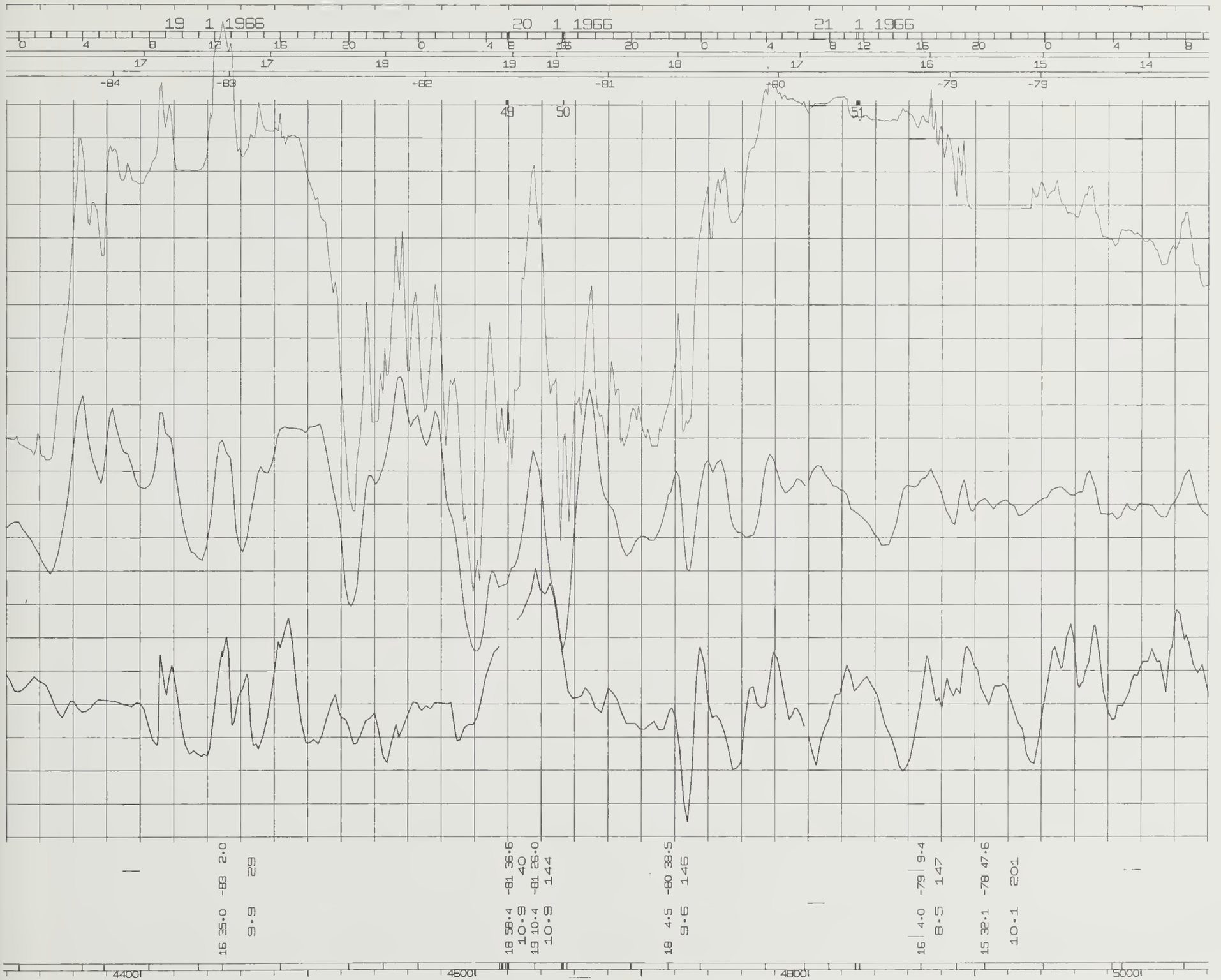

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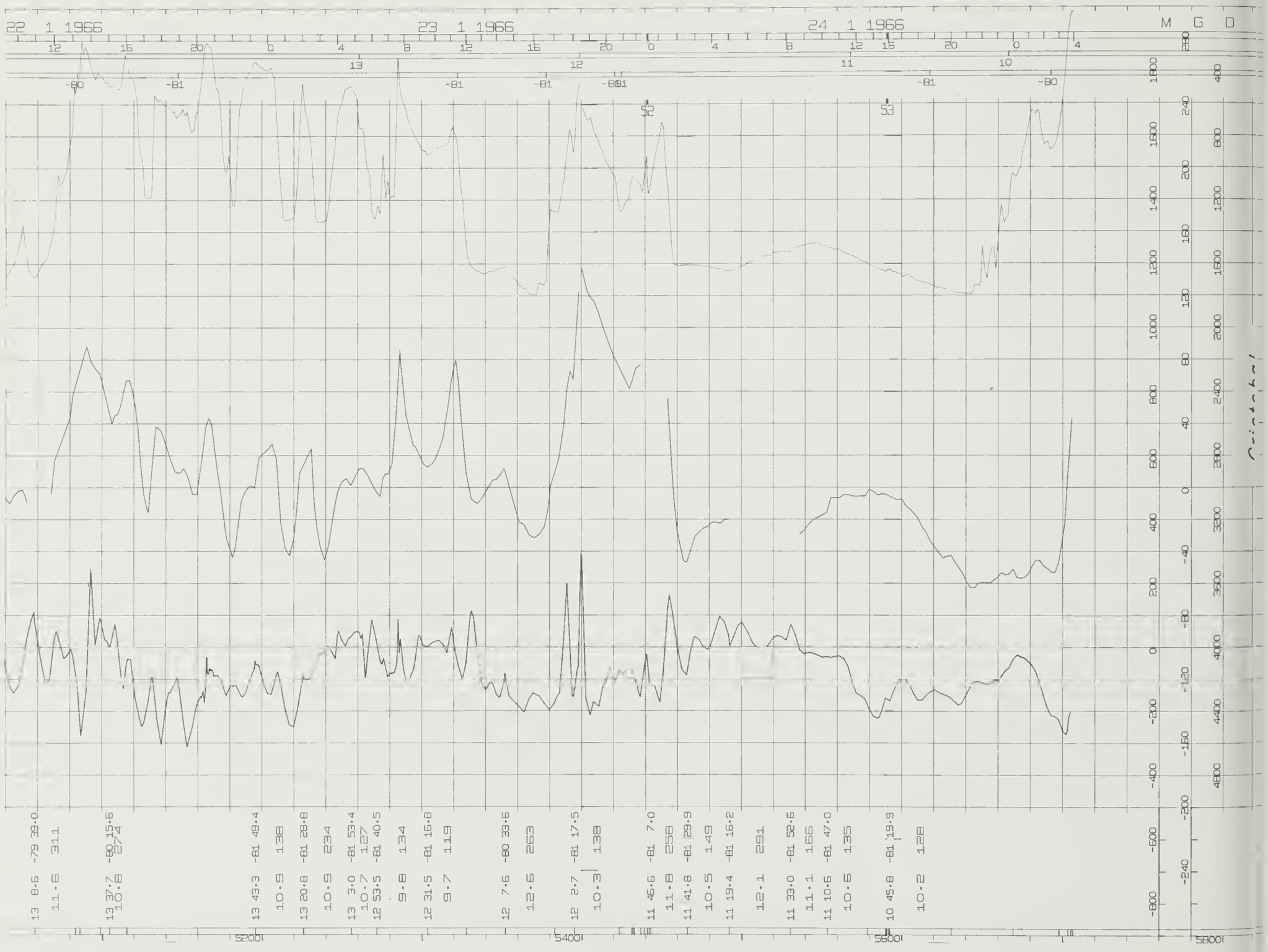

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21 57.8 -71 56.9 300
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22 18.0 -72 42.4
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21 34.6 -72 54.7 280
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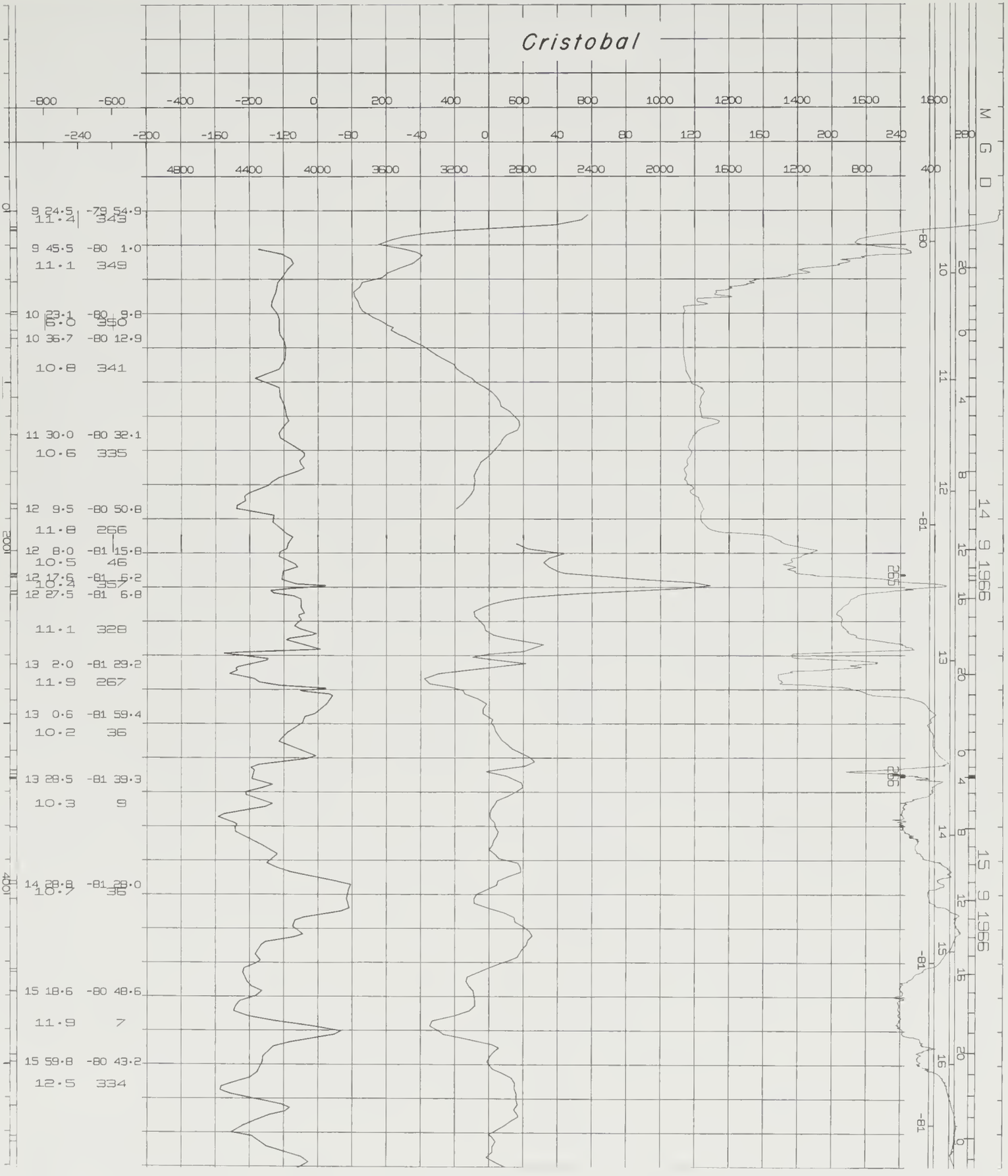

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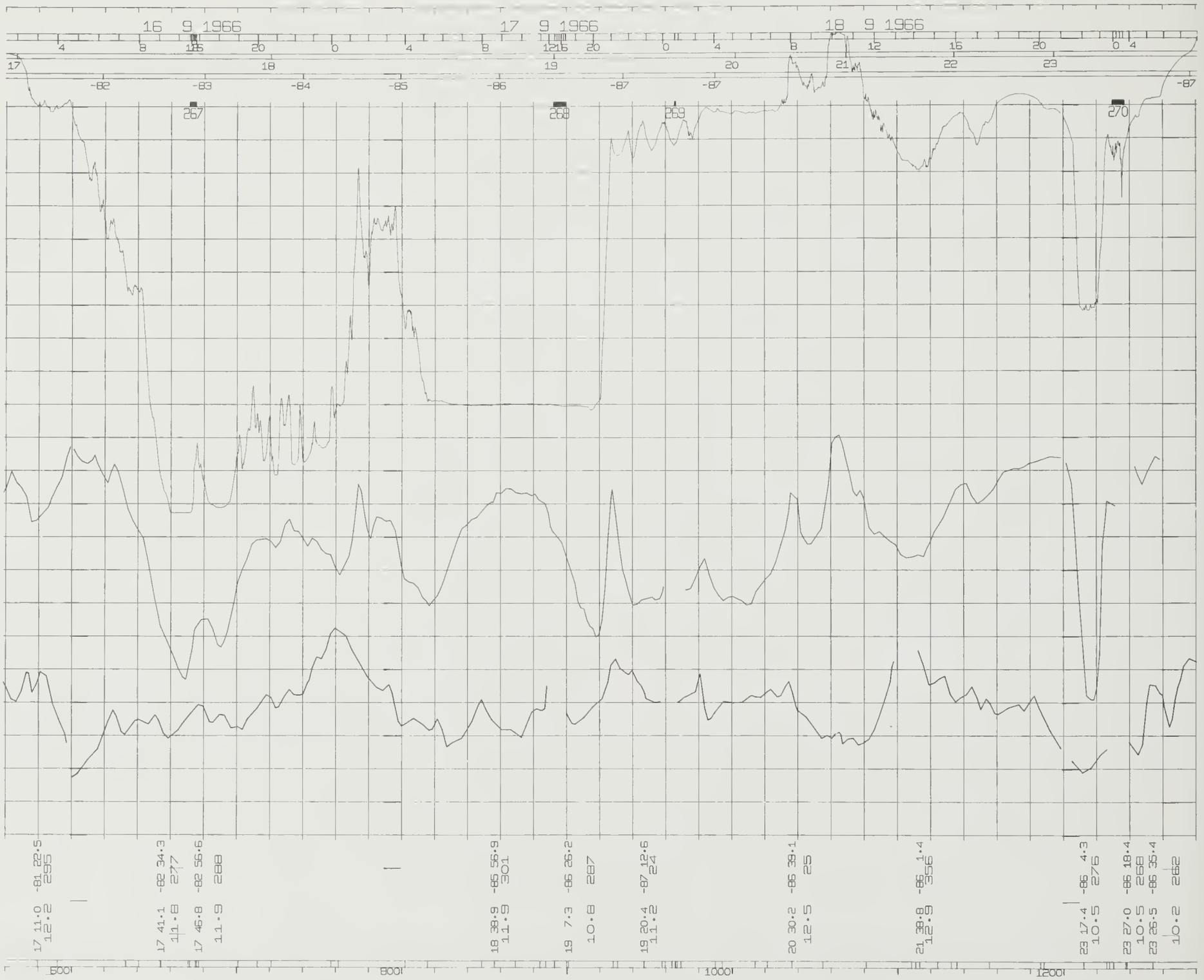

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19 21.9 -87 4.5 150 10.2
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17 22.0 -86 15.4 305 12.0
17 45.4 -86 50.0 92 9.4
17 43.5 -85 48.0 167 10.7
17 12.0 -85 40.7 184 10.6
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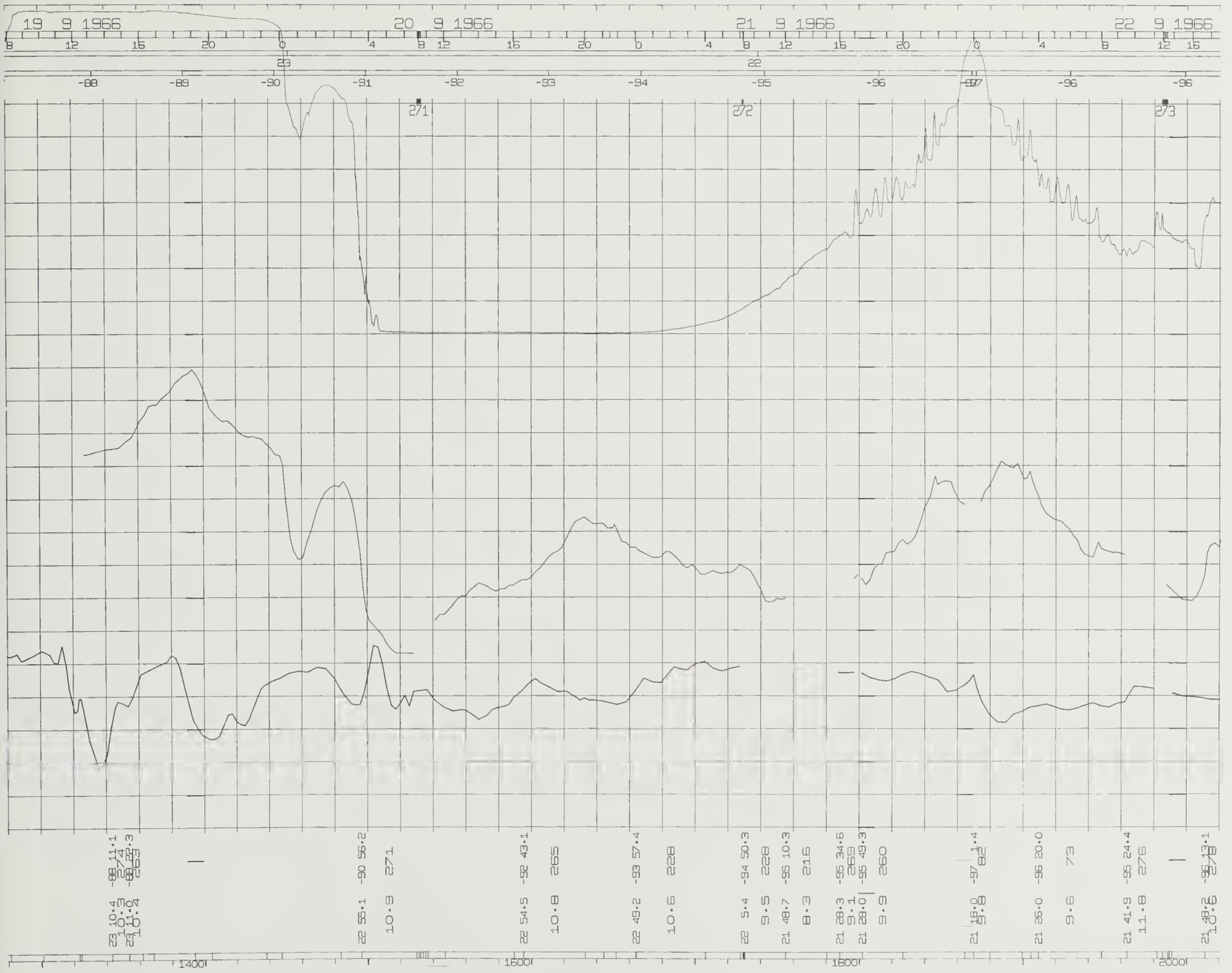

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9·9 29
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18 4·5 -80 38·5
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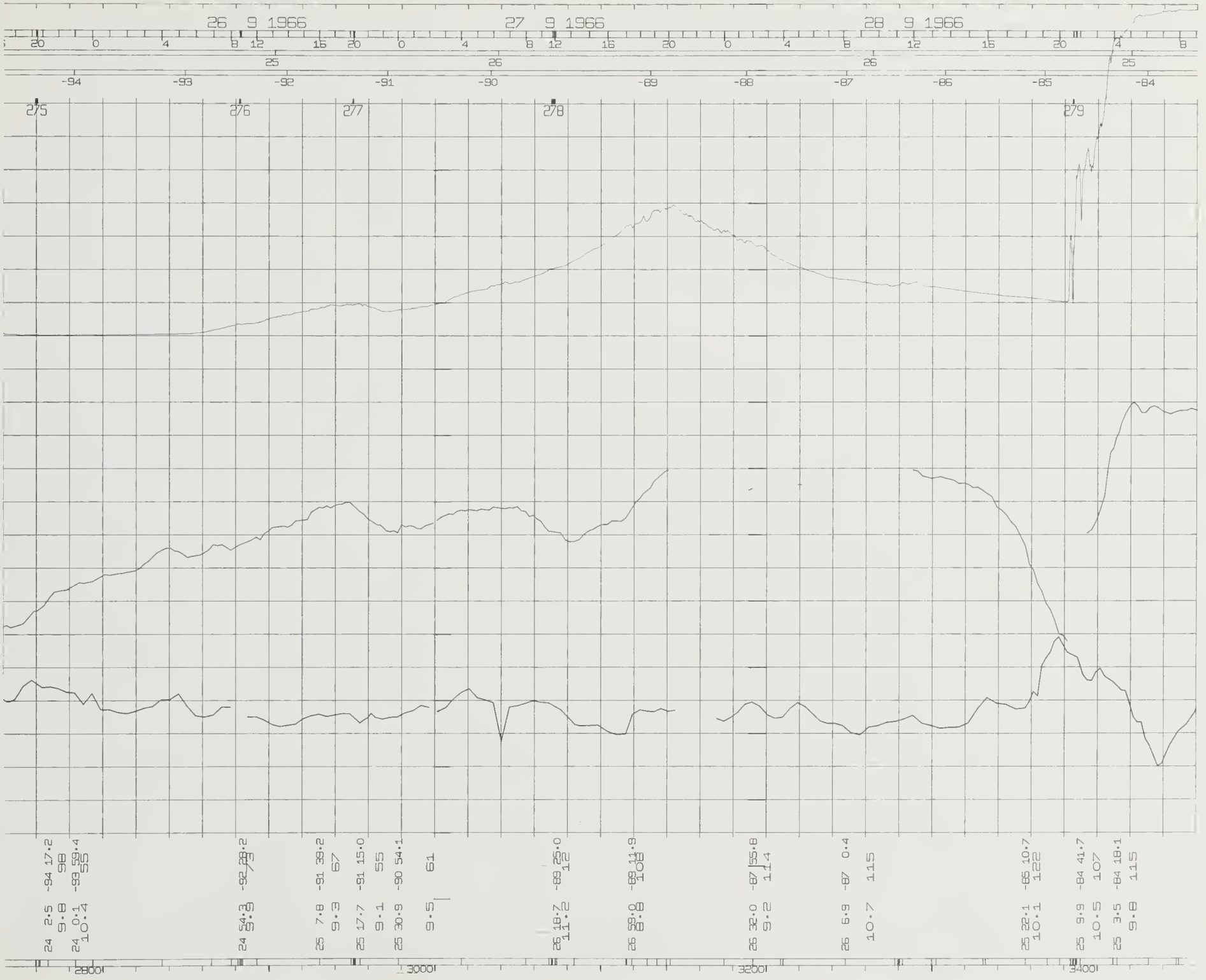

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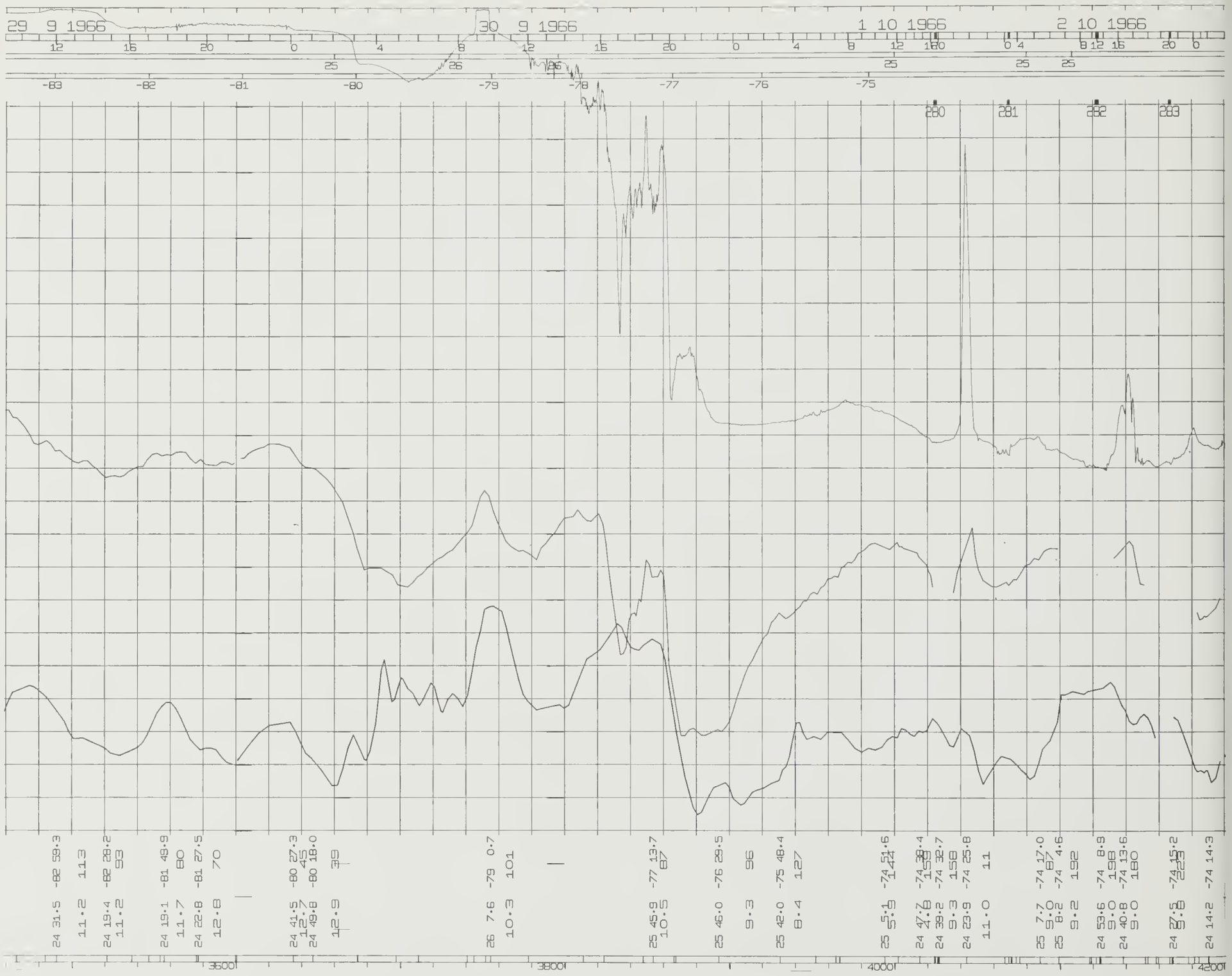

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11·4 343
9 45·5 -80 1·0
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6·0 350
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12 8·0 -81 15·8
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12 17·6 -81 6·2
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12 27·5 -81 6·8
11·1 328
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11·9 267
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13 28·5 -81 39·3
10·3 9
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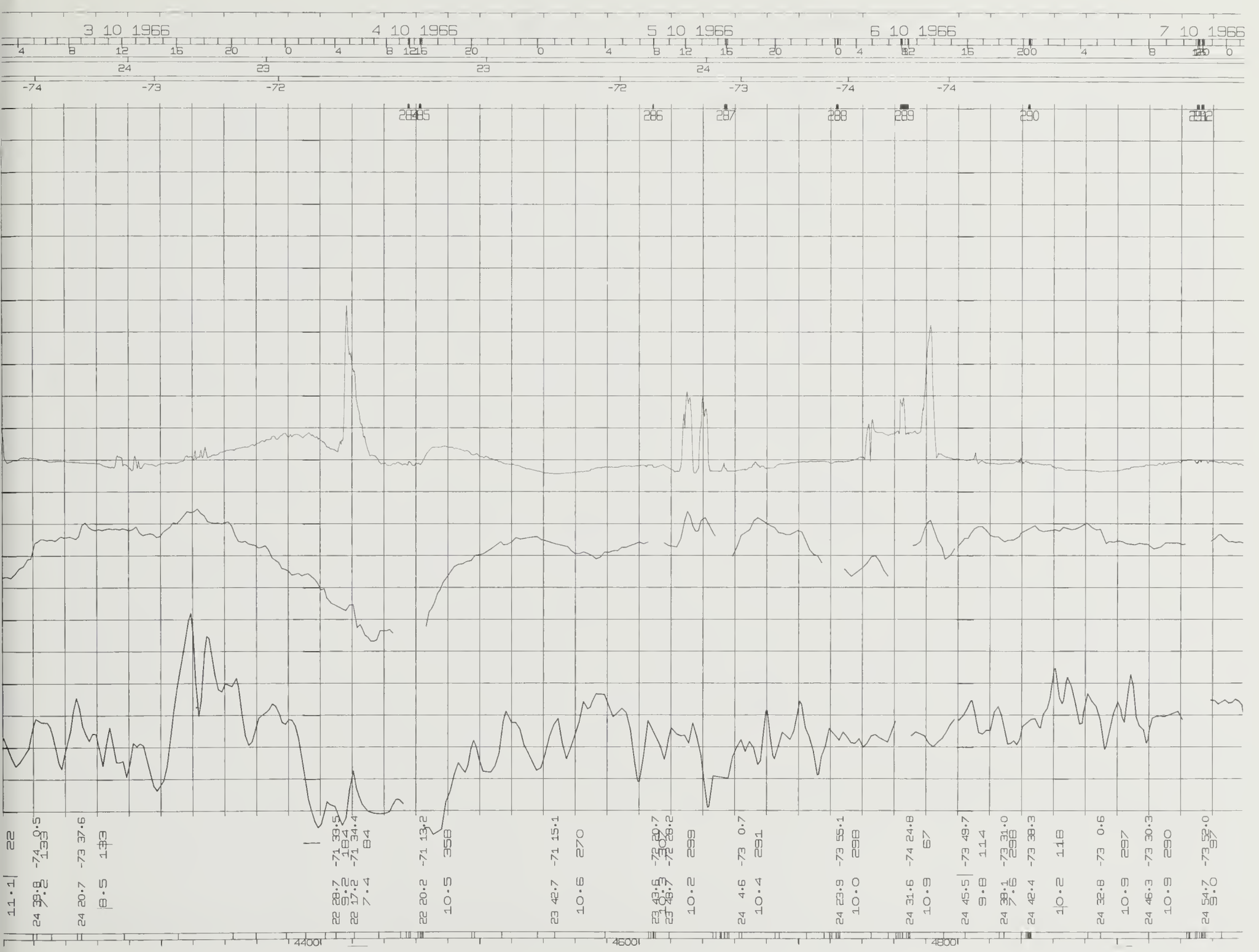

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19 7·3 -86 26·2 287 10·8
19 20·4 -87 12·6 24 11·2
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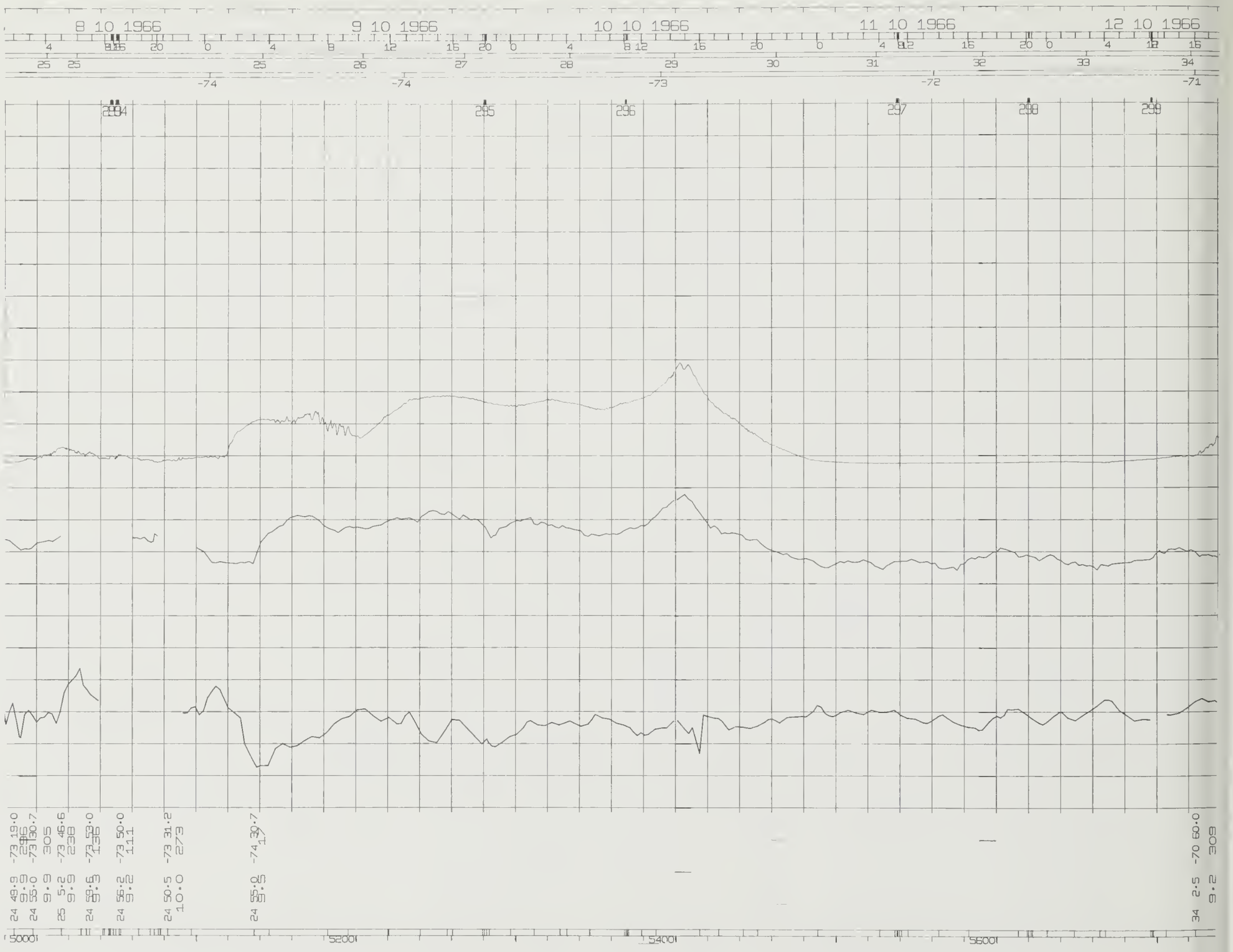

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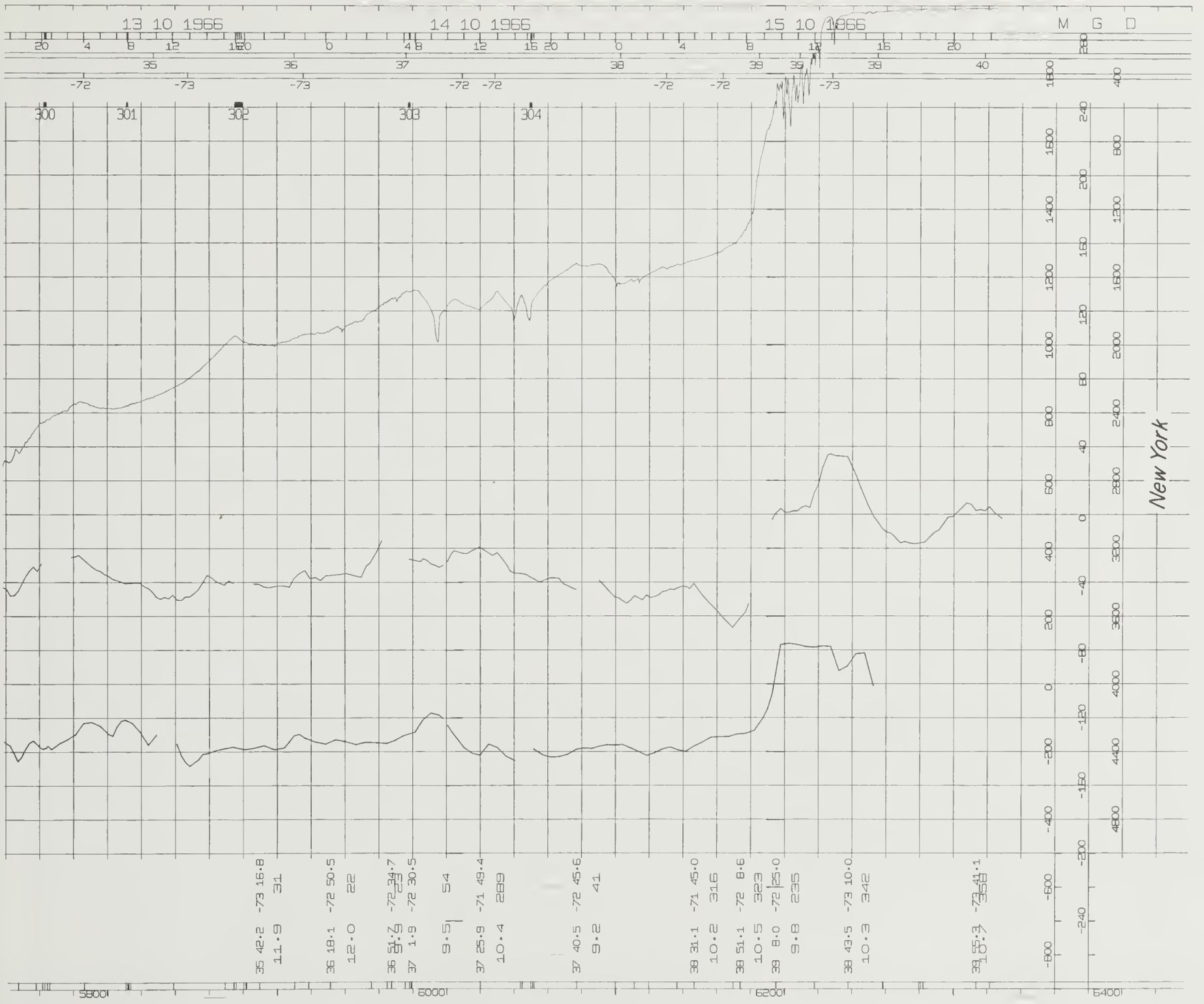

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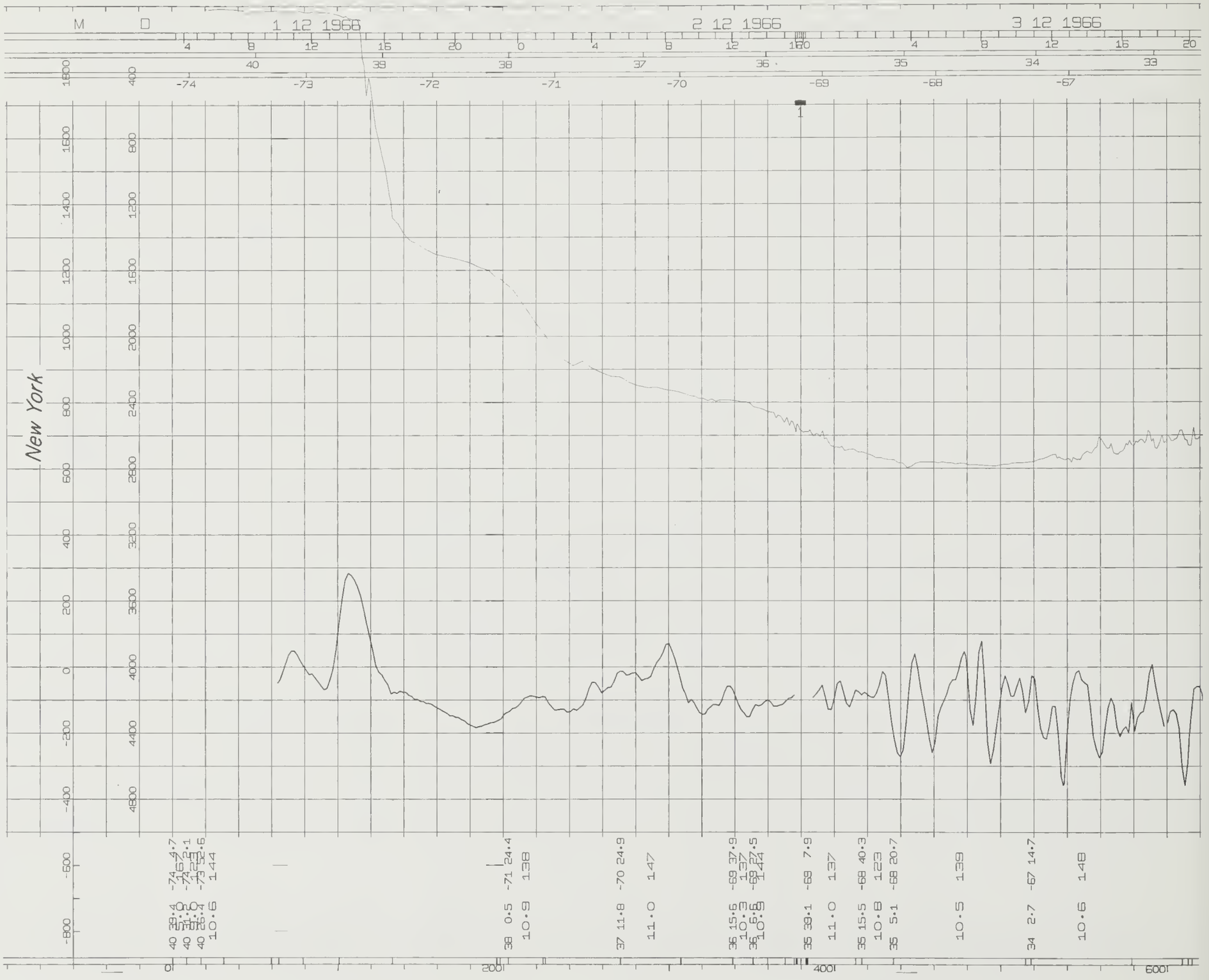

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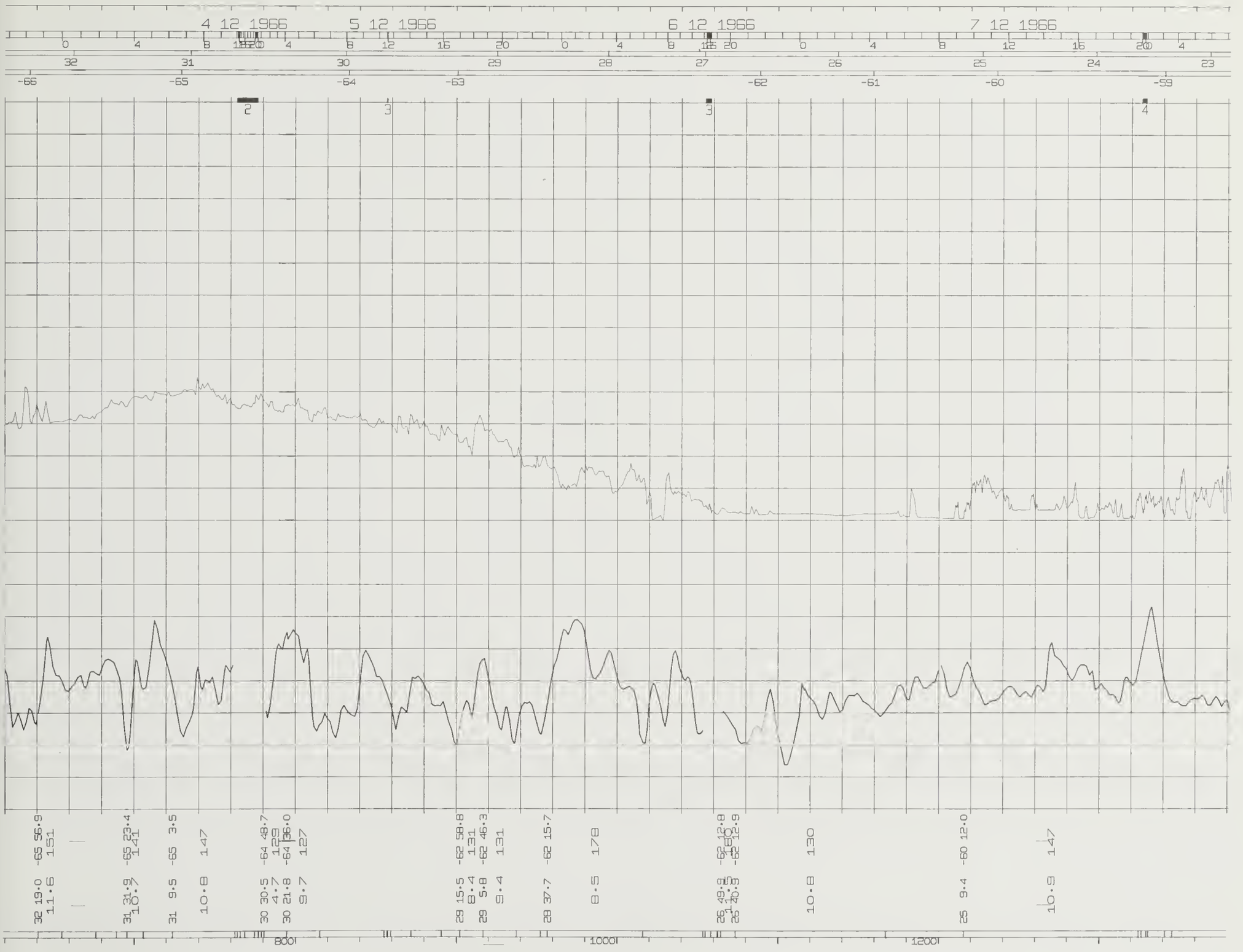

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8 10 1966
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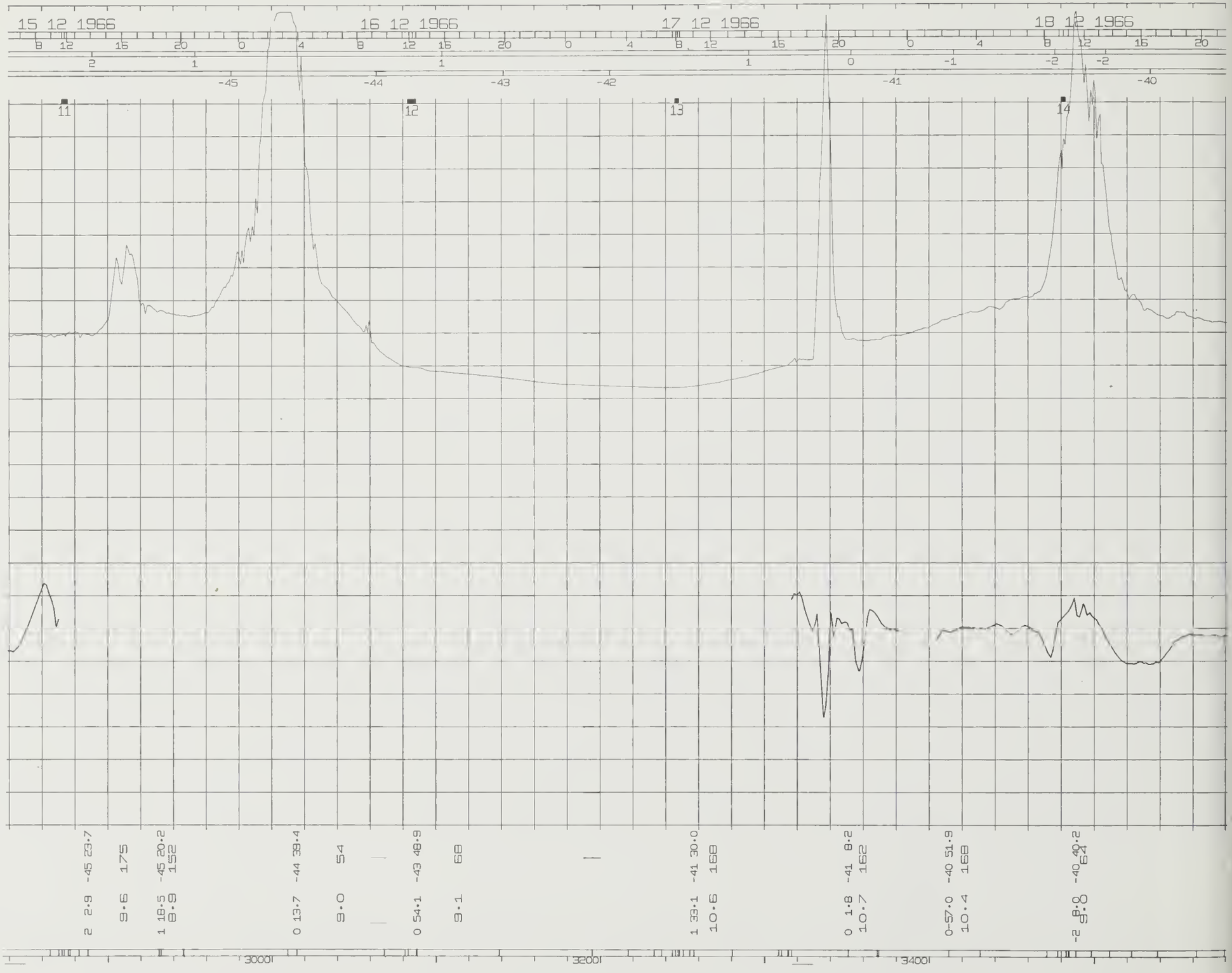

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M D
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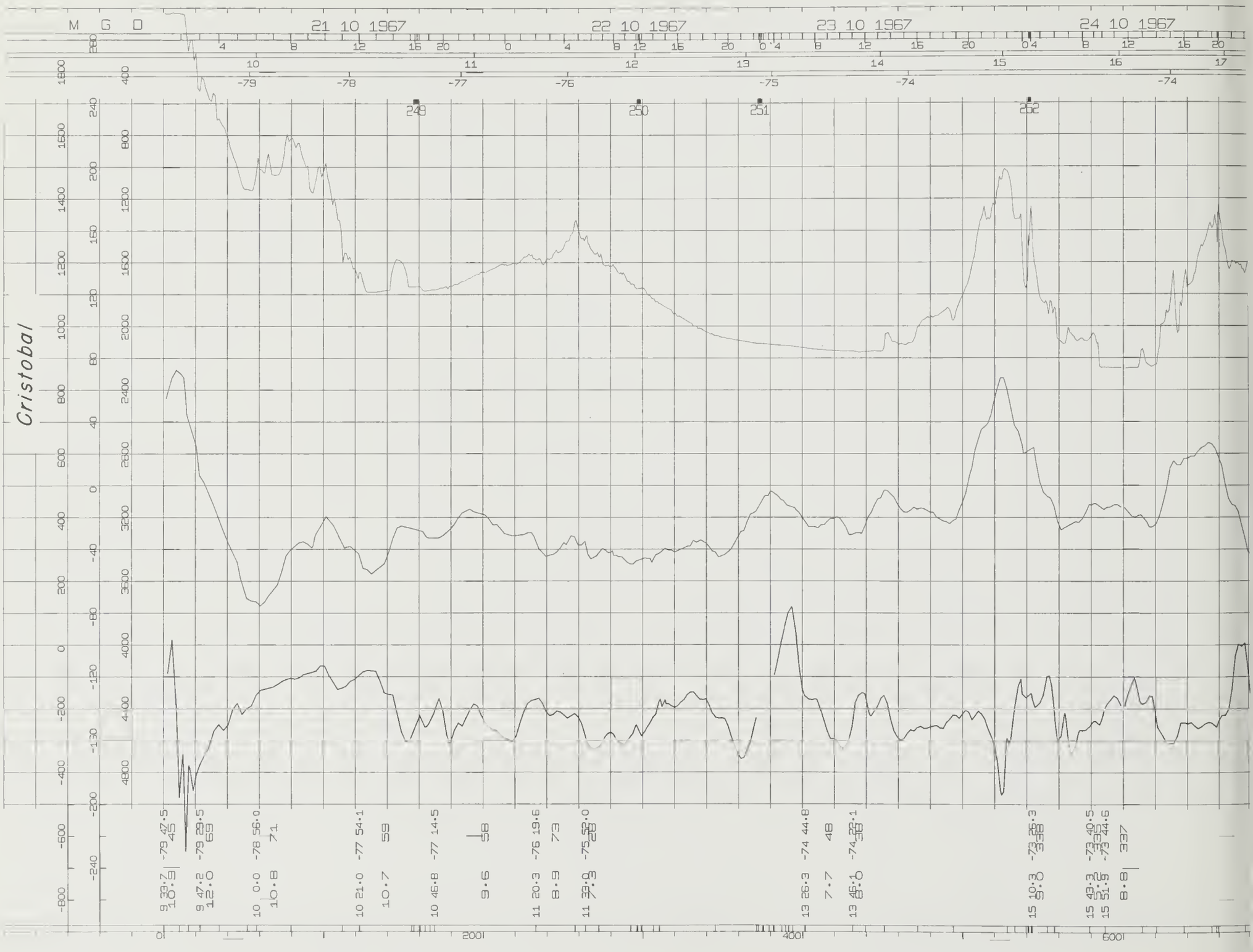

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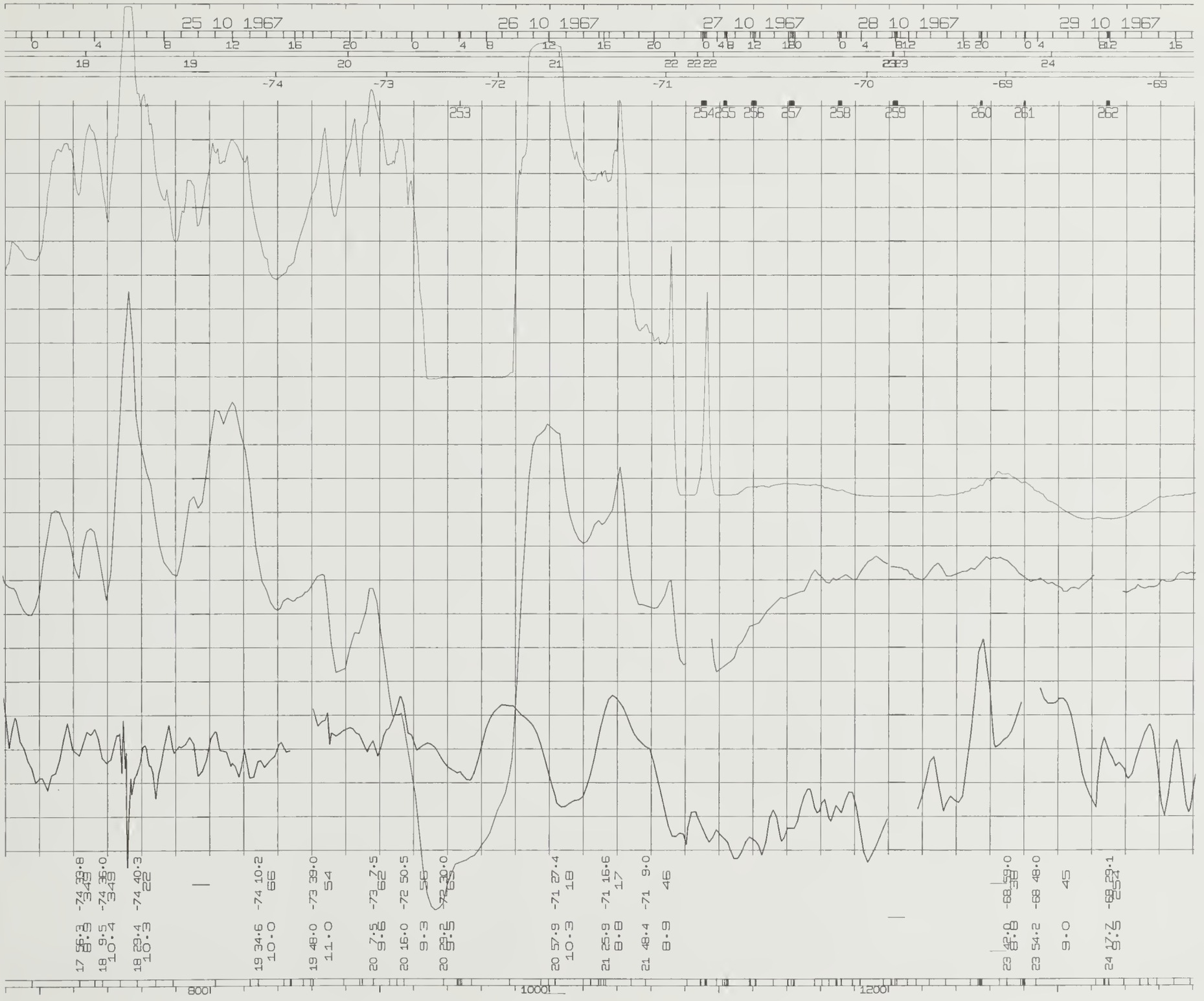

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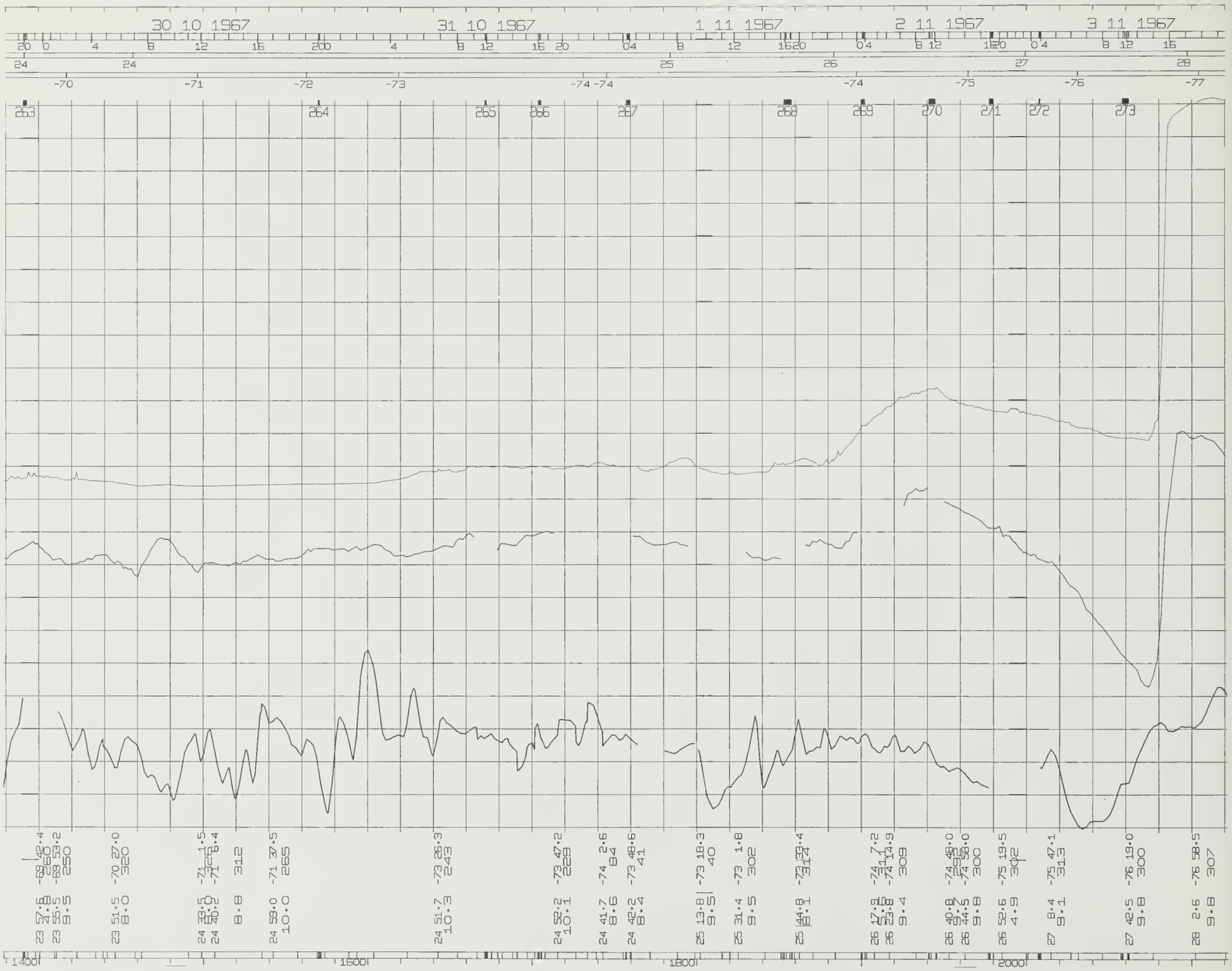

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12·0
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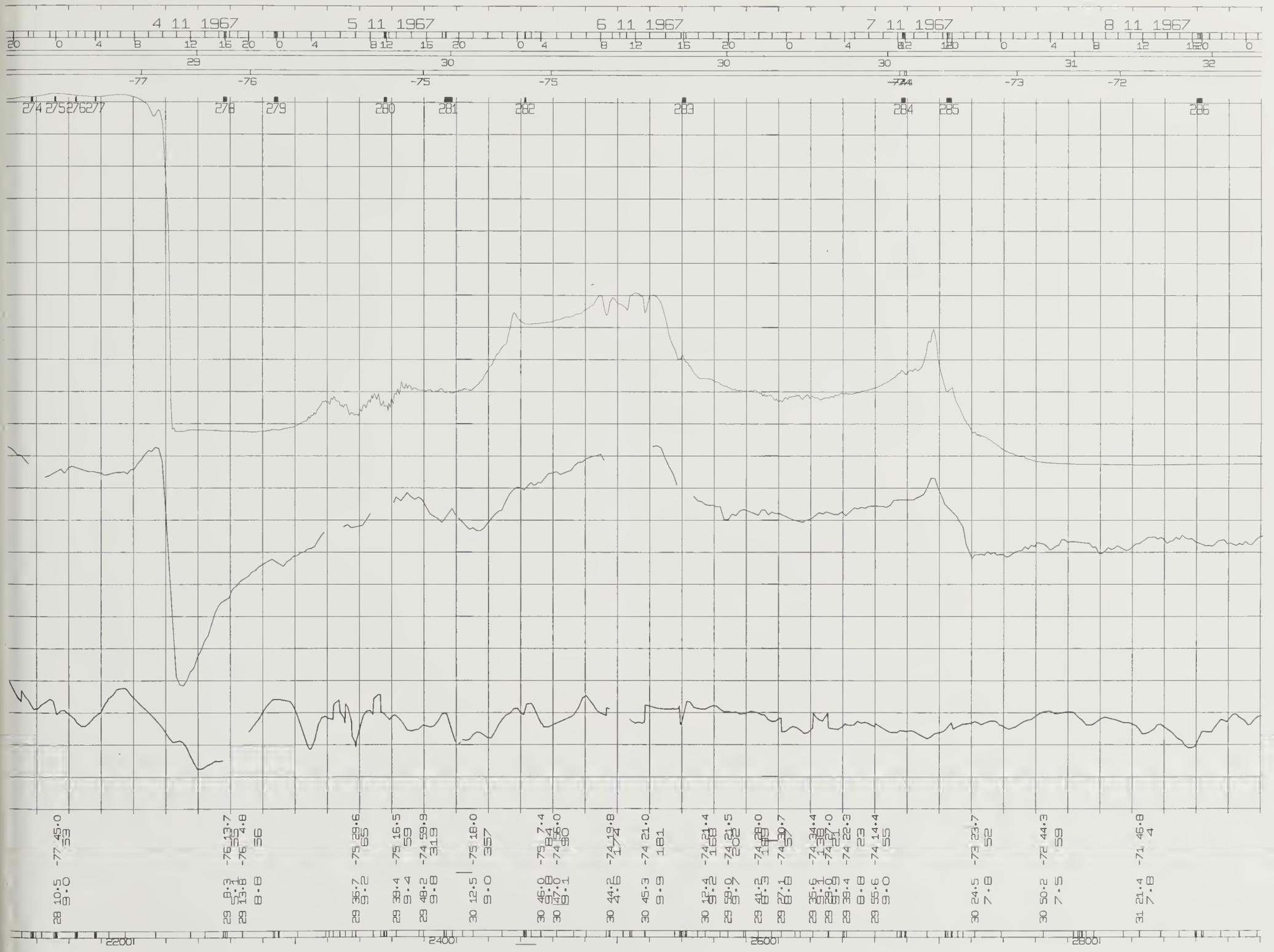

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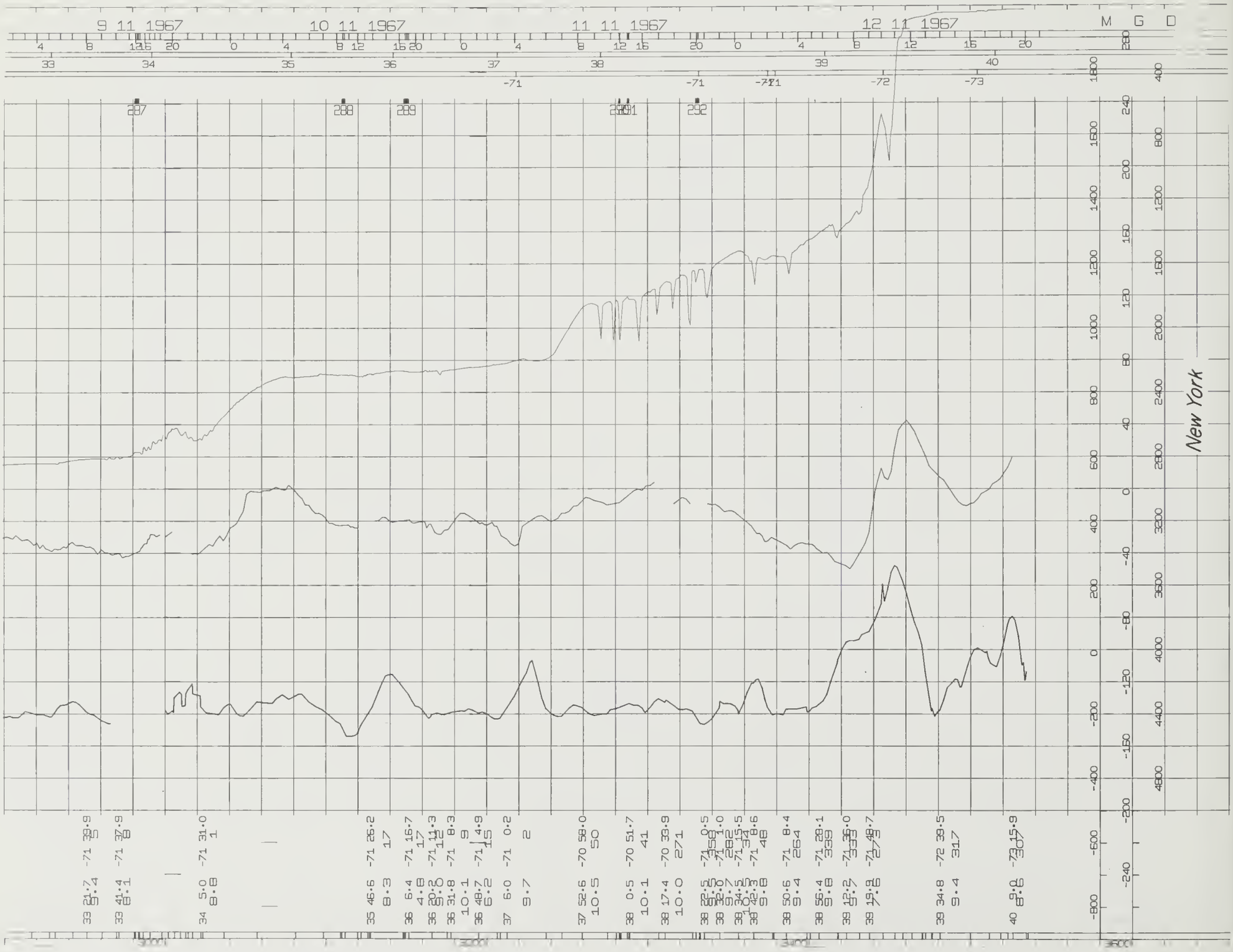

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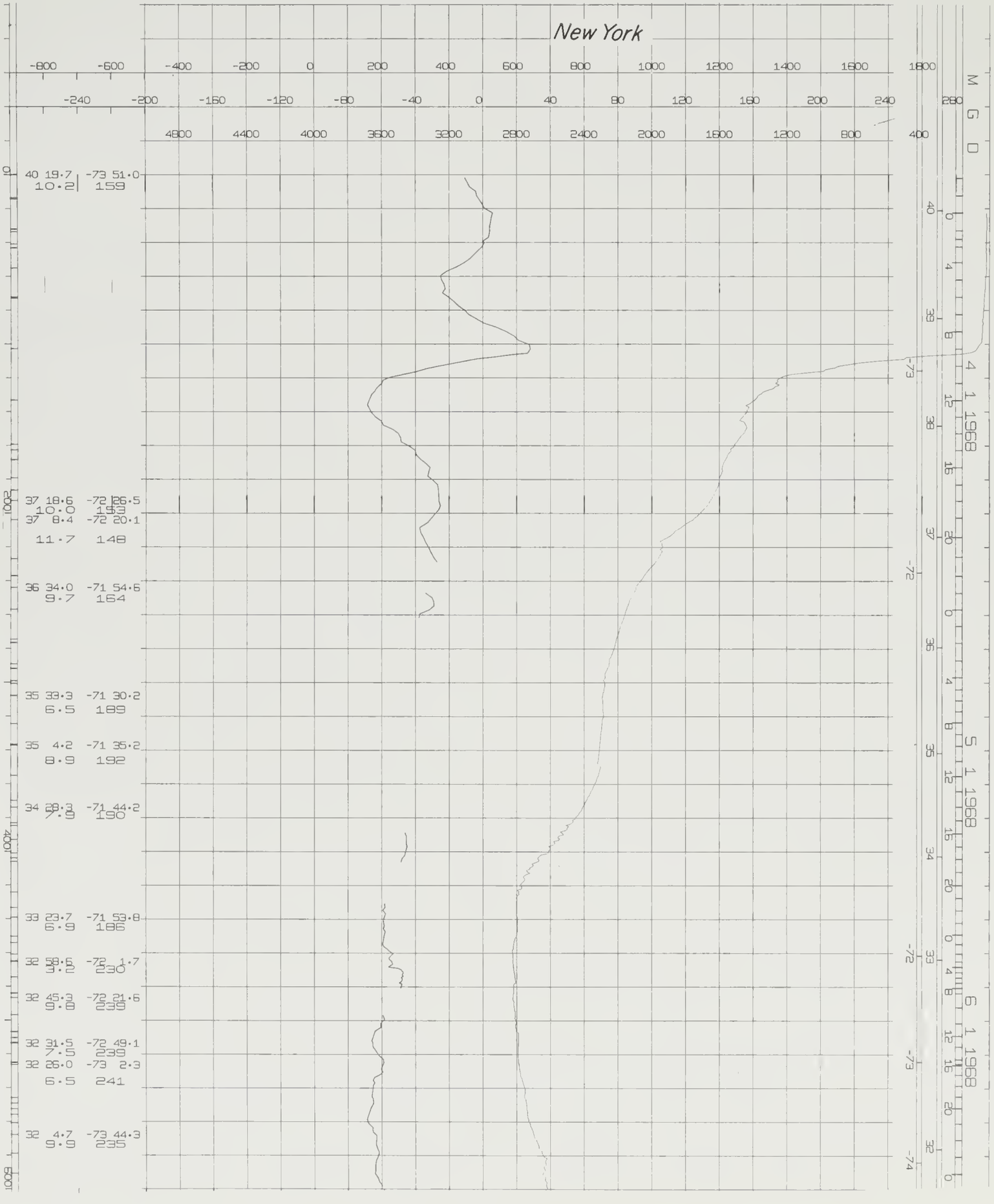

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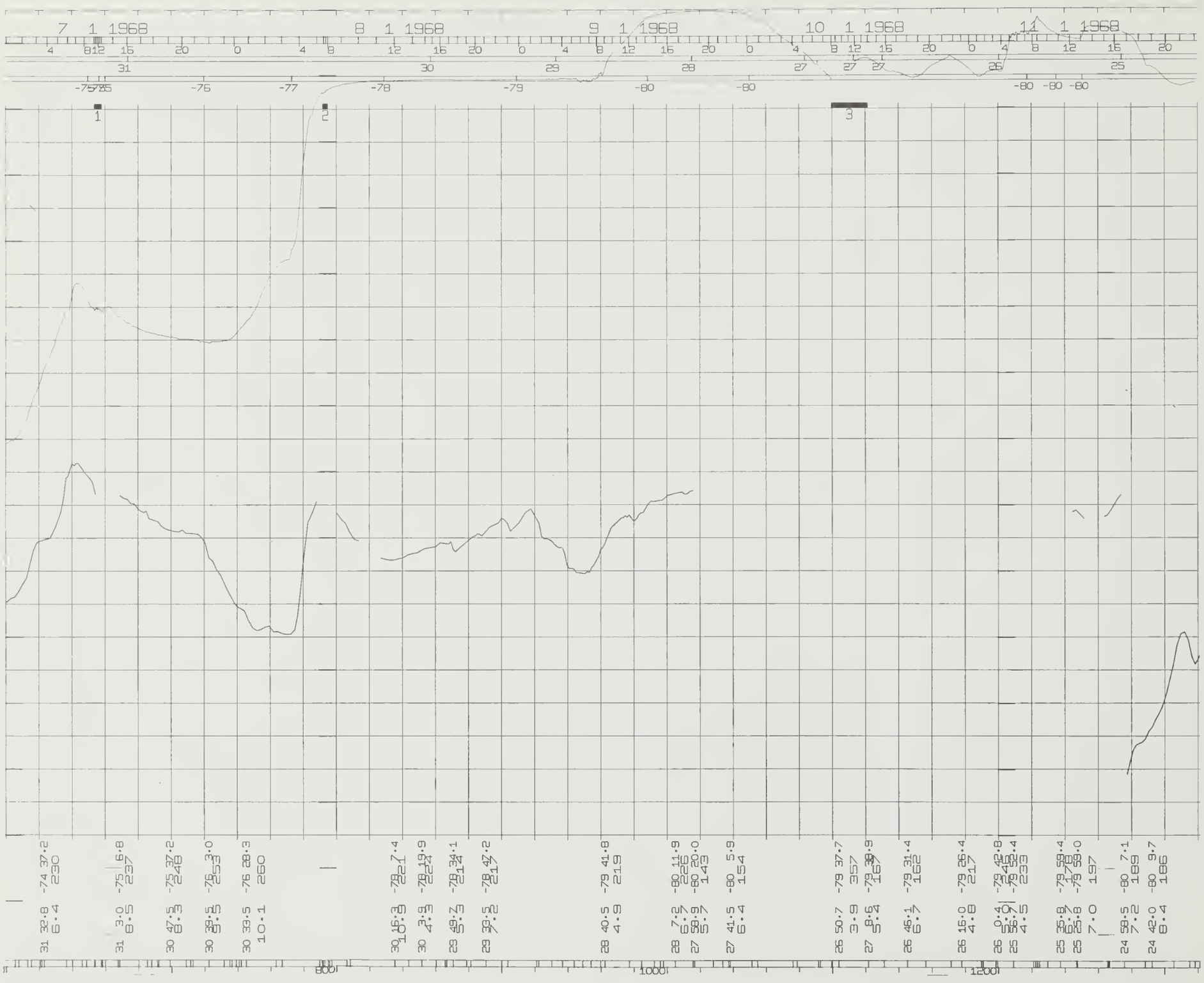

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3 11 1967
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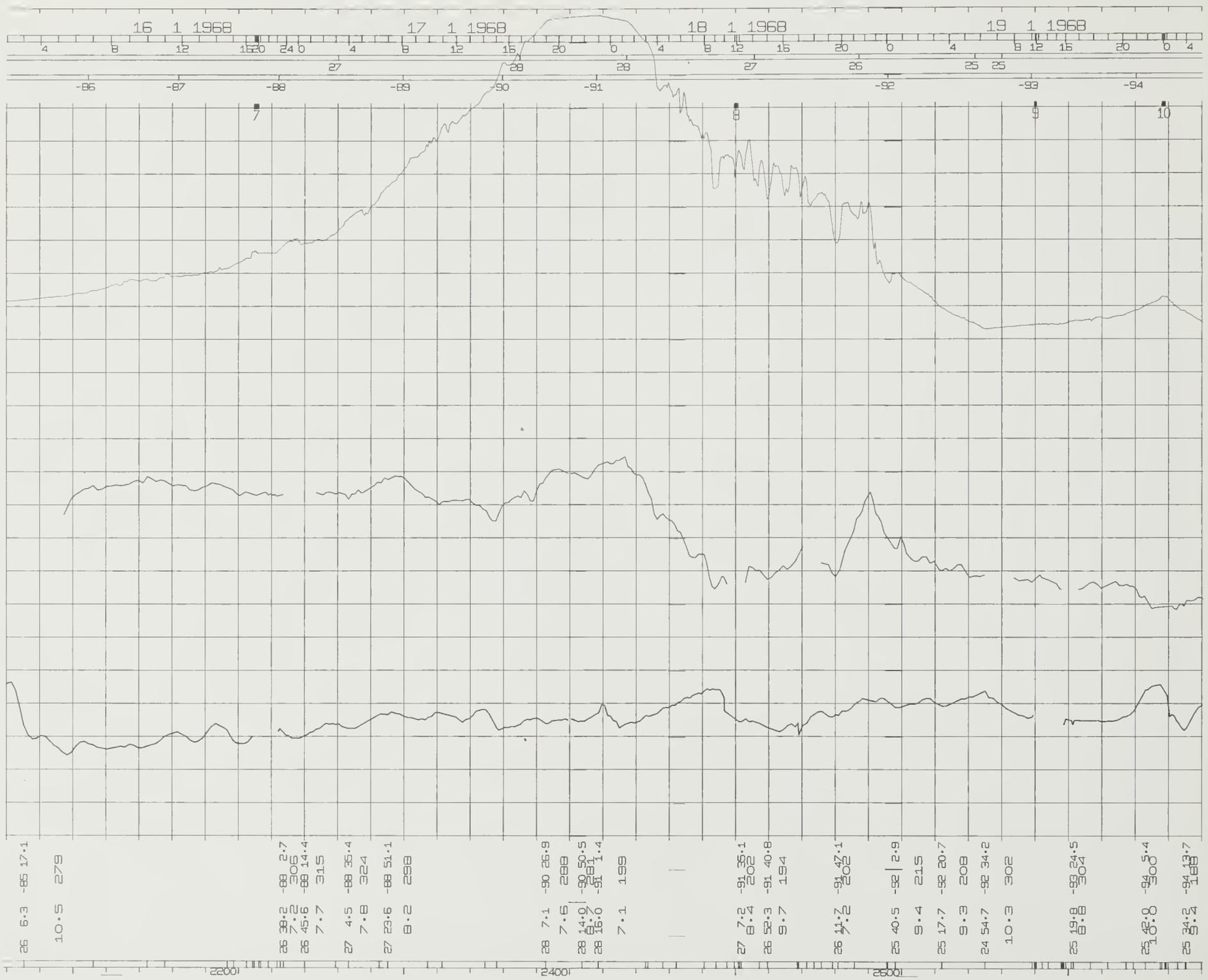

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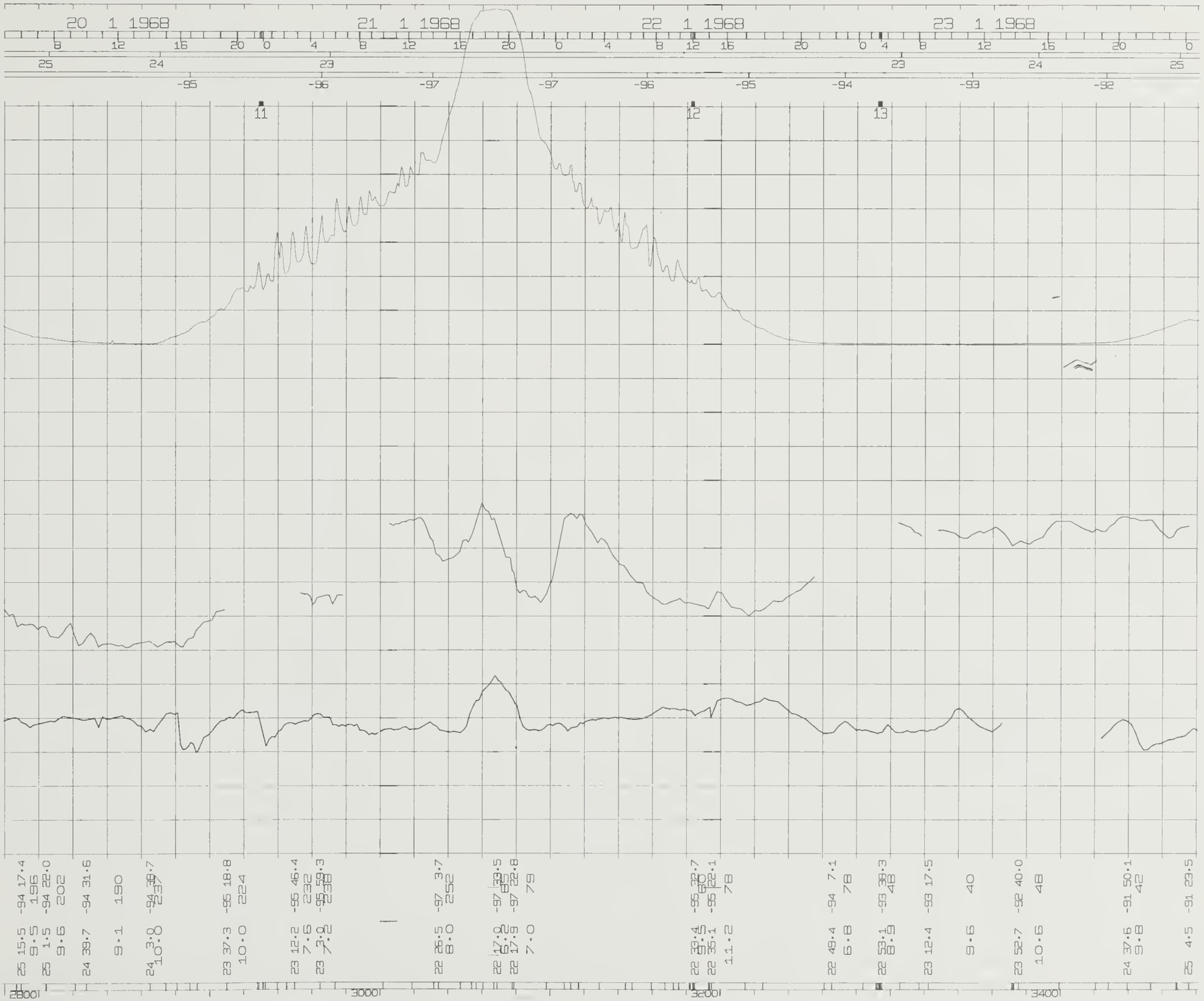

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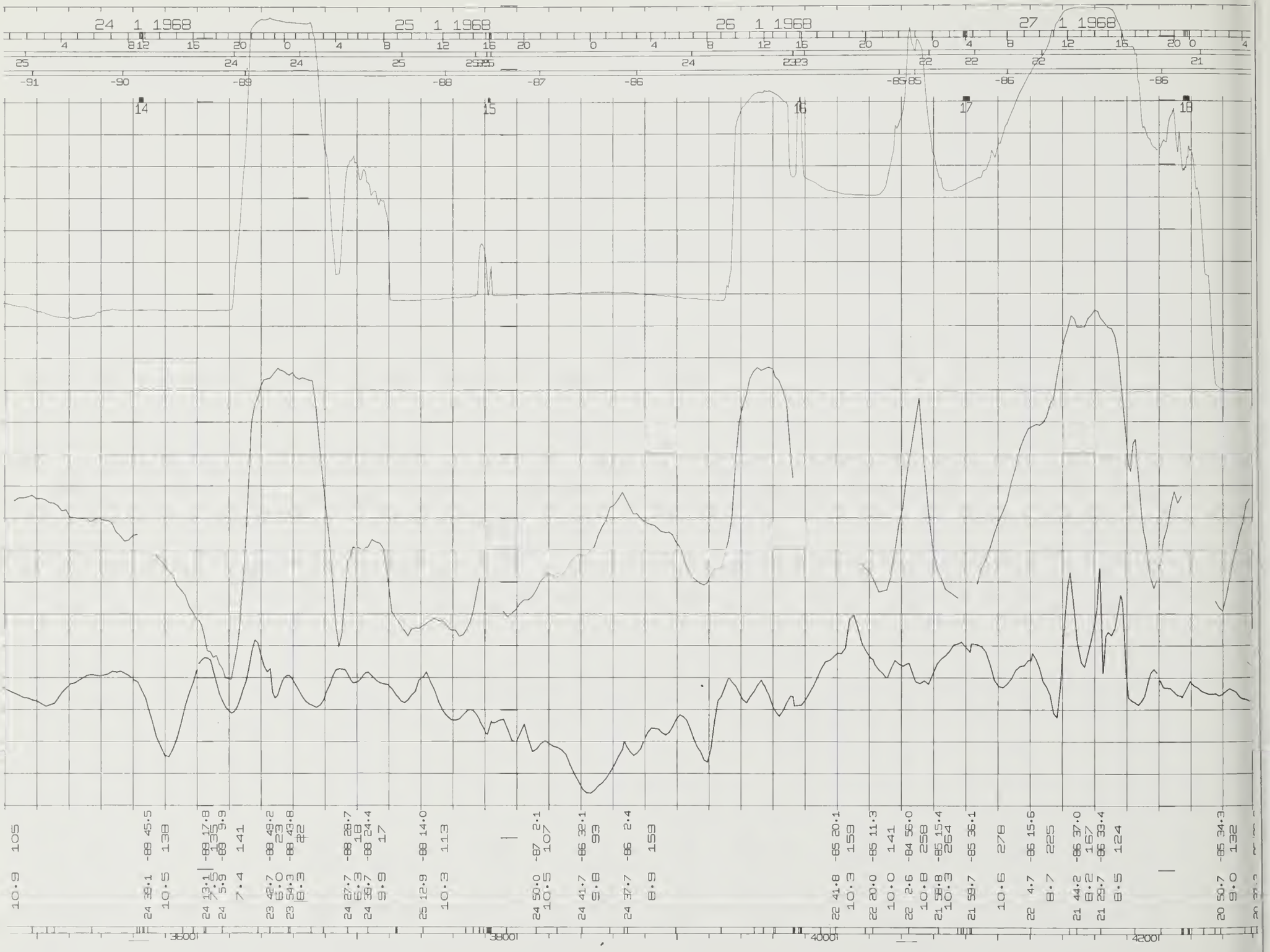

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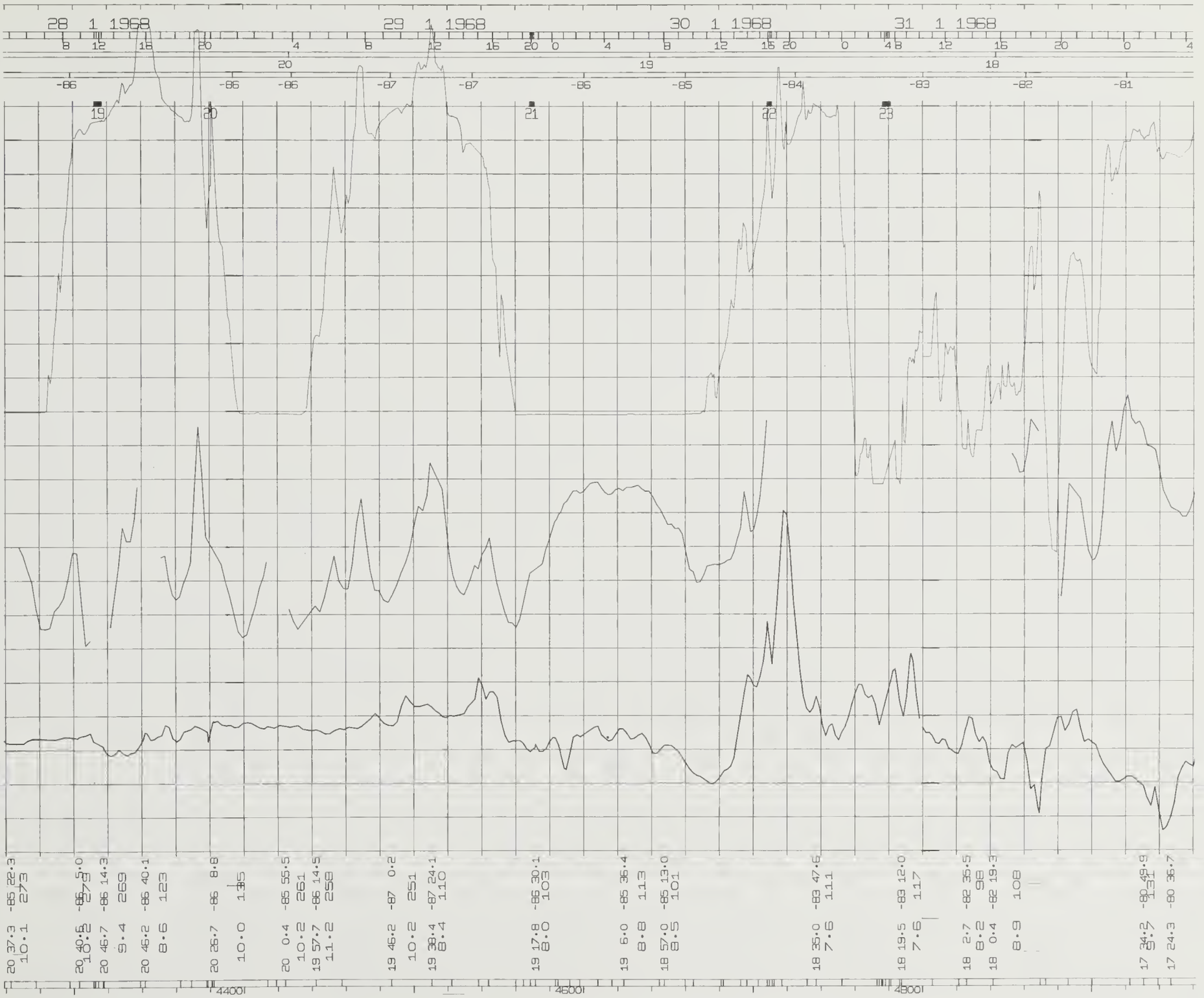

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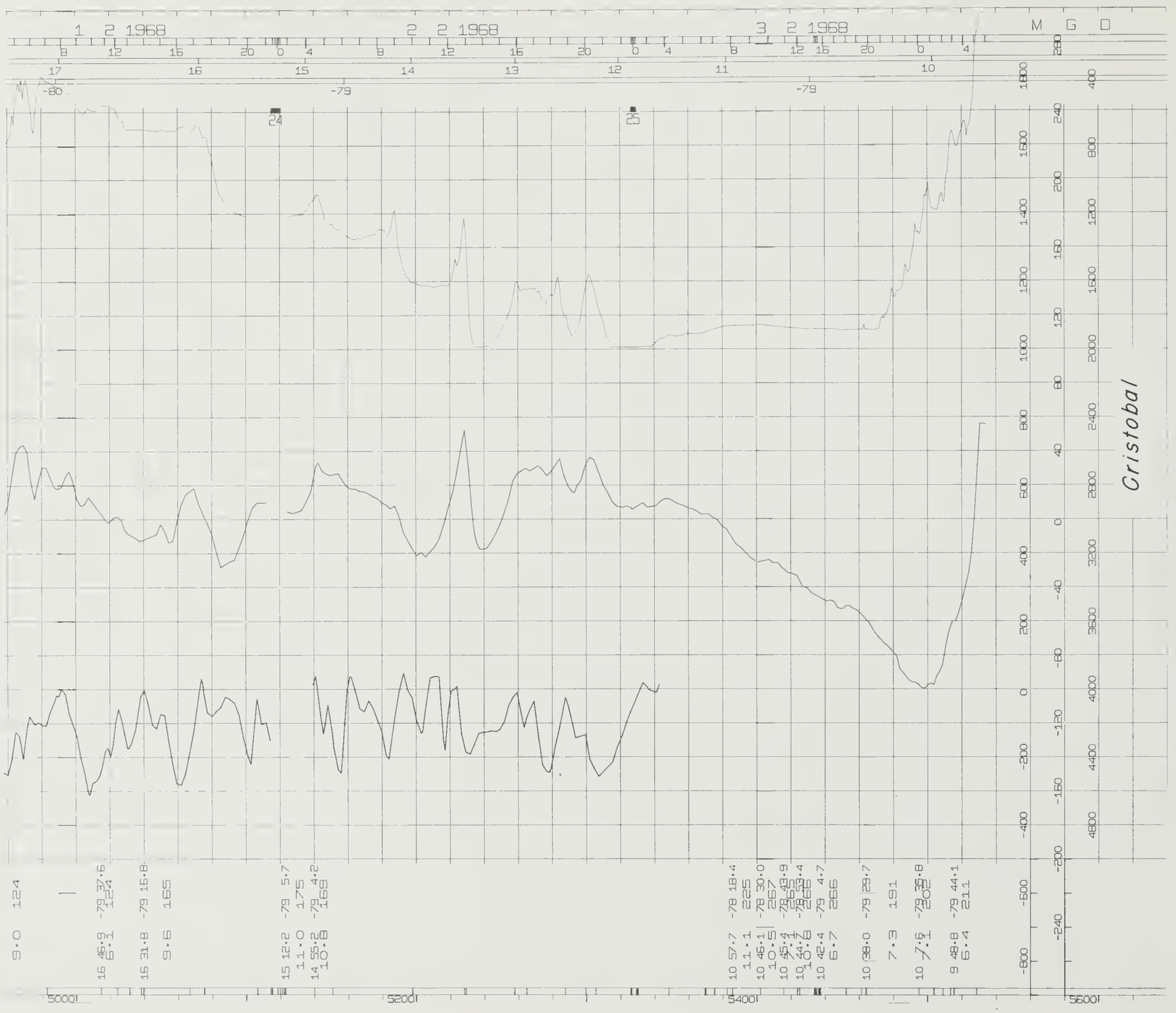

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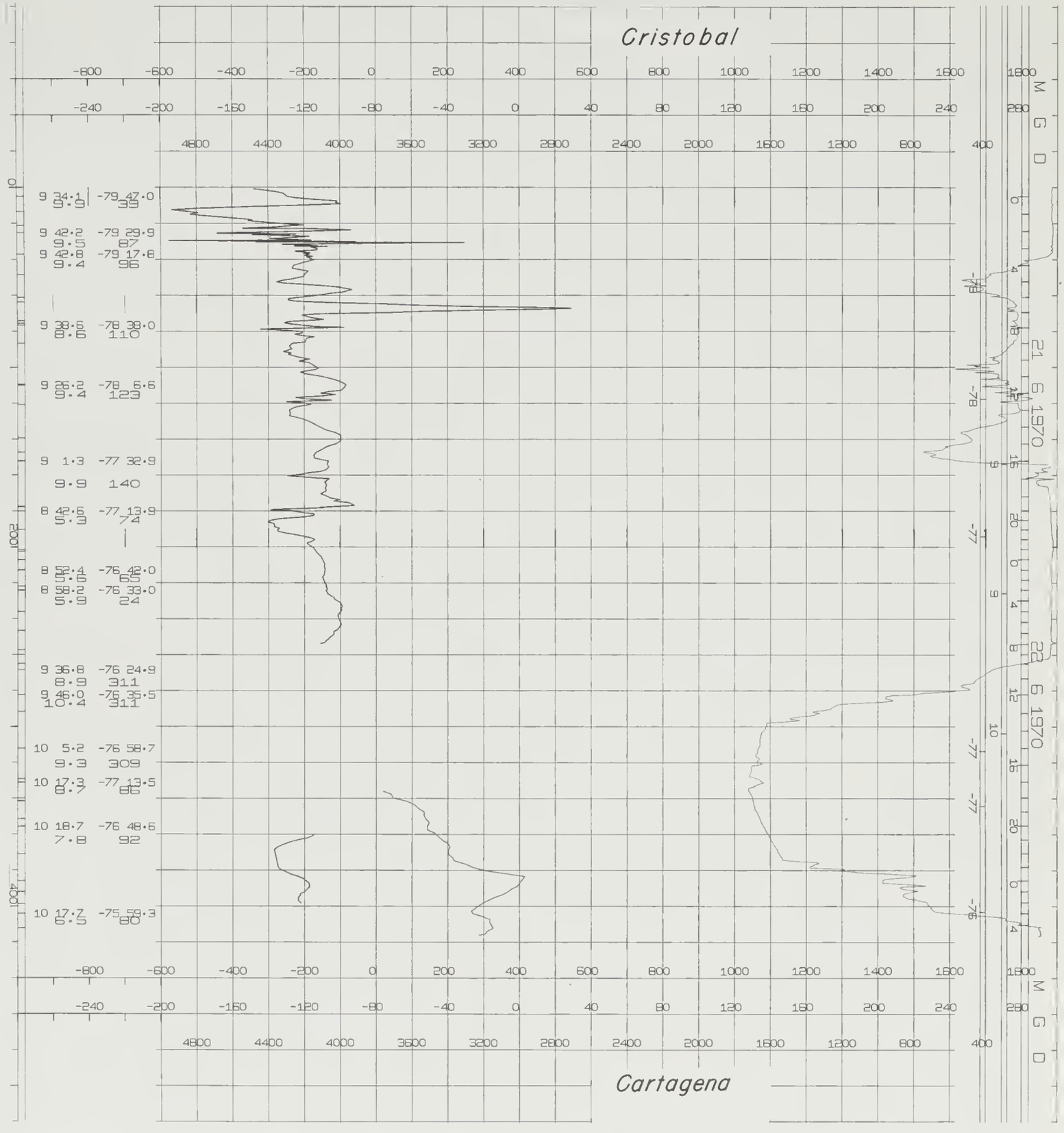

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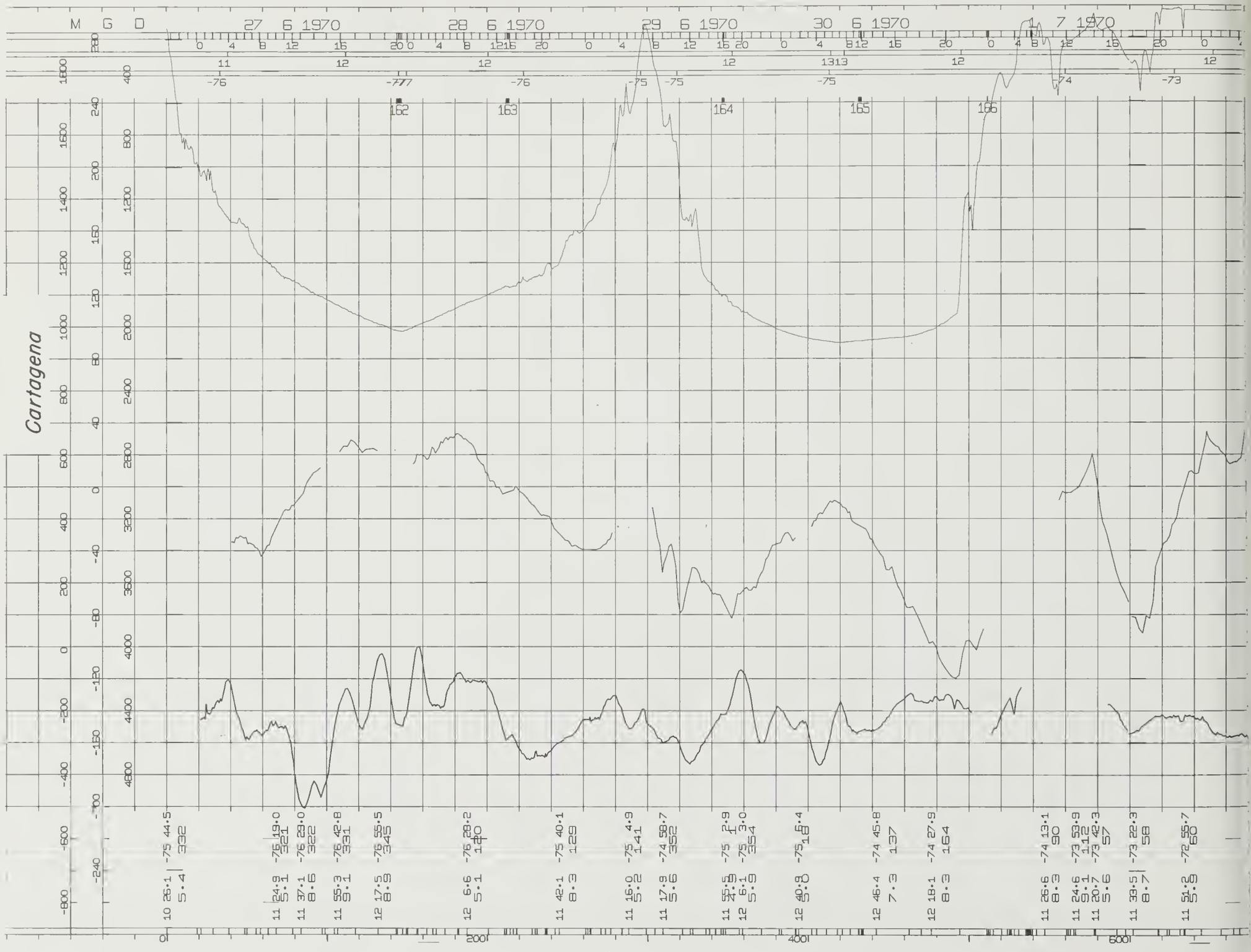

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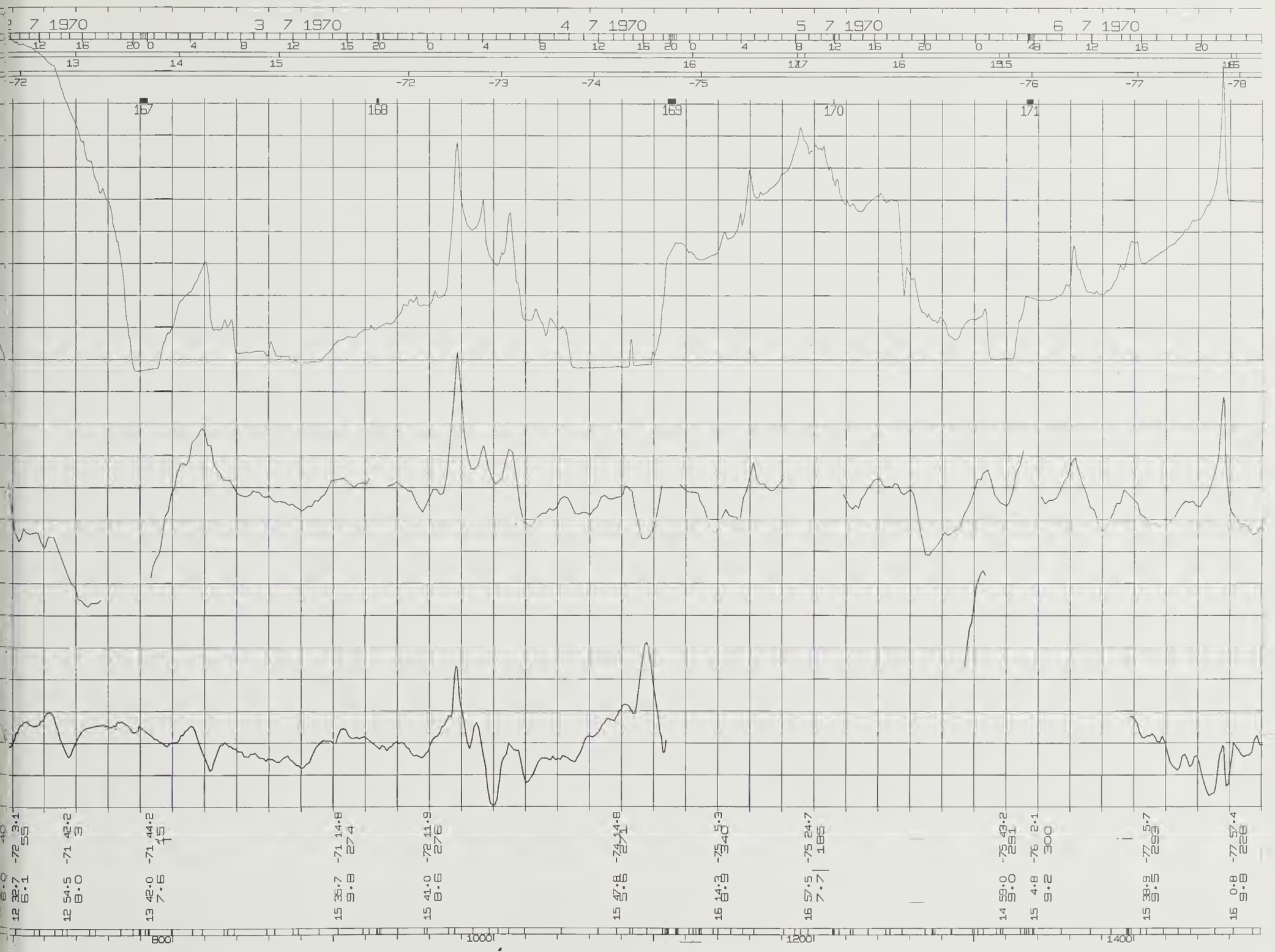

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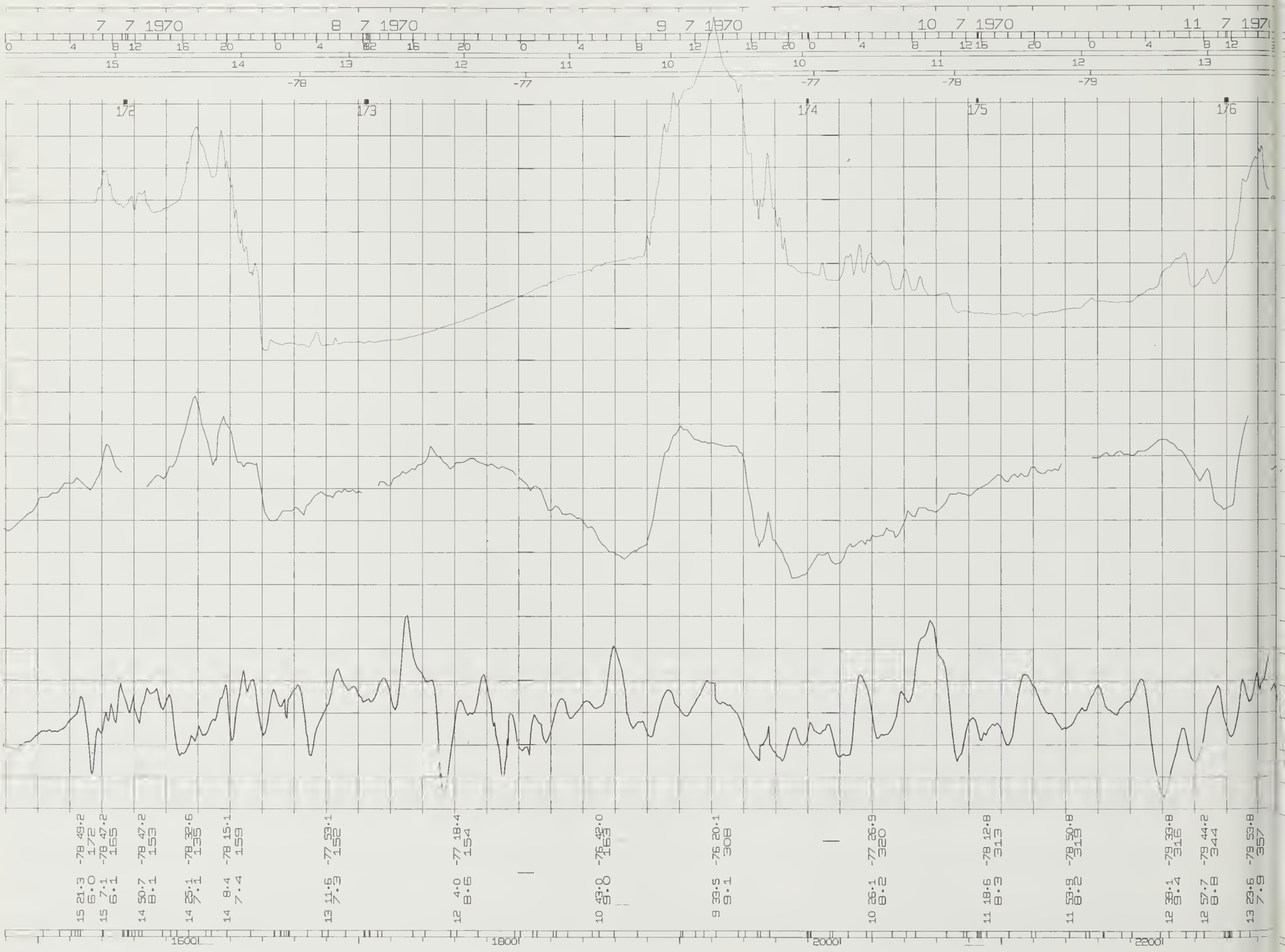

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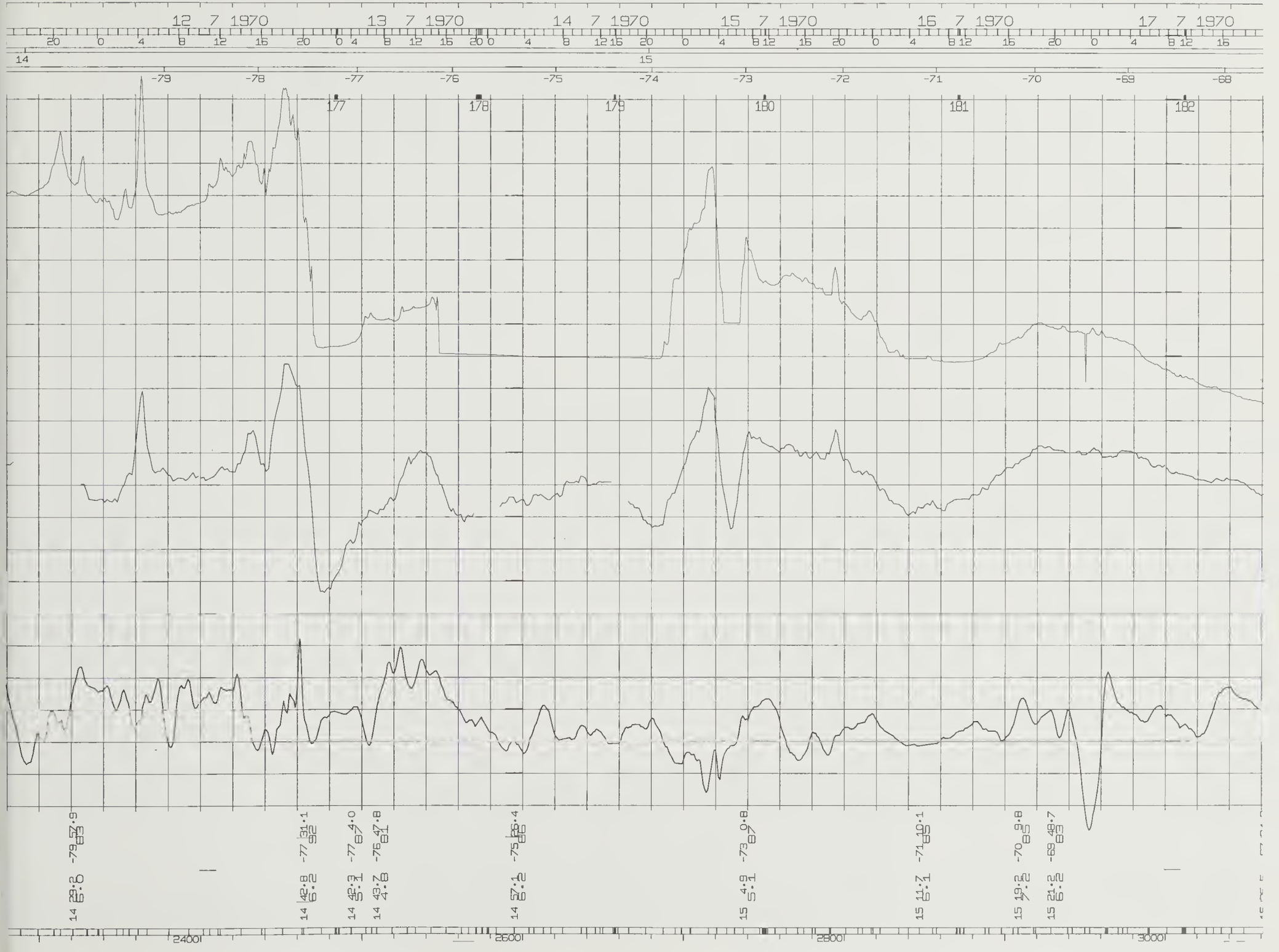

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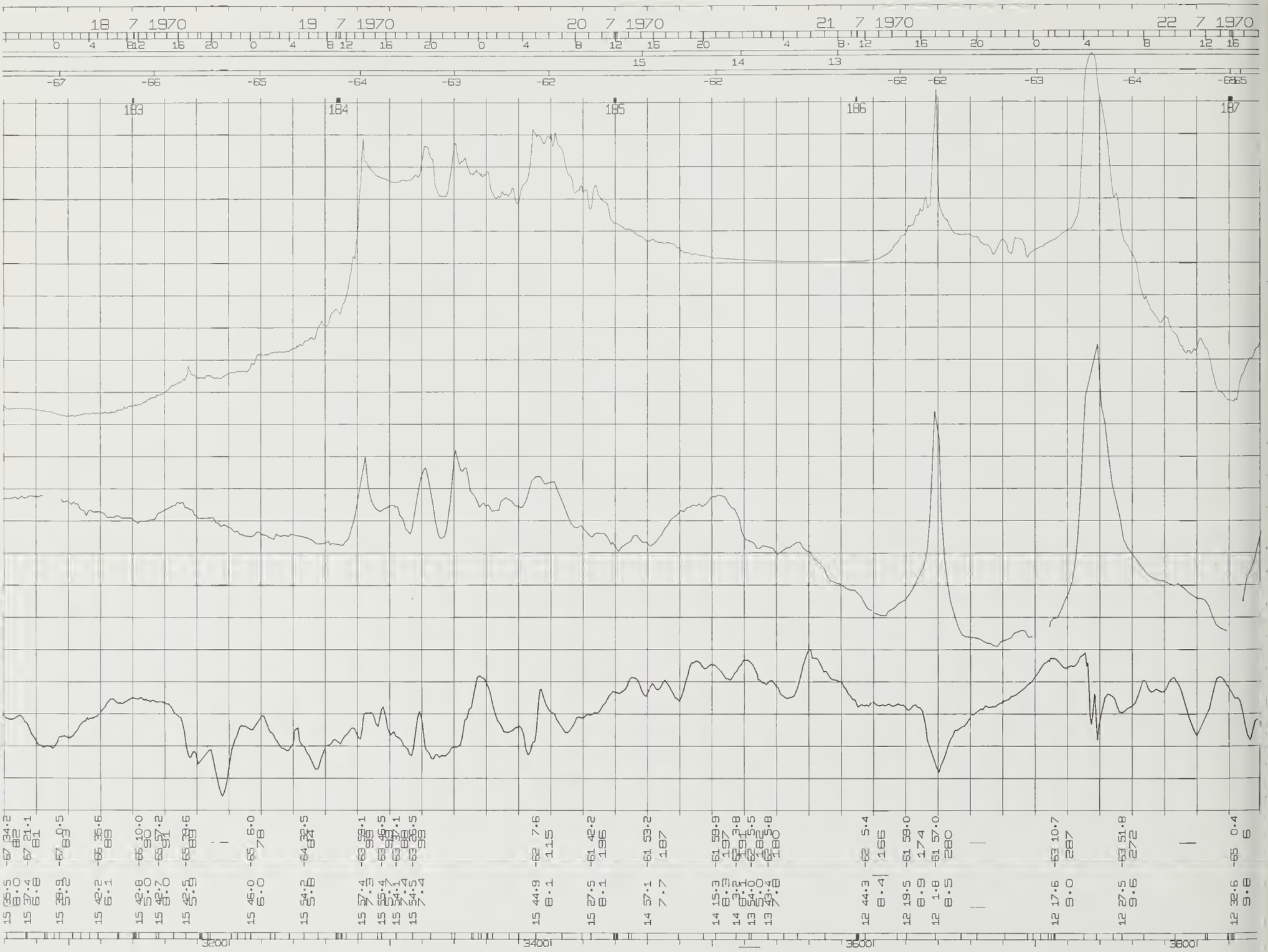

Cristobal
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9 42.2 -79 29.9
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9 42.8 -79 17.8
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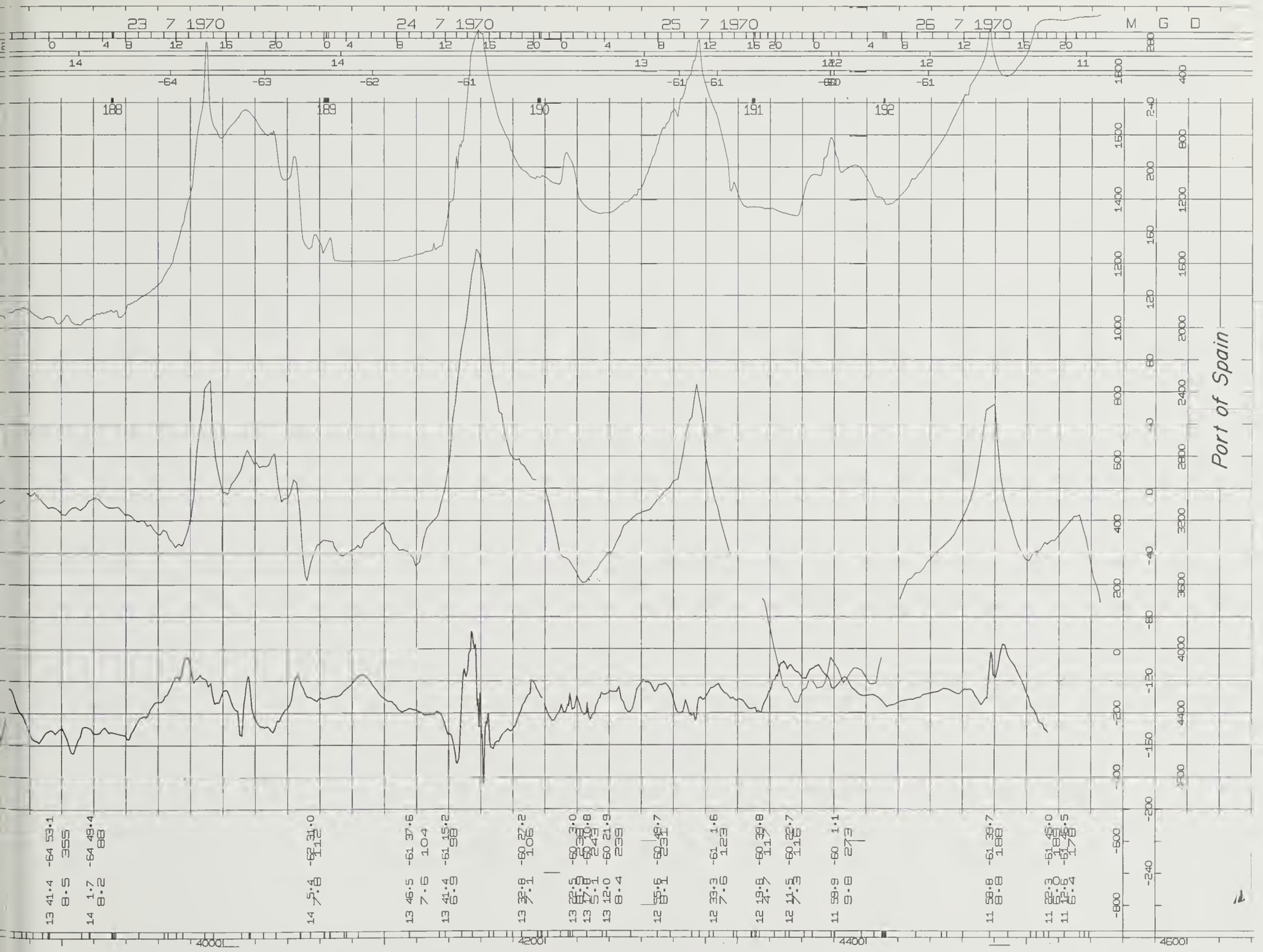

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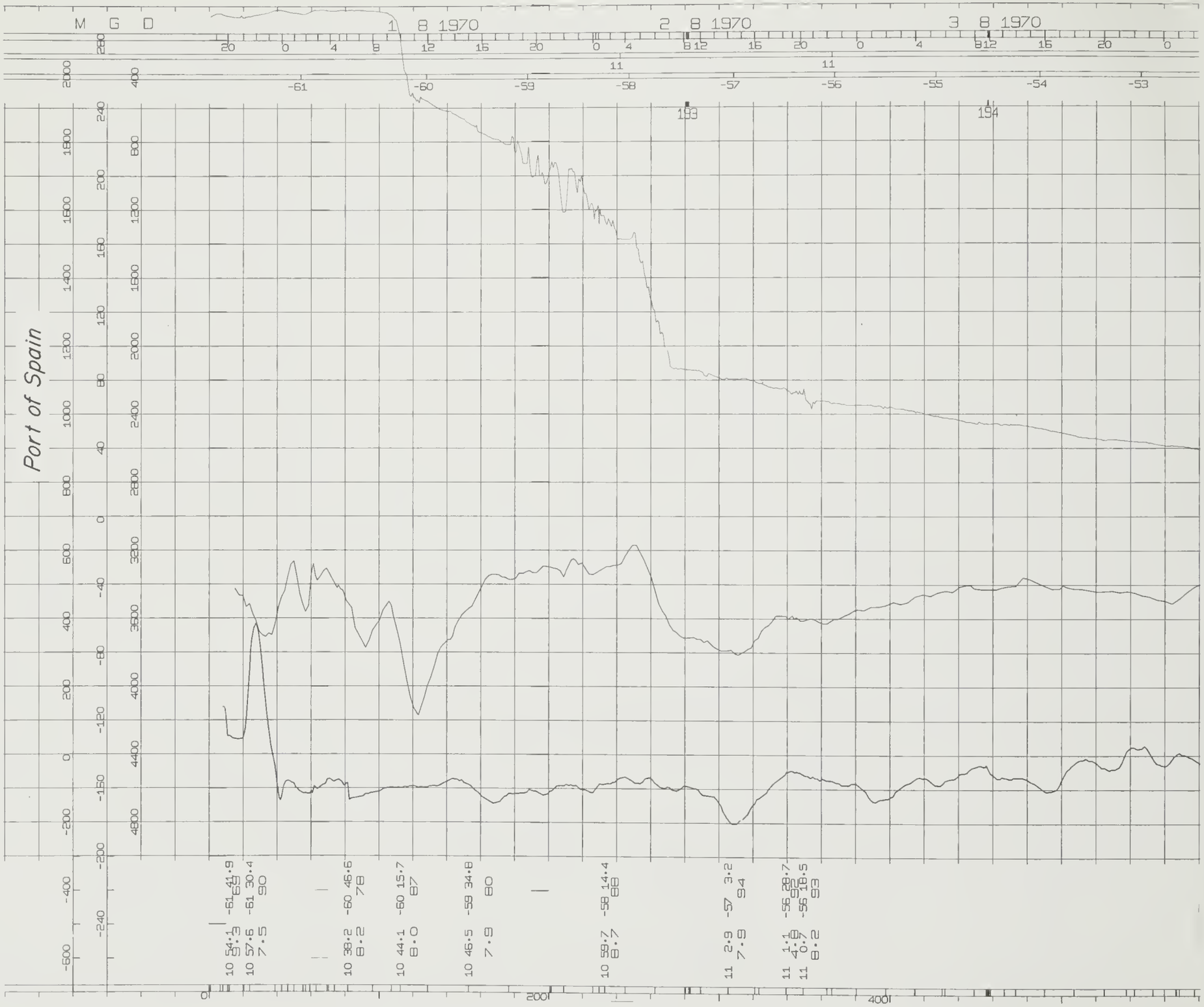

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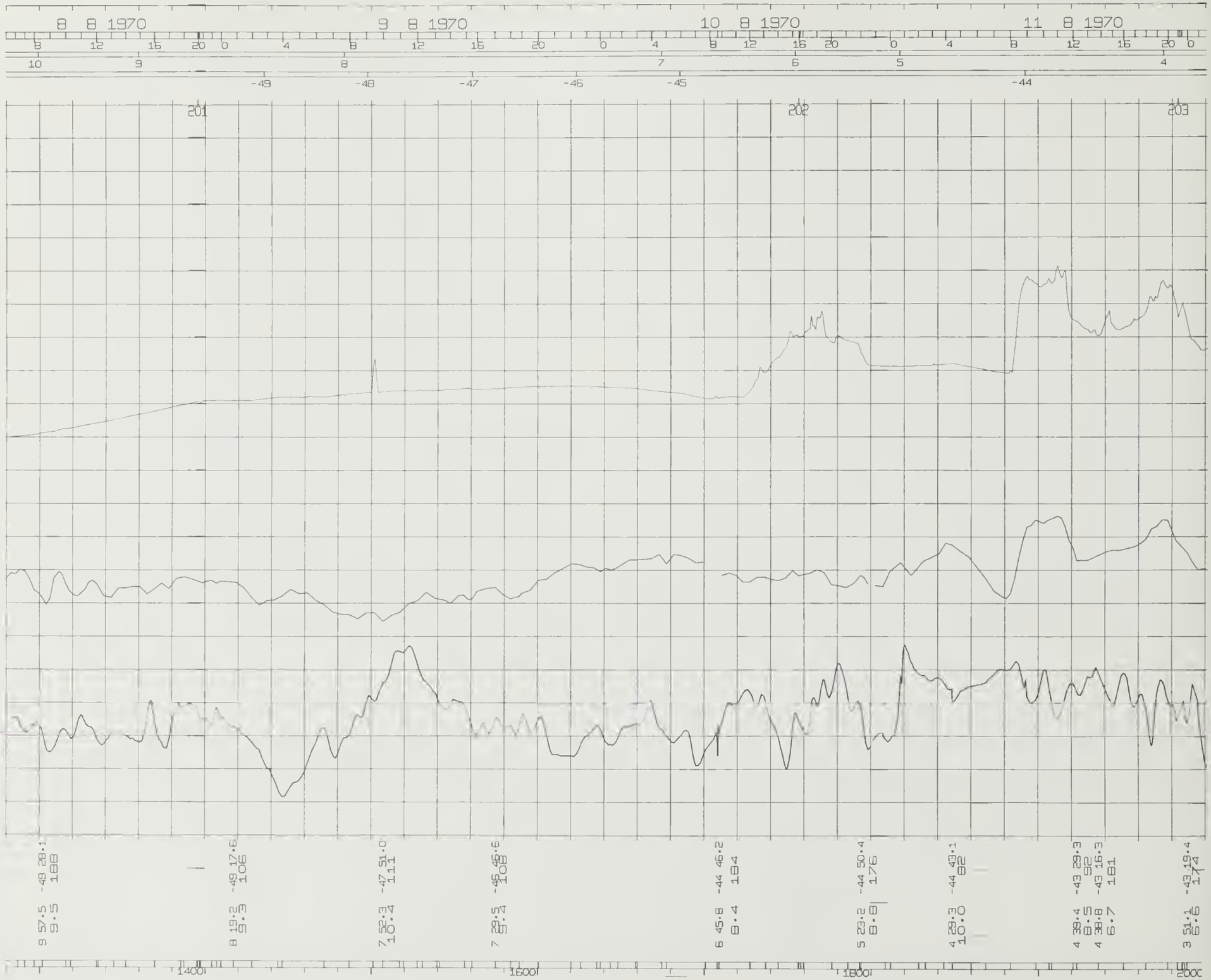

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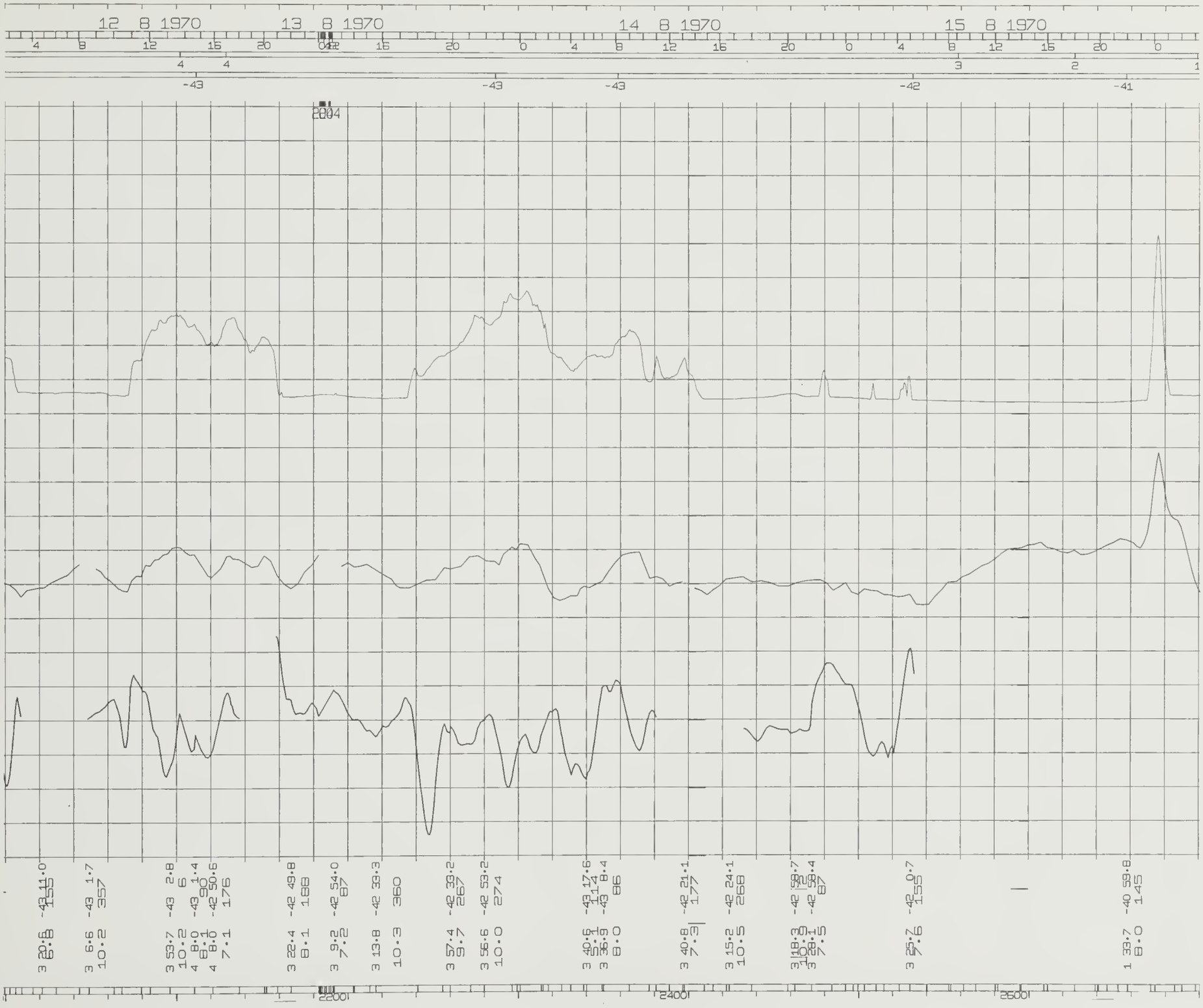

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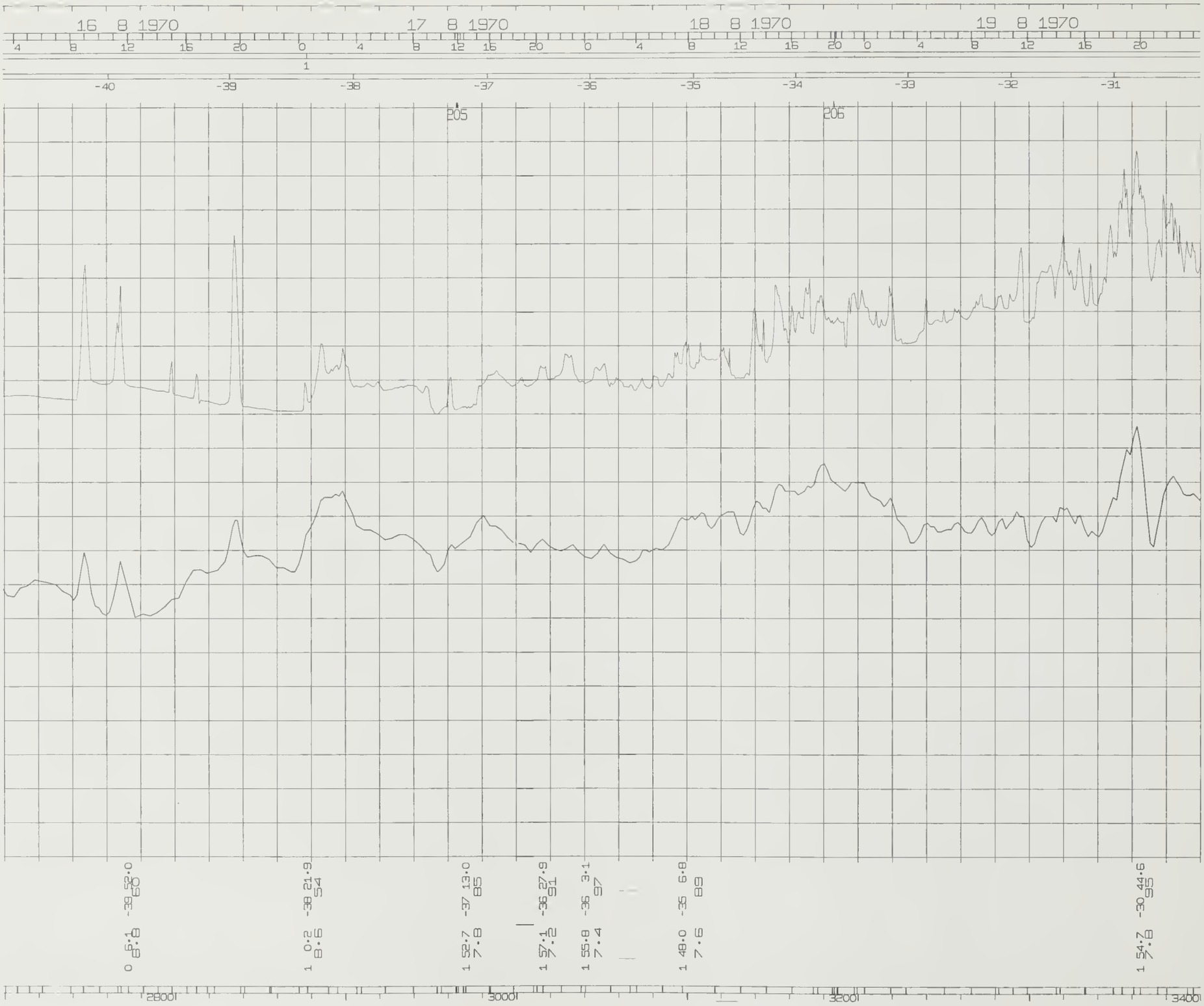

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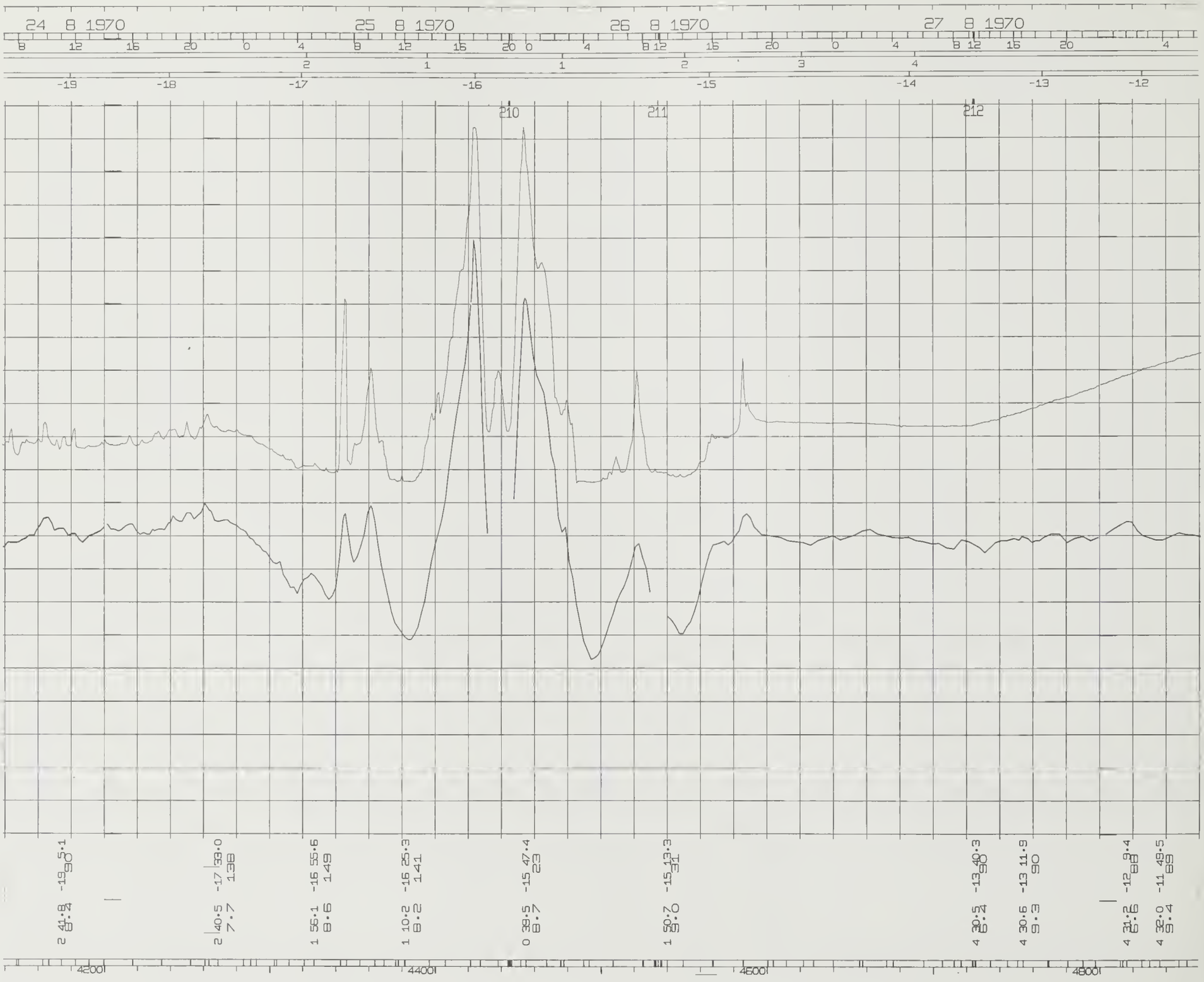

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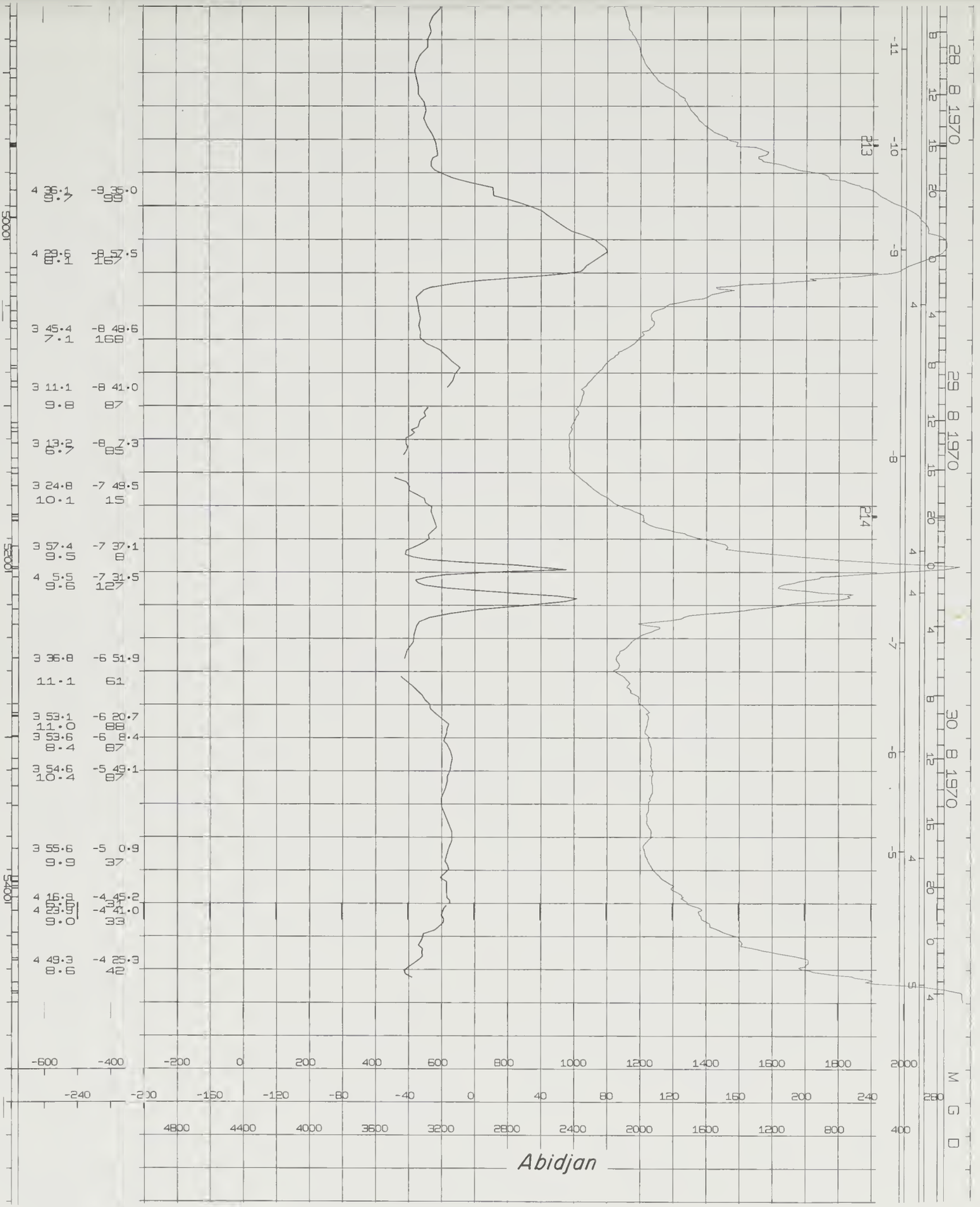

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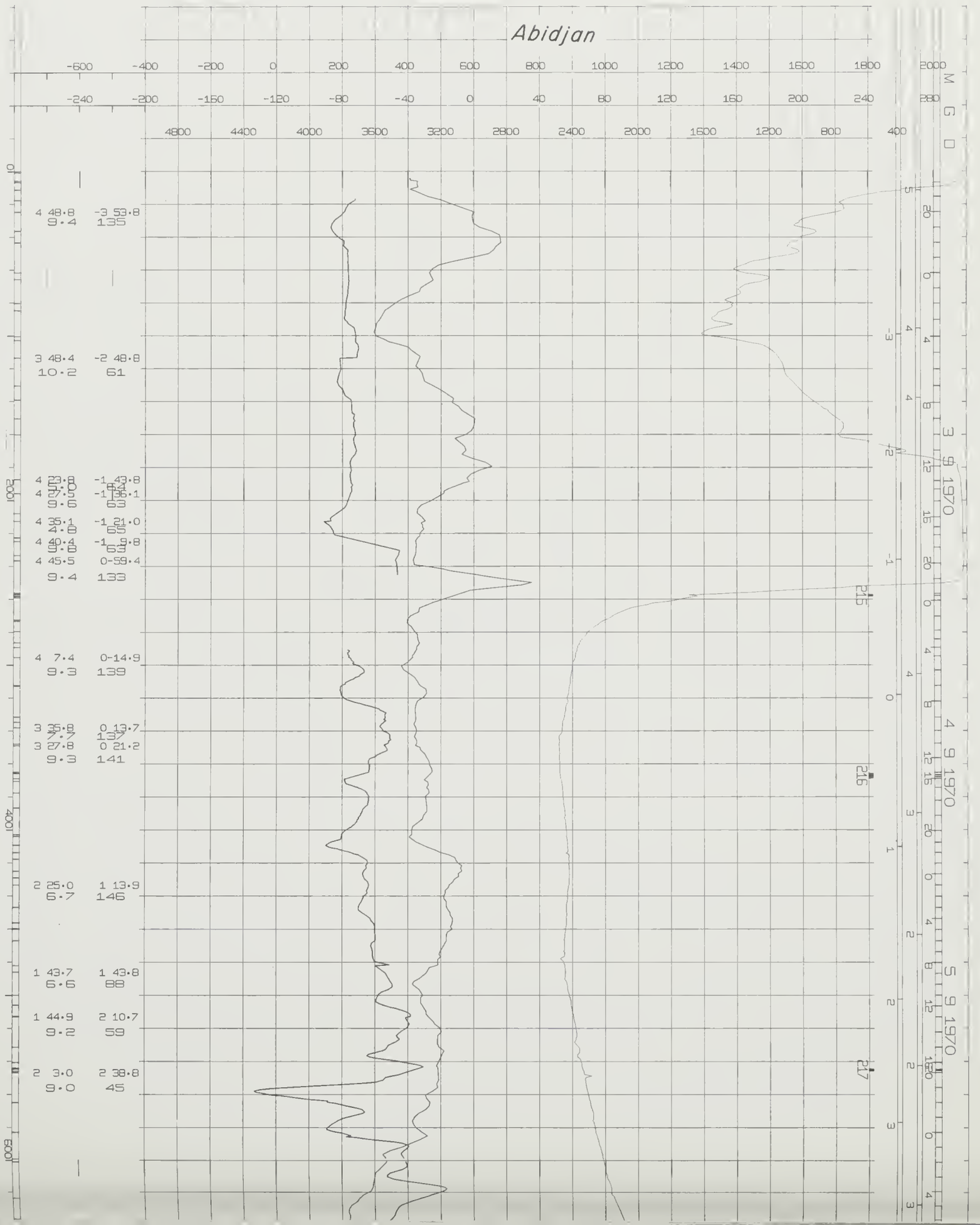

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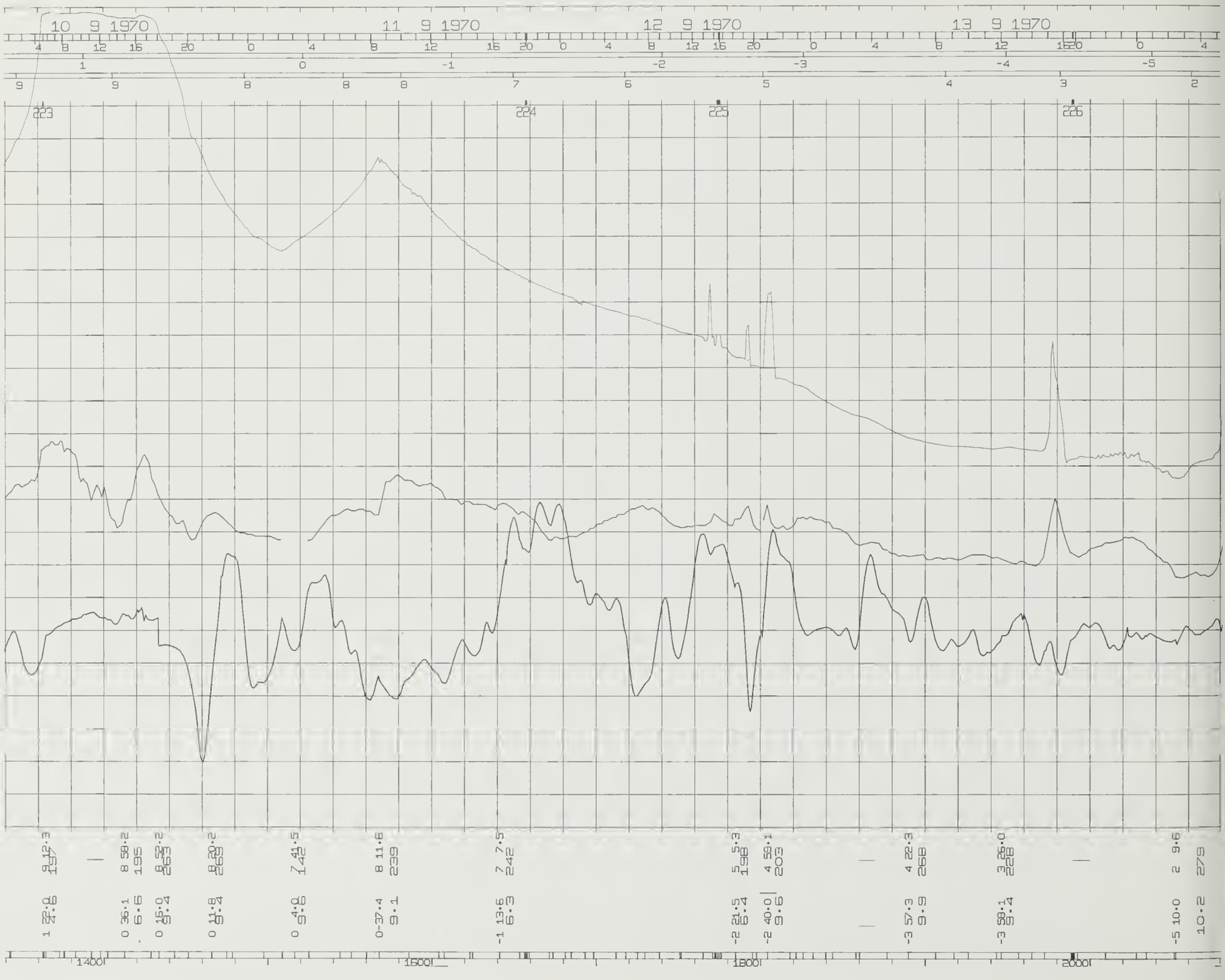

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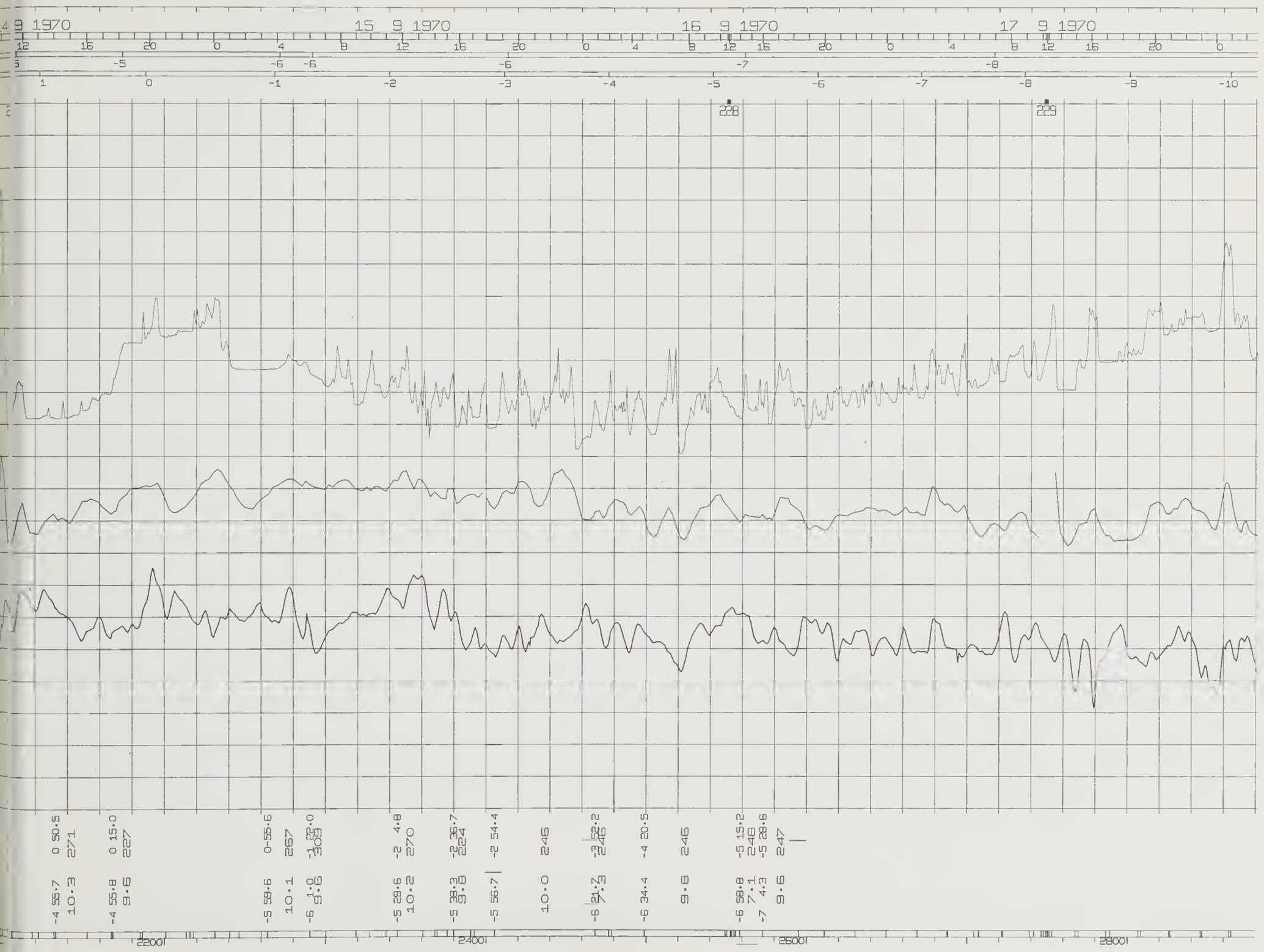

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M G D

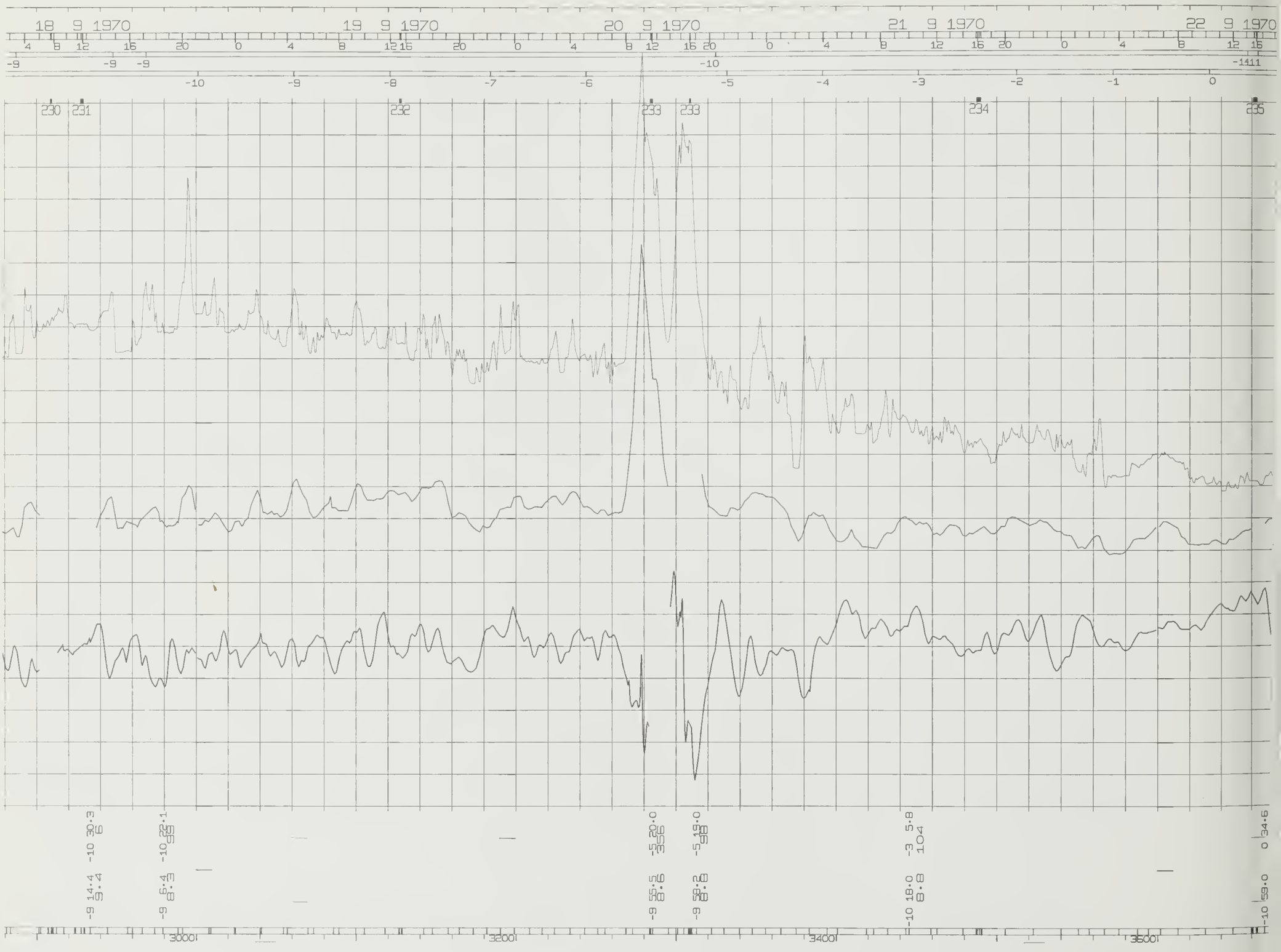
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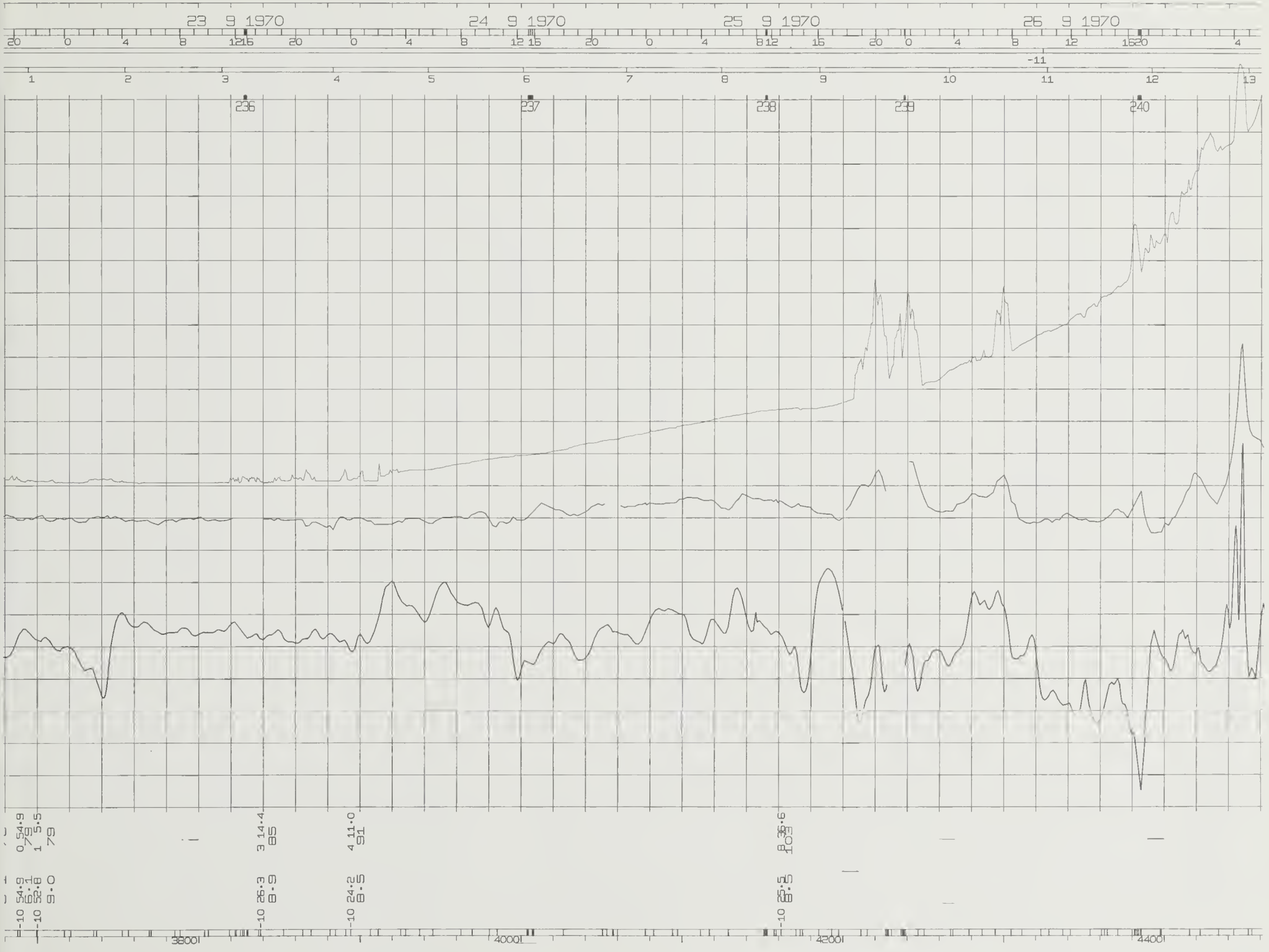

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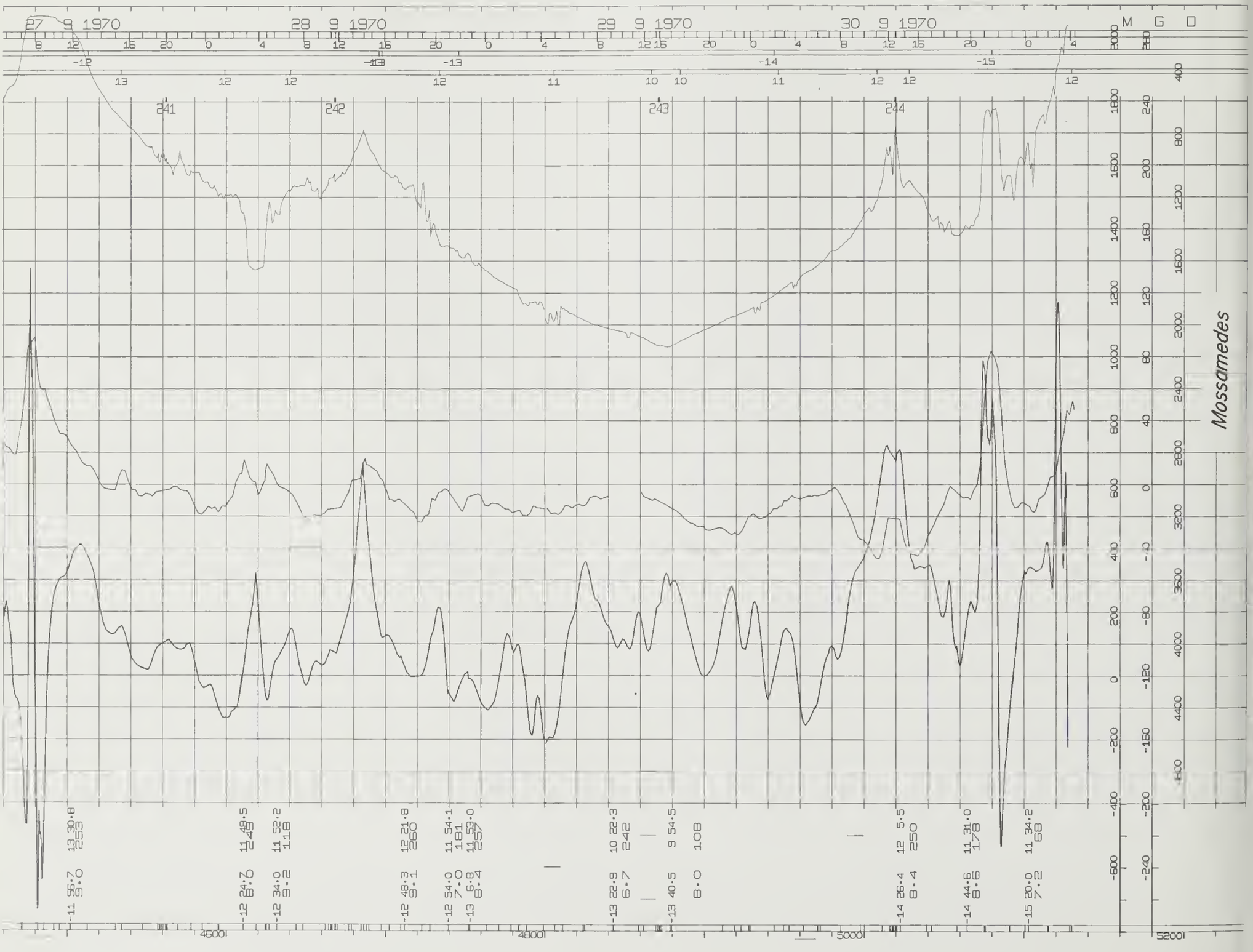

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PART B - NAVIGATION CHARTS

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7. AUTHOR(s)

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North Atlantic
Navigation Chart

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
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PART B: NAVIGATION CHARTS

0°-60°N and 30°E-105°W

CHART 1 VEMA 17 and 18
CHART 2 VEMA 19 and 20
CHART 3 VEMA 21 and 22
CHART 4 VEMA 23, 24 and 25
CHART 5 VEMA 26, 27 and 28
CHART 6 ROBERT D. CONRAD 8 and 9
CHART 7 ROBERT D. CONRAD 10
CHART 8 ROBERT D. CONRAD 11, 12 and 13

60°N-81°N and 40°E-105°W

CHART 9 VEMA 23 and 27
CHART 10 VEMA 28

April 1974

Technical Report No. 9-CU-9-74
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North Atlantic
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Navigation Chart

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Track charts for Lamont-Doherty Geological Observatory underway magnetic, gravity and depth data in the North Atlantic June 1961-January 1971 are given including the Norwegian Sea, Gulf of Mexico, Caribbean and Mediterranean Sea.

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JUNE 1961 - JANUARY 1971
-100
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CHART 2
VEMA 19 & 20
LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
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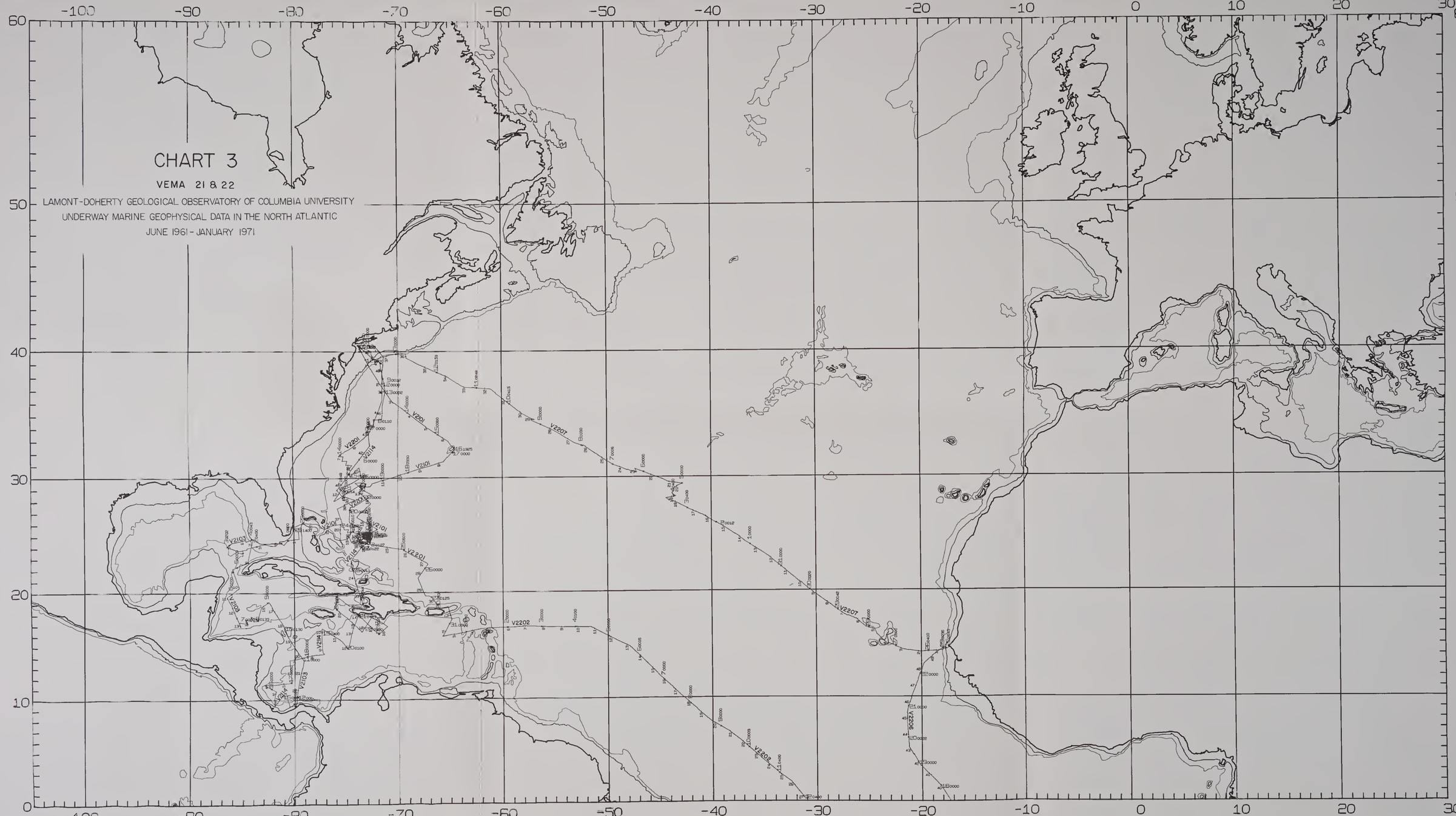
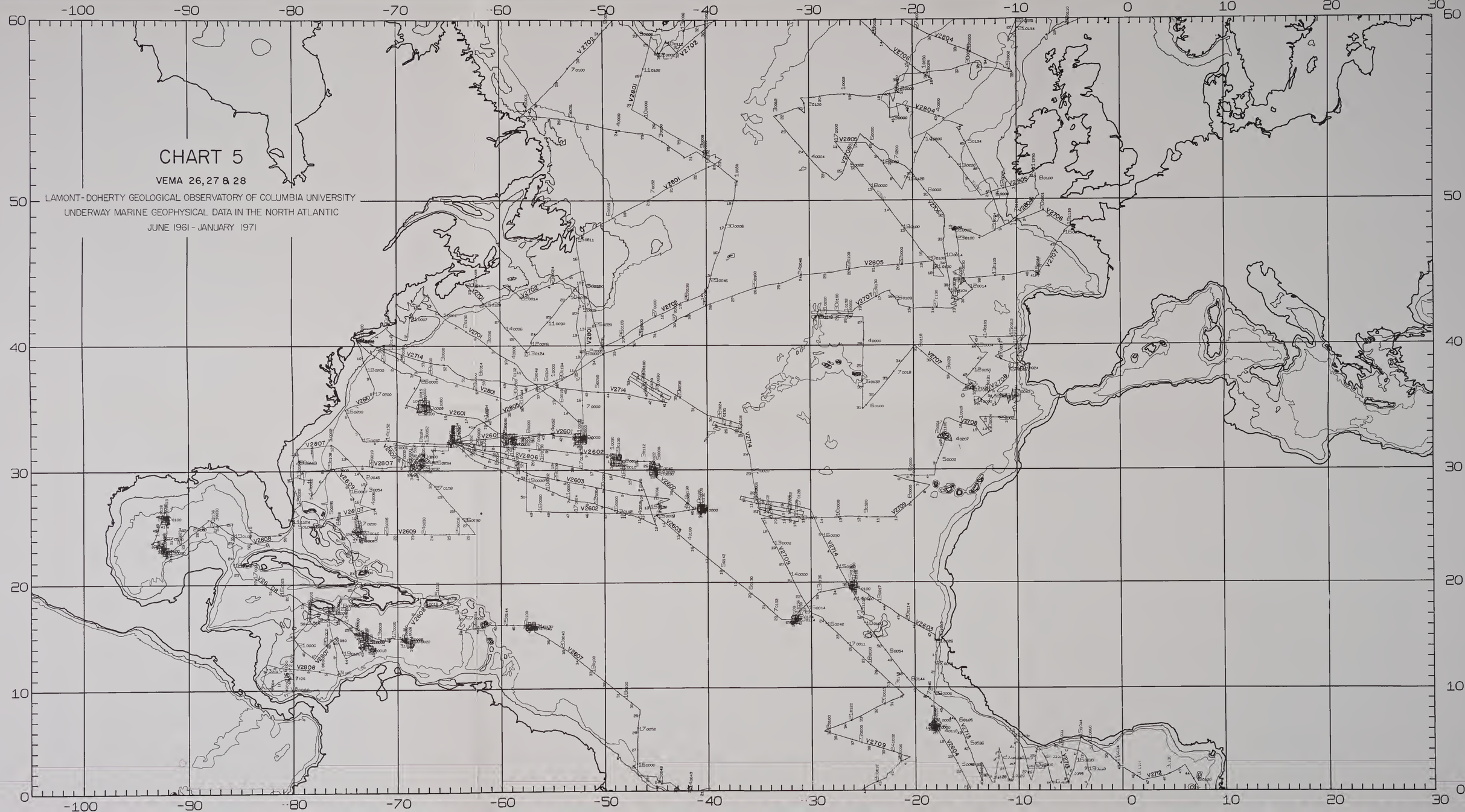

CHART 3
VEMA 21 & 22
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UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
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CHART 4
VEMA 23, 24 & 25
LAMONT DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
JUNE 1961 - JANUARY 1971


CHART 5
VEMA 26, 27 & 28
LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
JUNE 1961 - JANUARY 1971
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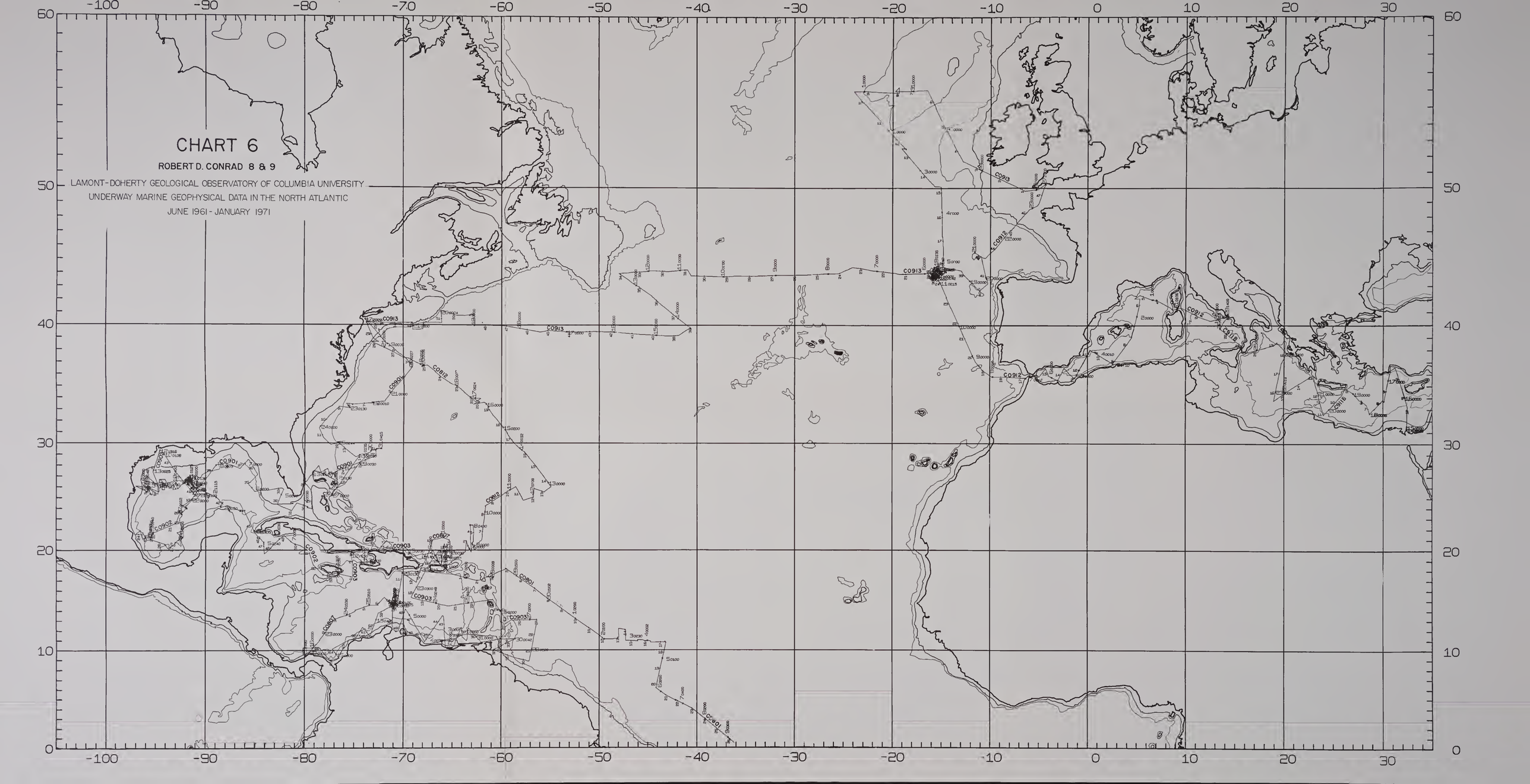
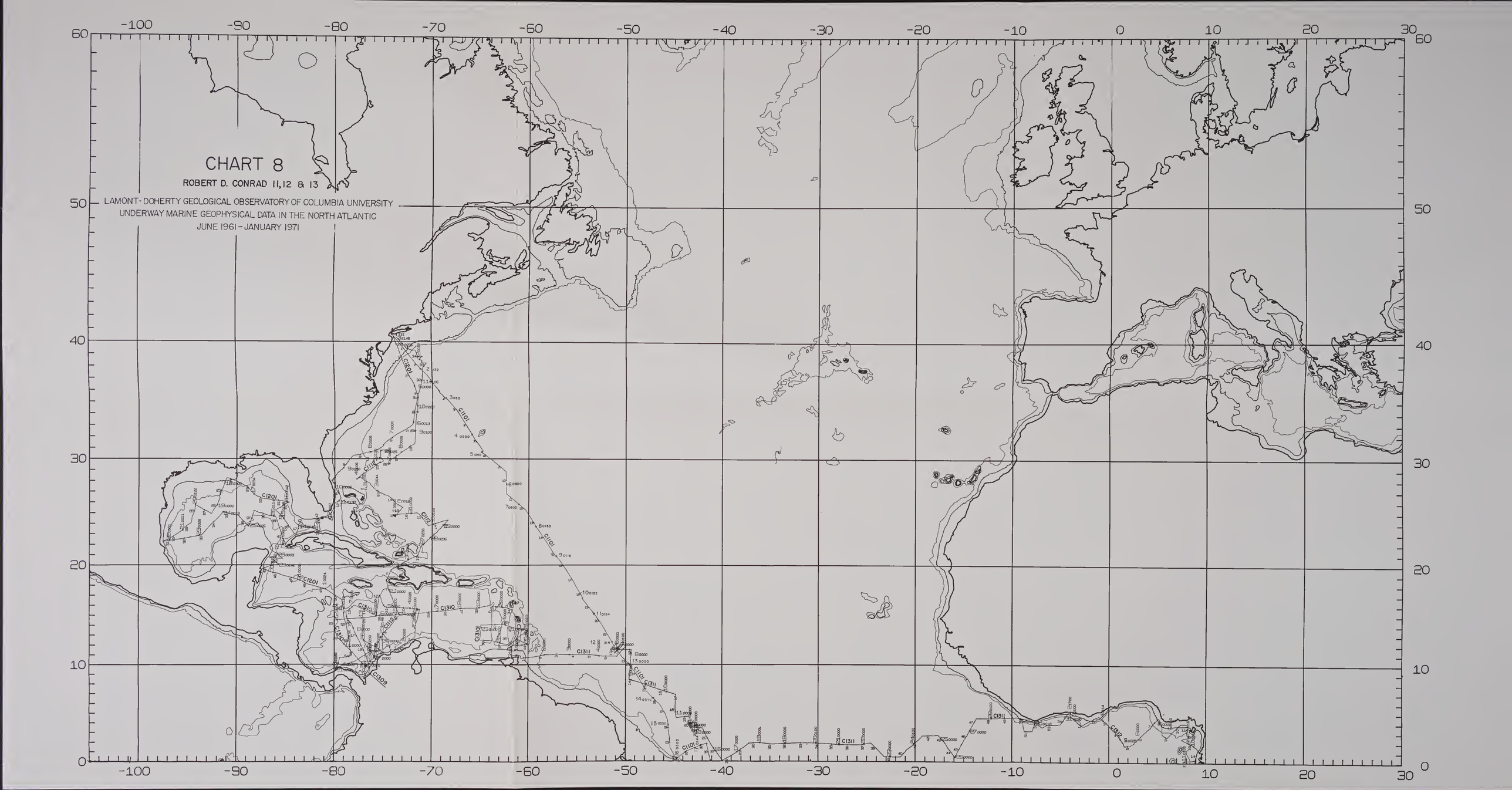
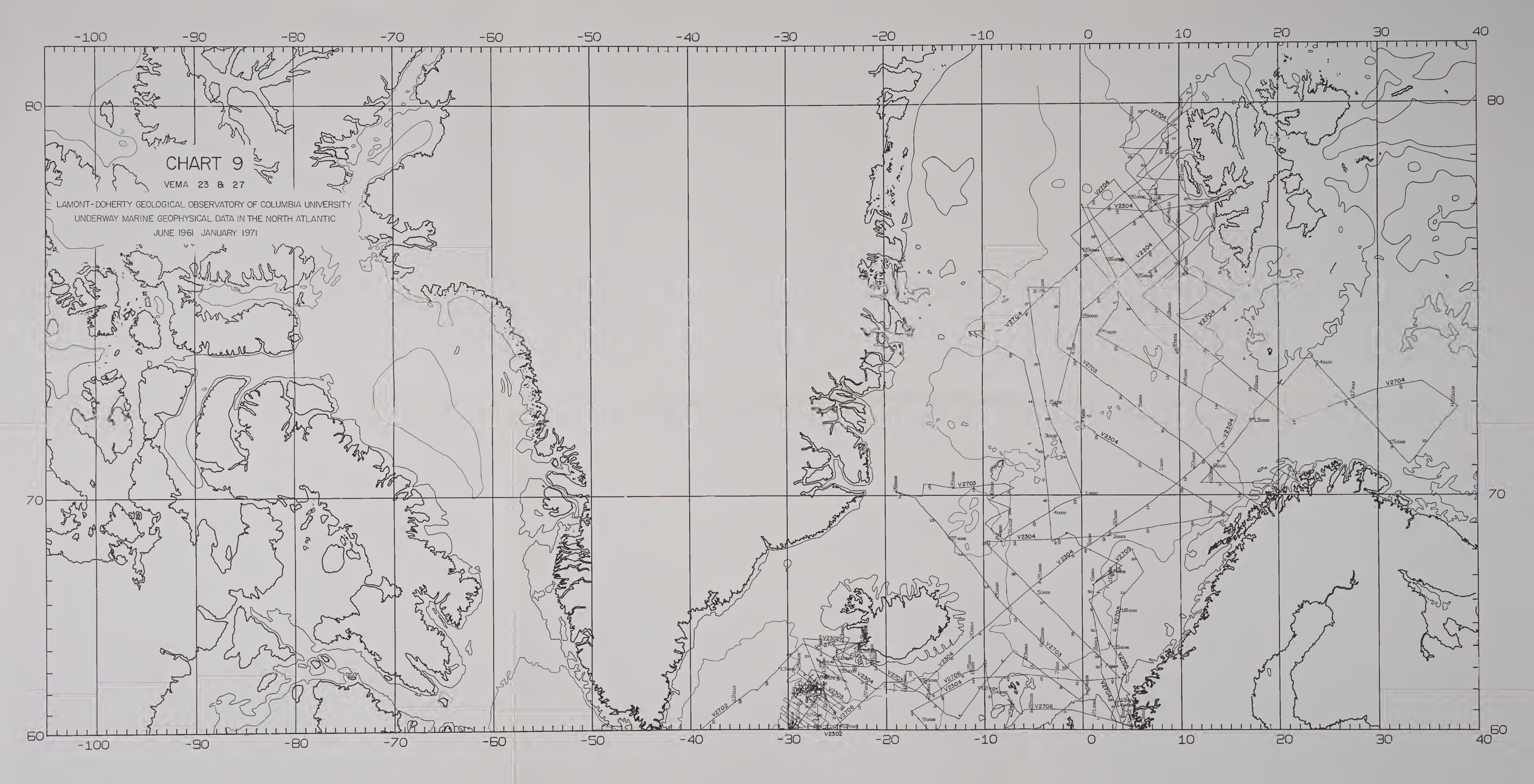
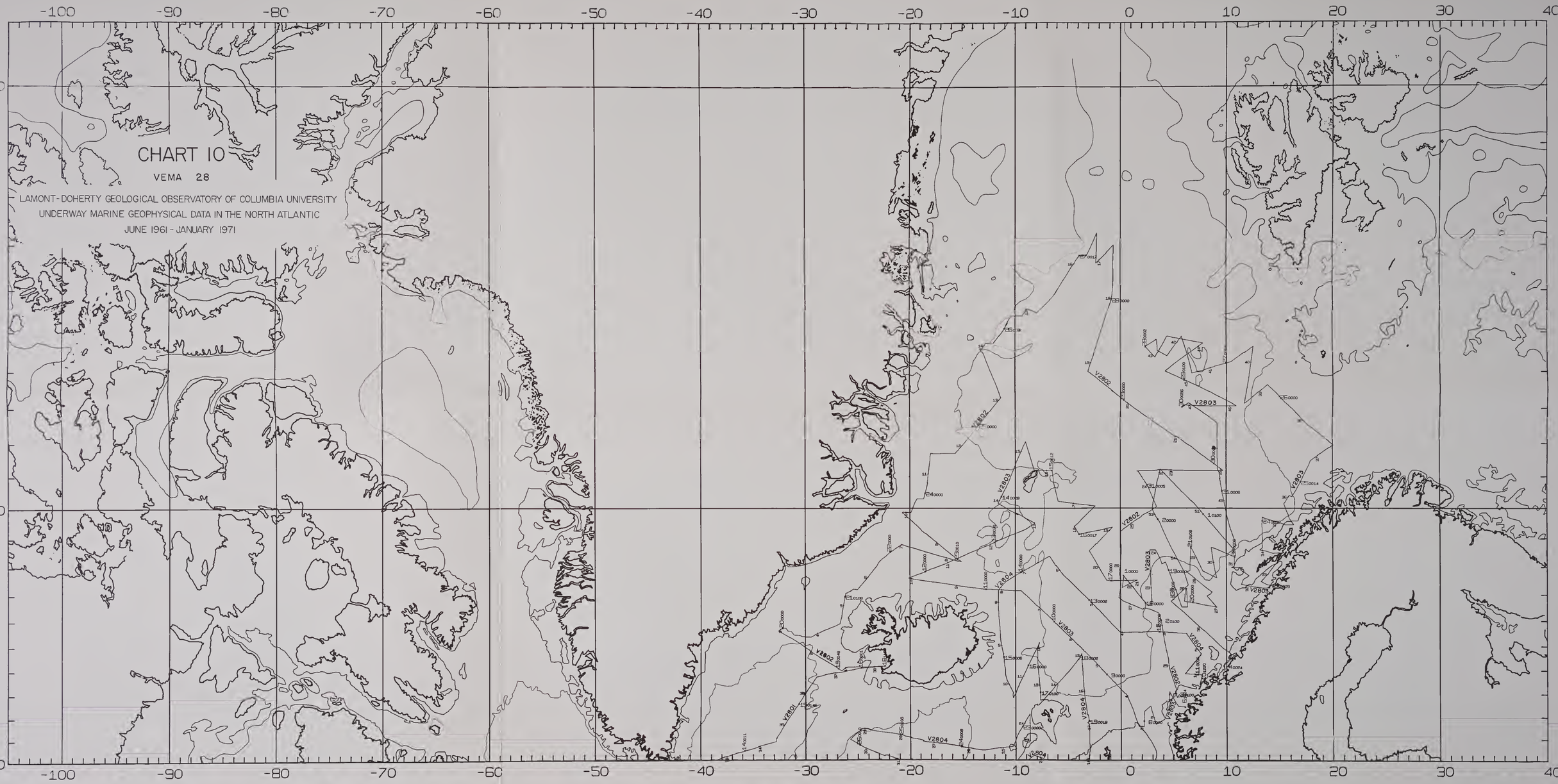

CHART 6
ROBERT D. CONRAD 8 & 9
LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
JUNE 1961 - JANUARY 1971
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CHART 7
ROBERT D. CONRAD 10
LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
JUNE 1961 - JANUARY 1971
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CHART 8
ROBERT D. CONRAD 11,12 & 13
LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
JUNE 1961 - JANUARY 1971
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CHART 9
VEMA 23 & 27
LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
JUNE 1961 JANUARY 1971
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V2703
V2706
V2302
V2702
V2305


CHART 10
VEMA 28
LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
UNDERWAY MARINE GEOPHYSICAL DATA IN THE NORTH ATLANTIC
JUNE 1961 - JANUARY 1971
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LAMONT-DOHERTY SURVEY OF THE WORLD OCEAN

General Editor, Manik Talwani

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Palisades, New York 10964

Underway Marine Geophysical Data in the North Atlantic June 1961 - January 1971

PART C: BATHYMETRIC, GEOMAGNETIC, AND GRAVITY PROFILES

VEMA 17 Legs 12, 13,14,15,16 and 17
VEMA 18 Legs 01,12,13,17,18 and 19
VEMA 19 Legs 01,02,03,12 and 13
VEMA 20 Legs 01,02,12 and 13
VEMA 21 Legs 01,03 and 14
VEMA 22 Legs 01,02,06 and 07
VEMA 23 Legs 01,02,03,04,05,06 and 07
VEMA 24 Legs 01,02 and 13
VEMA 25 Legs 01,02,03 and 04
VEMA 26 Legs 01,02,03,04,07,08,09 and 10

by

Manik Talwani, Dennis Hayes, Walter Pitman, and Thomas Aitken

April 1974

Technical Report No. 9-CU-9-74
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General Editor, Manik Talwani

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY
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June 1961 - January 1971

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INTRODUCTION

This six-part report describes the underway marine geophysical data acquired by the Lamont-Doherty Geological Observatory during the period 1961-1971 in the North Atlantic aboard the Research Vessels VEMA and ROBERT D. CONRAD. The development of the seismic reflection profiler, the surface ship gravimeter, and the proton precision magnetometer gave an enormous impetus to marine geophysical work. Under the vigorous leadership of Maurice Ewing, the past director of this observatory, these instruments, together with the precision depth recorder, were used nearly continuously on VEMA since 1961 and on ROBERT D. CONRAD since 1963 to help provide the framework for an understanding of the geophysics of the world oceans. The study of the data that were acquired played a basic role in the development of the theories of sea floor spreading, of plate tectonics, and of sediment accumulation and transport which have revolutionized geological thinking.

This report presents the data obtained along about 350,000 n. miles of track. Copies of the seismic reflection profiler records, digitized gravity values, total magnetic intensity values, and soundings are available from the Marine Geology and Geophysics Group, Environmental Data Service - NGSDC, Washington, D. C. 20235.

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CRUISE INDEX

VEMA

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
1712	Buenos Aires, Argentina	26 Jun 61	Dakar, Senegal	18 Jul 61	4247.1	M. Talwani
1713	Dakar, Senegal	19 Jul 61	Halifax, Nova Scotia	06 Aug 61	3168.4	M. Talwani
1714*	Halifax, Nova Scotia	11 Aug 61	Halifax, Nova Scotia	15 Aug 61	0593.5	C. Drake
1715*	Halifax, Nova Scotia	18 Aug 61	Argentia, Newfoundland	25 Aug 61	1157.9	C. Drake
1716*	Argentia, Newfoundland	25 Aug 61	Halifax, Nova Scotia	17 Sep 61	3819.3	C. Drake
1717	Halifax, Nova Scotia	23 Sep 61	New York, New York	29 Sep 61	1090.3	J. Worzel
1801*	New York, New York	01 Dec 61	St. George, Bermuda	05 Dec 61	0800.8	J. Ewing
1802	St. George, Bermuda	06 Dec 61	San Juan, Puerto Rico	24 Dec 61	3604.3	J. Ewing
1803	San Juan, Puerto Rico	27 Dec 61	Recife, Brazil	19 Jan 62	4018.7	M. Langseth
1817	Cristobal, Panama C.Z.	28 Oct 62	Nassau, Bahamas	11 Nov 62	3057.3	C. Drake
1818	Nassau, Bahamas	14 Nov 62	St. George, Bermuda	25 Nov 62	1963.5	C. Drake
1819	St. George, Bermuda	25 Nov 62	New York, New York	07 Dec 62	2213.6	C. Drake
1901* **	New York, New York	21 Feb 63	St. George, Bermuda	26 Feb 63	0778.7	G. Bryan
1902*	St. George, Bermuda	28 Feb 63	St. Thomas, Virgin Is.	13 Mar 63	2136.1	G. Bryan
1903	St. Thomas, Virgin Is.	15 Mar 63	Cristobal, Panama C.Z.	25 Mar 63	1965.4	M. Talwani
1912	Cape Town, S. Africa	20 Sep 63	Abidjan, Ivory Coast	24 Oct 63	5333.0	M. Ewing
1913	Abidjan, Ivory Coast	15 Nov 63	New York, New York	11 Dec 63	5226.9	C. Drake
2001*	New York, New York	13 Feb 64	San Juan, Puerto Rico	24 Feb 63	2324.8	C. Windisch
2002	San Juan, Puerto Rico	02 Mar 64	Cristobal, Panama C.Z.	16 Mar 64	2960.0	M. Talwani
2012	Recife, Brazil	11 Nov 64	St. George, Bermuda	03 Dec 64	4126.3	C. Drake
2013	St. George, Bermuda	05 Dec 64	New York, New York	10 Dec 64	0841.2	C. Drake
2101	New York, New York	11 Feb 65	Miami, Florida	25 Feb 65	2303.2	J. Worzel
2103	Miami, Florida	28 Feb 65	Cristobal, Panama C.Z.	12 Mar 65	2290.3	J. Worzel
2114	Cristobal, Panama C.Z.	14 Nov 65	New York, New York	10 Dec 65	5005.7	J. Ewing
2201	New York, New York	10 Jan 66	San Juan, Puerto Rico	27 Jan 66	3044.3	C. Windisch
2202	San Juan, Puerto Rico	30 Jan 66	Recife, Brazil	16 Feb 66	3600.4	M. Talwani
2206	Cape Town, S. Africa	26 Apr 66	Dakar, Senegal	23 May 66	4922.1	M. Ewing
2207	Dakar, Senegal	25 May 66	New York, New York	13 Jun 66	3865.7	T. Aitken
2301	New York, New York	27 Jul 66	Halifax, Nova Scotia	05 Aug 66	1711.2	C. Windisch
2302	Halifax, Nova Scotia	08 Aug 66	Reykjavik, Iceland	25 Aug 66	3520.5	C. Windisch
2303	Reykjavik, Iceland	27 Aug 66	Reykjavik, Iceland	15 Sep 66	4212.0	M. Talwani
2304	Reykjavik, Iceland	17 Sep 66	Glasgow, Scotland	11 Oct 66	5180.7	C. Windisch
2305	Glasgow, Scotland	15 Oct 66	Las Palmas, Canary Is.	03 Nov 66	3963.5	T. Aitken
2306	Las Palmas, Canary Is.	06 Nov 66	St. George, Bermuda	05 Dec 66	5711.7	J. Ewing
2307	St. George, Bermuda	08 Dec 66	New York, New York	15 Dec 66	1326.9	J. Ewing
2401	New York, New York	16 Jan 67	Miami, Florida	30 Jan 67	2717.4	J. Worzel
2402	Miami, Florida	31 Jan 67	Cristobal, Panama C.Z.	19 Feb 67	3904.2	J. Worzel
2413	Rio De Janeiro, Brazil	17 Nov 67	Miami, Florida	15 Dec 67	5664.9	R. Gerard
2501	Miami, Florida	05 Jan 68	Bridgetown, Barbados	05 Feb 68	5569.6	M. Langseth

* No Gravity
** No Magnetics

CRUISE INDEX (Continued)

VEMA (Continued)

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
2502	Bridgetown, Barbados	08 Feb 68	Paramaribo, Surinam	08 Mar 68	5197.9	D. Hayes
2503	Paramaribo, Surinam	11 Mar 68	New York, New York	02 Apr 68	3963.6	W. Pitman
2504	New York, New York	05 Apr 68	New York, New York	10 Apr 68	0977.5	S. Eittreim
2601*	New York, New York	24 Jul 68	St. George, Bermuda	16 Aug 68	4747.3	D. Epp
2602*	St. George, Bermuda	24 Aug 68	St. George, Bermuda	21 Sep 68	5559.3	T. Aitken
2603*	St. George, Bermuda	26 Sep 68	Dakar, Senegal	21 Oct 68	4799.6	T. Aitken
2604	Dakar, Senegal	26 Oct 68	Rio De Janeiro, Brazil	25 Nov 68	6237.3	M. Talwani
2607	Recife, Brazil	03 Feb 69	San Juan, Puerto Rico	28 Feb 69	5285.1	D. Hayes
2608	San Juan, Puerto Rico	05 Mar 69	Miami, Florida	05 Apr 69	5914.1	J. Worzel
2609	Miami, Florida	11 Apr 69	St. George, Bermuda	09 May 69	5209.6	T. Aitken
2610	St. George, Bermuda	12 May 69	Staten Island, N.Y.	18 May 69	1085.8	J. Ewing
2701	New York, New York	29 May 69	Halifax, Nova Scotia	15 Jun 69	2923.1	T. Aitken
2702	Halifax, Nova Scotia	20 Jun 69	Reykjavik, Iceland	16 Jul 69	4503.2	P. Rabinowitz
2703	Reykjavik, Iceland	19 Jul 69	Tromsø, Norway	06 Aug 69	3355.1	P. Rabinowitz
2704	Tromsø, Norway	10 Aug 69	Bergen, Norway	08 Sep 69	5436.0	M. Talwani
2705	Bergen, Norway	12 Sep 69	Bergen, Norway	19 Sep 69	1440.1	M. Talwani
2706	Bergen, Norway	20 Sep 69	Brest, France	16 Oct 69	4397.9	H. Poppe
2707	Brest, France	19 Oct 69	Lisbon, Portugal	18 Nov 69	5146.2	J. Worzel
2708	Lisbon, Portugal	21 Nov 69	Funchal, Madeira	02 Dec 69	1825.0	P. Fox
2709	Funchal, Madeira	03 Dec 69	Recife, Brazil	30 Dec 69	5180.3	J. Bonnin
2712**	Cape Town, S. Africa	13 Feb 70	Abidjan, Ivory Coast	12 Mar 70	5172.2	G. Bryan
2713	Abidjan, Ivory Coast	15 Mar 70	St. Vincent, C.Verde Is.	10 Apr 70	5211.5	W. Pitman
2714	St. Vincent, C.Verde Is.	13 Apr 70	New York, New York	10 May 70	5573.4	W. Pitman
2801	New York, New York	25 Jun 70	Reykjavik, Iceland	16 Jul 70	3825.2	C. Windisch
2802	Reykjavik, Iceland	18 Jul 70	Aalesund, Norway	03 Aug 70	2985.6	C. Windisch
2803	Aalesund, Norway	06 Aug 70	Trondheim, Norway	04 Sep 70	5760.6	M. Talwani
2804	Trondheim, Norway	10 Sep 70	Cork, Ireland	08 Oct 70	5114.7	J. Jones
2805	Cork, Ireland	11 Oct 70	St. George, Bermuda	02 Nov 70	4240.0	K. Hunkins
2806	St. George, Bermuda	06 Nov 70	St. George, Bermuda	21 Nov 70	2406.4	S. Lieber
2807	St. George, Bermuda	24 Nov 70	Kingston, Jamaica	23 Dec 70	5227.8	V. Renard
2808	Kingston, Jamaica	28 Dec 70	Cristobal, Panama C.Z.	08 Jan 71	1596.9	T. Aitken & M. Truchan

* No Gravity
** No Magnetics

CRUISE INDEX (Continued)

ROBERT D. CONRAD

Cruise & Leg	From Port	From Date	To Port	To Date	N. Miles	Chief Scientist
0801	San Juan, Puerto Rico	26 Nov 63	Cape Town, S. Africa	29 Dec 63	6569.7	R. Wall
0807	Cristobal, Panama C.Z.	21 Apr 64	San Juan, Puerto Rico	02 May 64	1974.1	J. Ewing
0812	San Juan, Puerto Rico	05 Aug 64	New York, New York	22 Aug 64	2964.9	C. Fray
0901	New York, New York	17 Oct 64	Galveston, Texas	10 Nov 64	4379.8	J. Heirtzler
0902	Galveston, Texas	12 Nov 64	Kingston, Jamaica	08 Dec 64	5348.1	M. Ewing
0903	Kingston, Jamaica	10 Dec 64	Colon, Panama C.Z.	16 Jan 65	6762.6	M. Talwani
9B11	Port Said, Egypt	14 Jul 65	Naples, Italy	26 Jul 65	2302.9	M. Ewing
0912	Naples, Italy	29 Jul 65	Plymouth, England	23 Aug 65	4749.8	M. Ewing
0913	Plymouth, England	27 Aug 65	New York, New York	21 Sep 65	5514.8	R. Houtz
1001	New York, New York	01 Dec 65	Kingston, Jamaica	24 Dec 65	4196.9	J. Heirtzler
1003	Kingston, Jamaica	28 Dec 65	Cristobal, Panama C.Z.	25 Jan 66	5707.1	R. Wall
1012	Cristobal, Panama C.Z.	13 Sep 66	New York, New York	15 Oct 66	6329.4	R. Leyden
1101*	New York, New York	01 Dec 66	Recife, Brazil	22 Dec 66	4257.3	D. Hayes
1112	Cristobal, Panama C.Z.	21 Oct 67	New York, New York	12 Nov 67	3543.1	S. Eittreim & W. Ryan
1201	New York, New York	03 Jan 68	Cristobal, Panama C.Z.	04 Feb 68	5534.6	C. Windisch
1309	Cristobal, Panama C.Z.	20 Jun 70	Cartagena, Colombia	23 Jun 70	0417.1	W. Ludwig
1310	Cartagena, Colombia	26 Jun 70	Port-of-Spain, Trinidad	26 Jul 70	4546.3	W. Ludwig
1311	Port-of-Spain, Trinidad	31 Jul 70	Abidjan, Ivory Coast	31 Aug 70	5461.6	R. Markl
1312	Abidjan, Ivory Coast	02 Sep 70	Mossamedes, Angola	01 Oct 70	5131.5	R. Leyden

* No Gravity

DESCRIPTION OF GEOPHYSICAL DATA PROFILES

The geophysical data profiles of the underway data are displayed in computer plots. In addition, these plots indicate ship's position, speed, course, cruise station numbers, etc. All data are plotted against distance in nautical miles along track, indicated by the bottom scale.

The three scales along the sides at the beginning and end of the plot, labeled D (for depth), G (for gravity), and M (for magnetics), indicate the respective scales for depth in uncorrected fathoms (assuming a speed of sound in water of 800 fathoms per second), free-air gravity anomalies in milligals, and residual magnetic intensity in gammas (using the reference field described by Cain et al., 1964). These profile traces are plotted at constant scales although the zero lines for magnetics and gravity traces are shifted up or down from leg to leg in order to minimize interference between traces. (Note that for a very few legs the magnetics scale has been contracted by a factor of two in order to fit the extremes of the values on the plot.)

Depth, gravity and magnetics are sampled at different intervals and therefore, at any one time there may be only one or two data values. Some plots indicate individual measurements by a cross.

The bathymetric profile is plotted with the lightest line and starts at the top of the plot. The free-air gravity profile is plotted with a medium line and is usually the middle trace of the three. The residual magnetic profile is plotted with the heaviest line

and is usually the bottom trace. For each profile trace, registration ticks on the horizontal grid lines are made in the same pen weight during the plotting of the profile. These ticks should ideally fall exactly on the printed grid and any deviation indicates the extent to which the profile is not justified with the grid.

The scales above the profiles are concerned with time and position of the ship. The top annotation gives the day, month and year. Directly under this is a scale showing interpolated whole hour marks with 4-hour intervals annotated below. The next two lines of annotation indicate respectively the points at which exact degrees of latitude and longitude are crossed. The cruise station numbers are annotated just below the top line of the grid and have a black line indicating their duration.

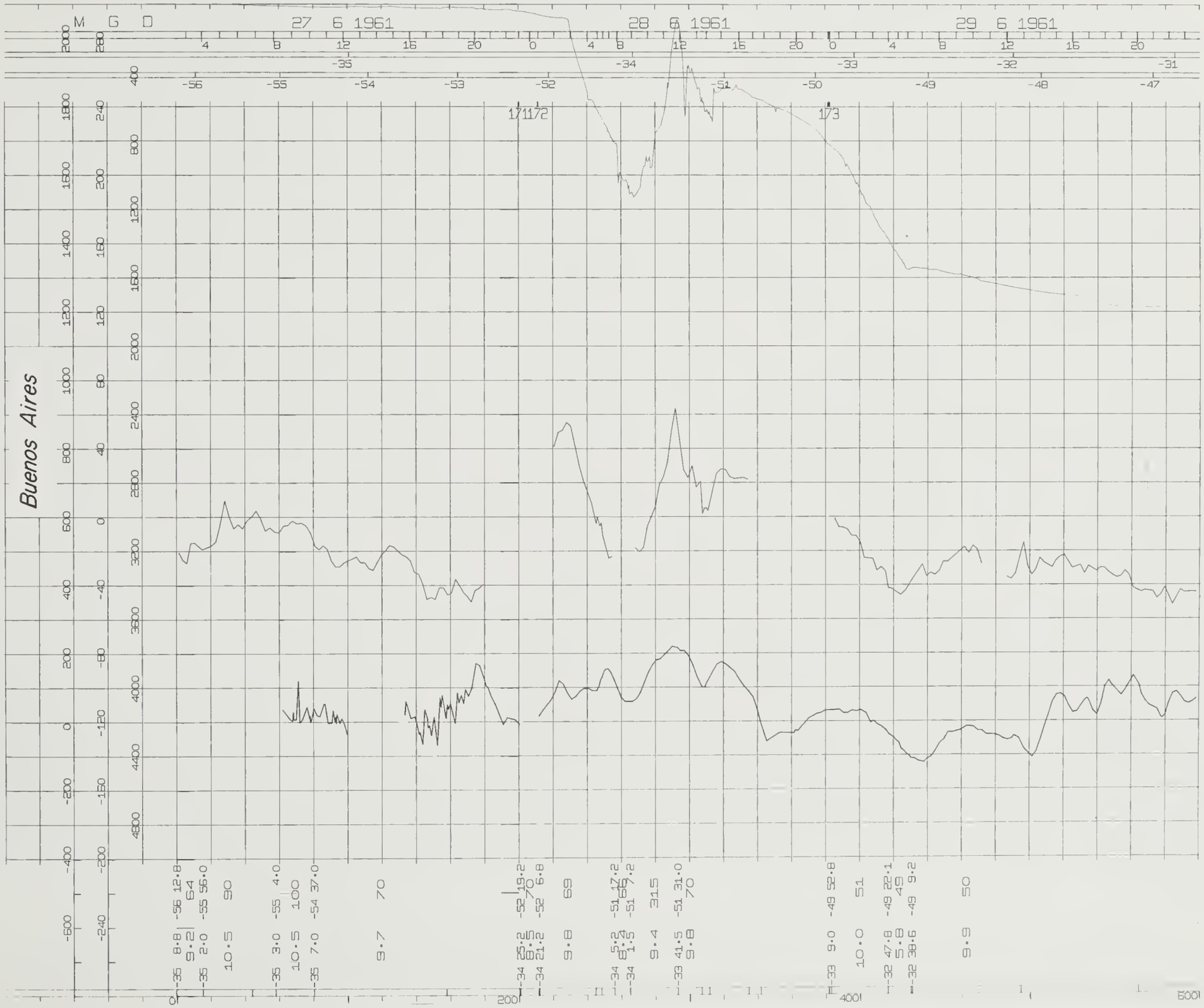
The scales along the bottom part of the plot contain the positions, courses, and speeds of each navigation point. In some cases the navigation points became too numerous to annotate clearly and therefore only major navigation points were included. The criteria used to decide which points to omit vary from leg to leg. We have generally, but not always, annotated all major change of control and/or speed. It is best to refer to the navigation listings in Part A of this report for exact positions. Below these annotations is a distance scale with annotations every 200 nautical miles.

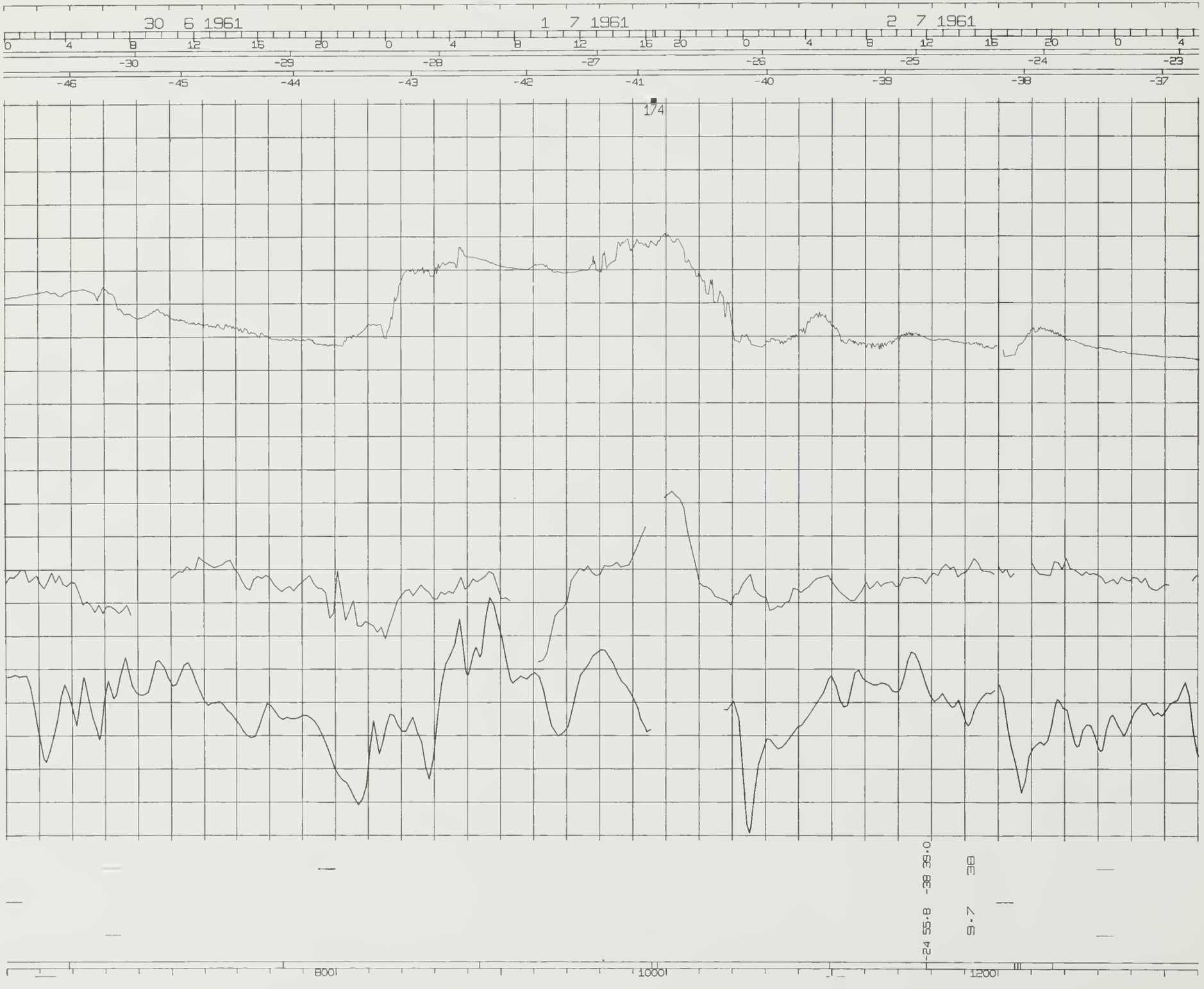
The computer programs used in making these plots have been described by Talwani (1969).

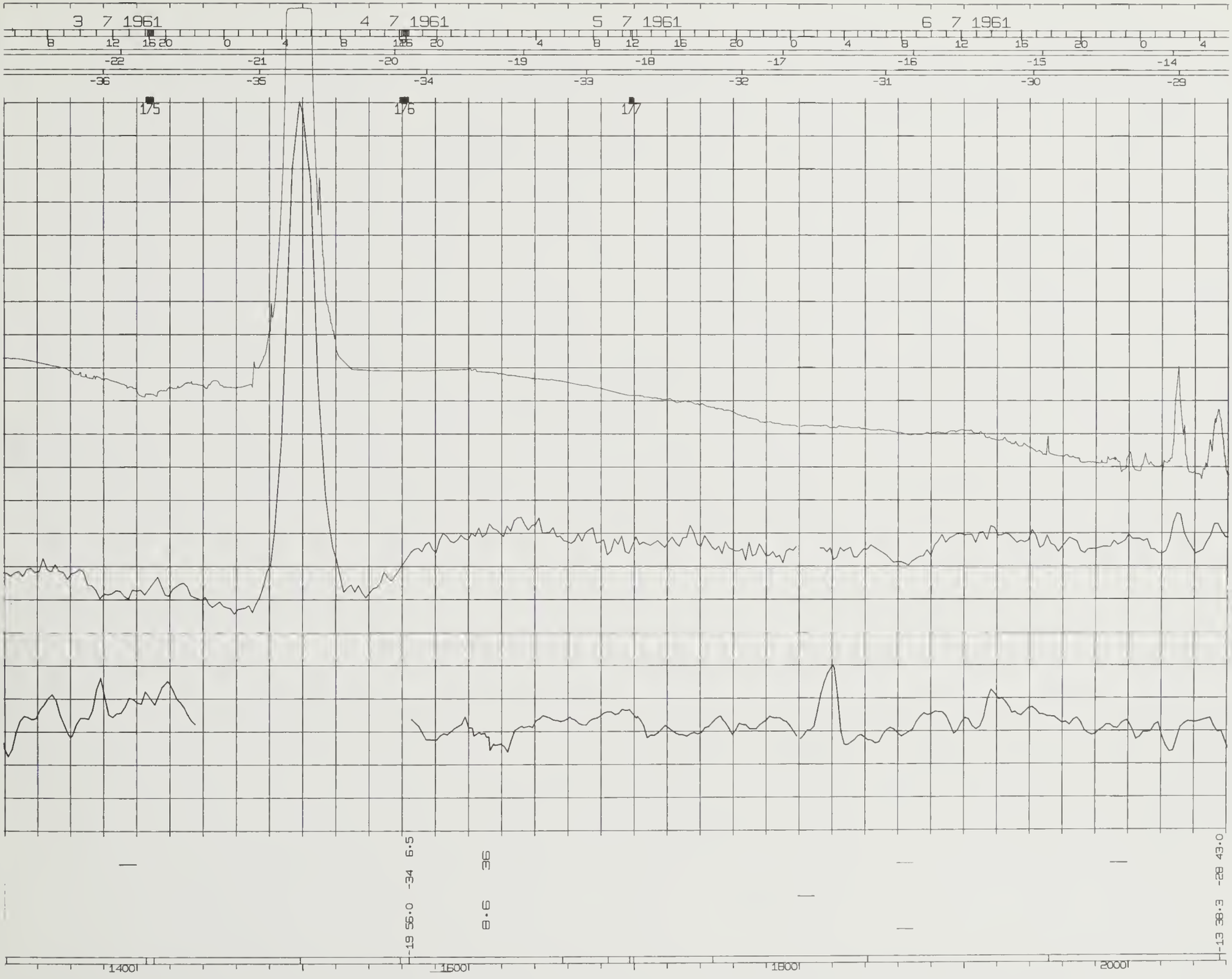
References

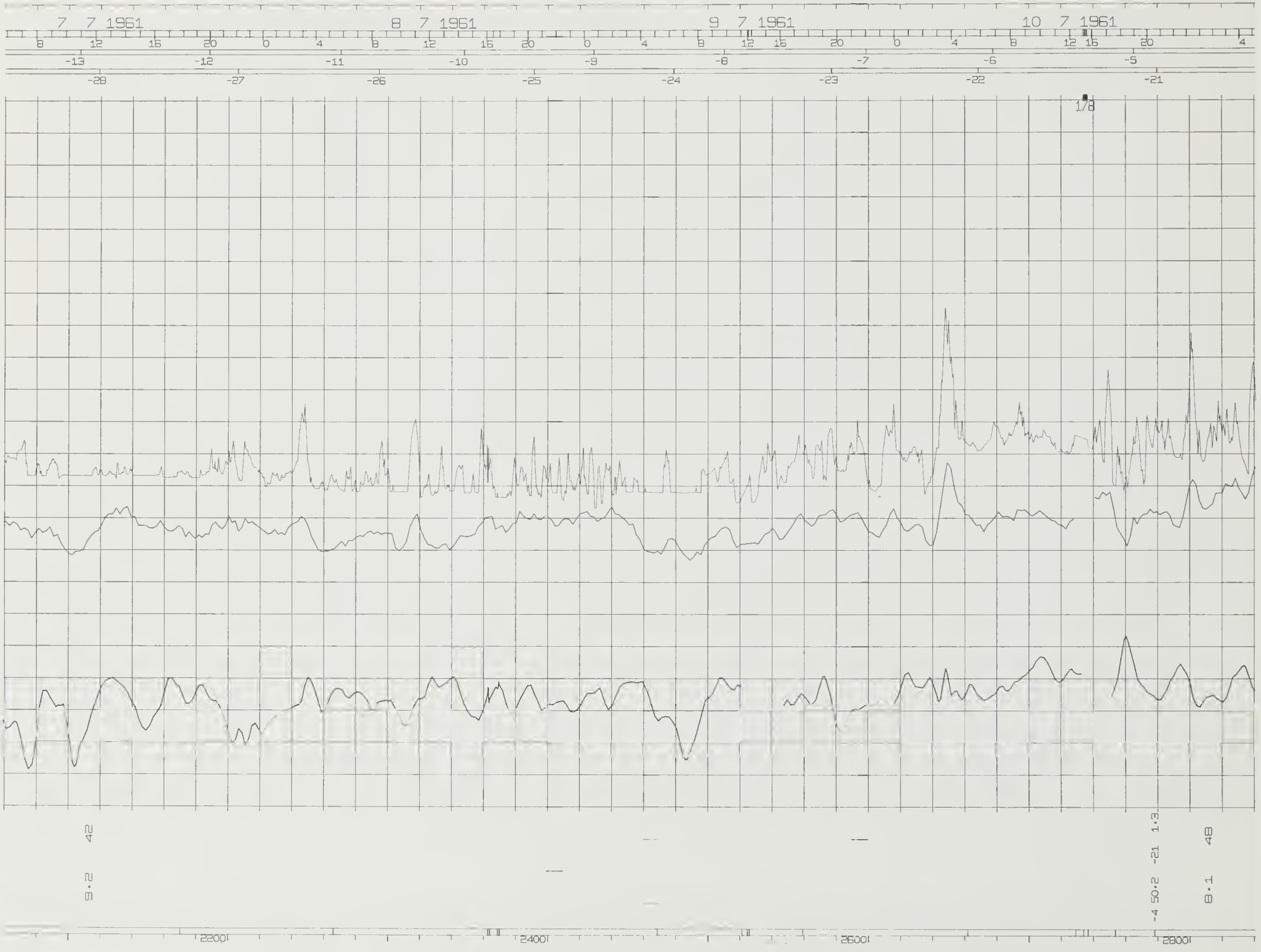
Cain, J. C., W. E. Daniels, S. J. Hendricks, and D. C. Jensen (1964) NASA Report X-612-65-72.

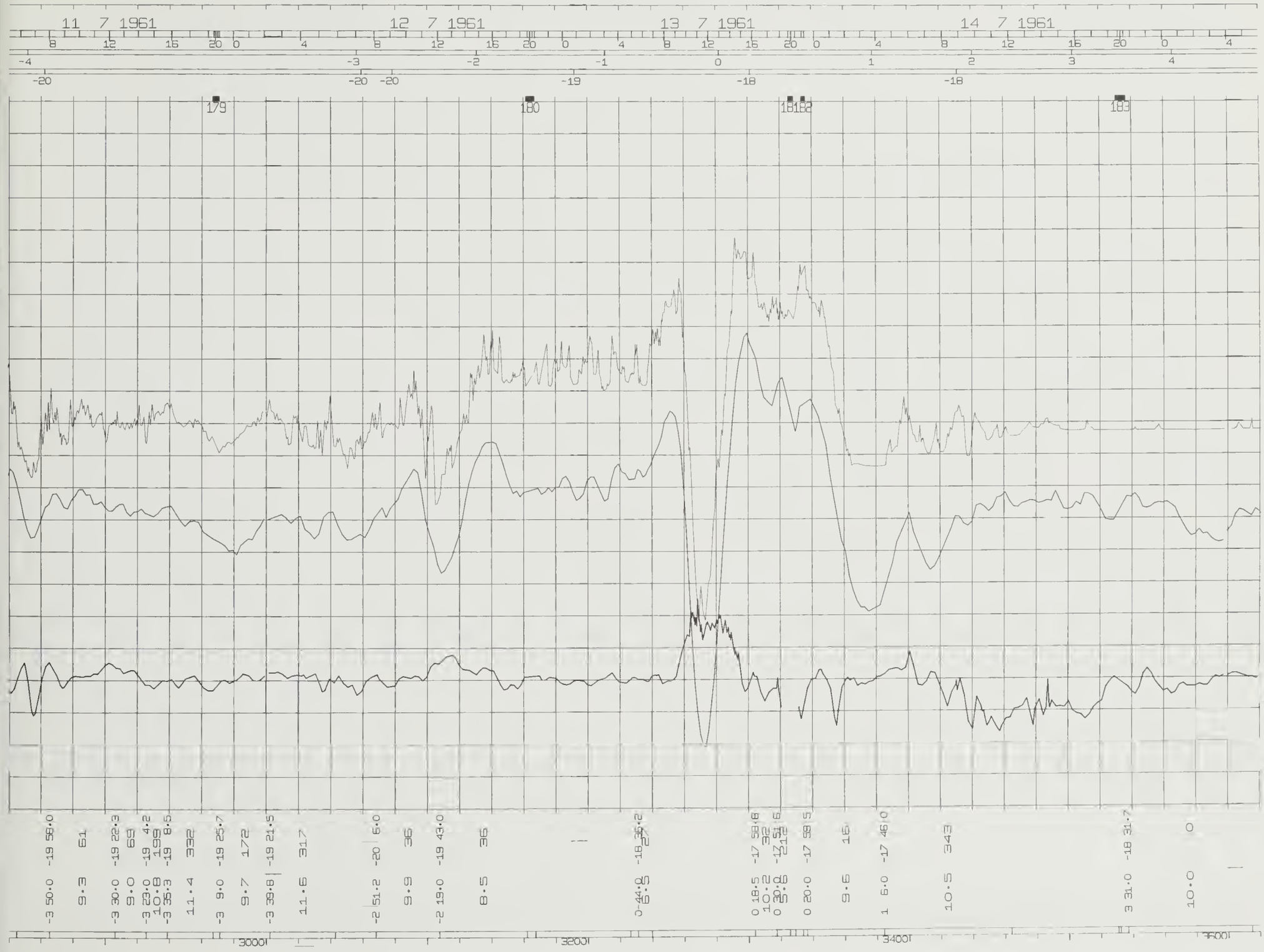
Talwani, M. (1969) A computer system for the reduction, storage and display of underway data acquired at sea; Technical Report No. CU-1-69 N00014-67-A-0108-0004, p. 1-348.

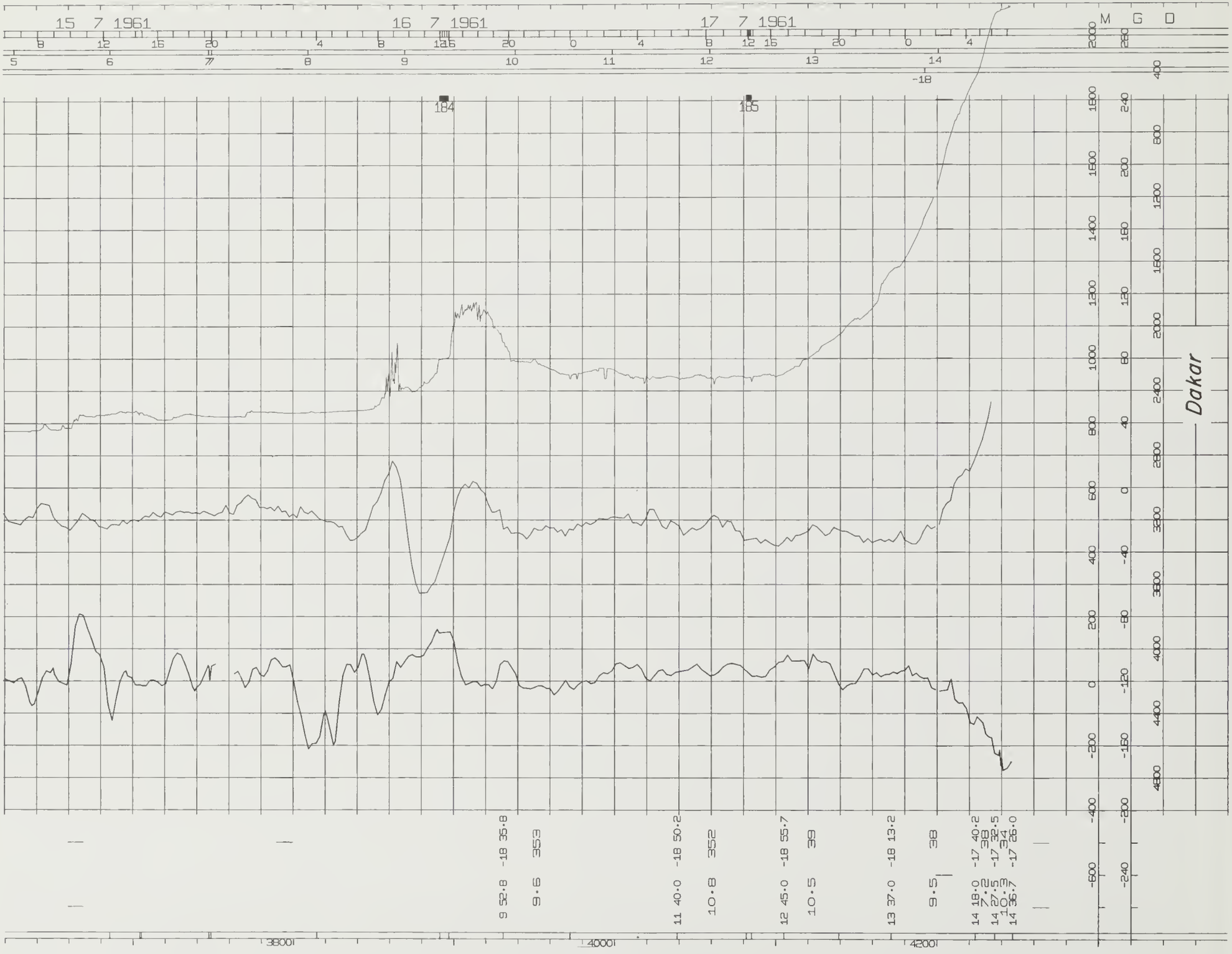

M G D
27 6 1961
28 6 1961
29 6 1961
171172
173
Buenos Aires

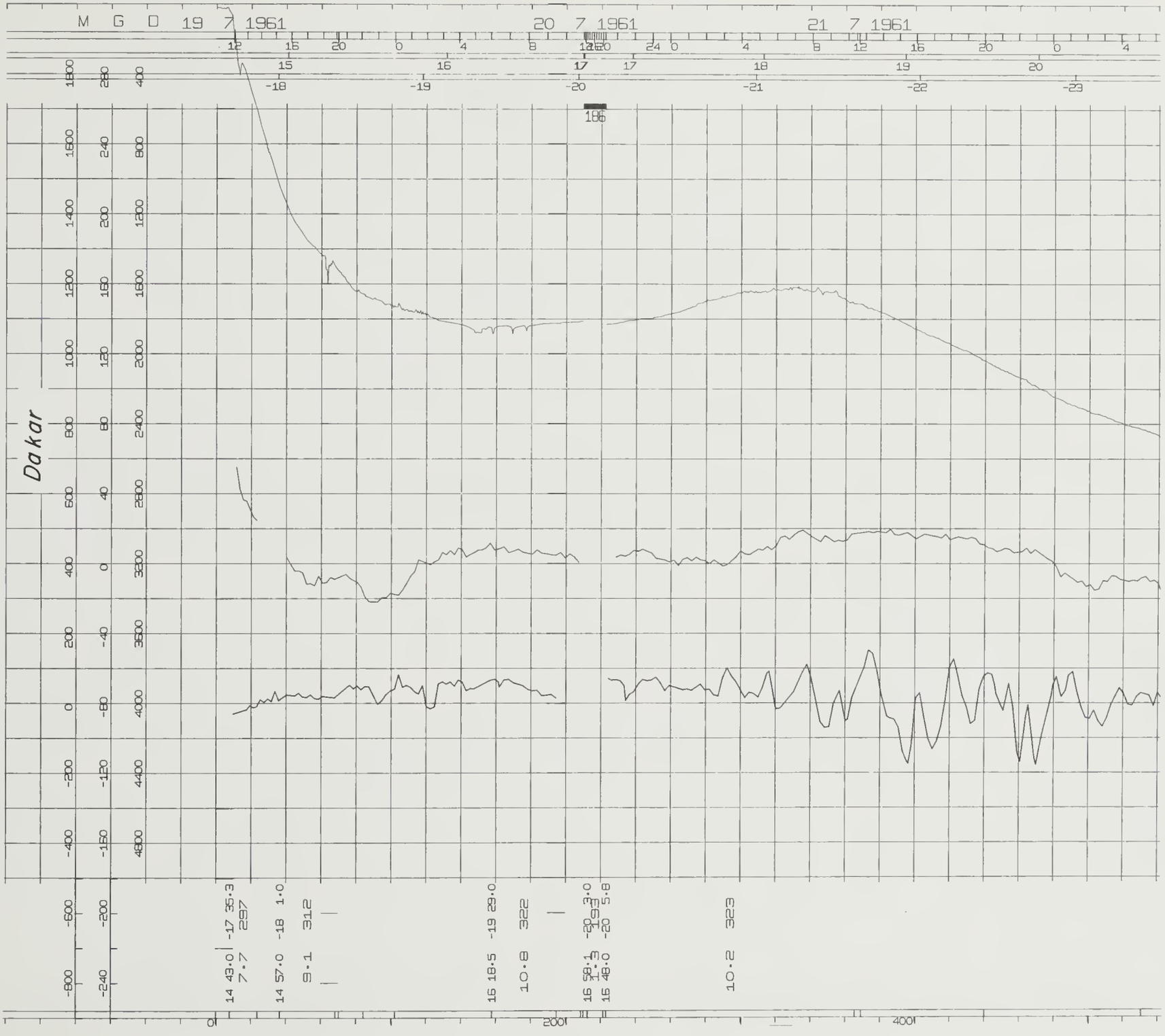

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0 4 8 12 16 20 0 4 8 12 16 20 0 4 8 12 16 20 0 4
-30 -29 -28 -27 -26 -25 -24 -23
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10001
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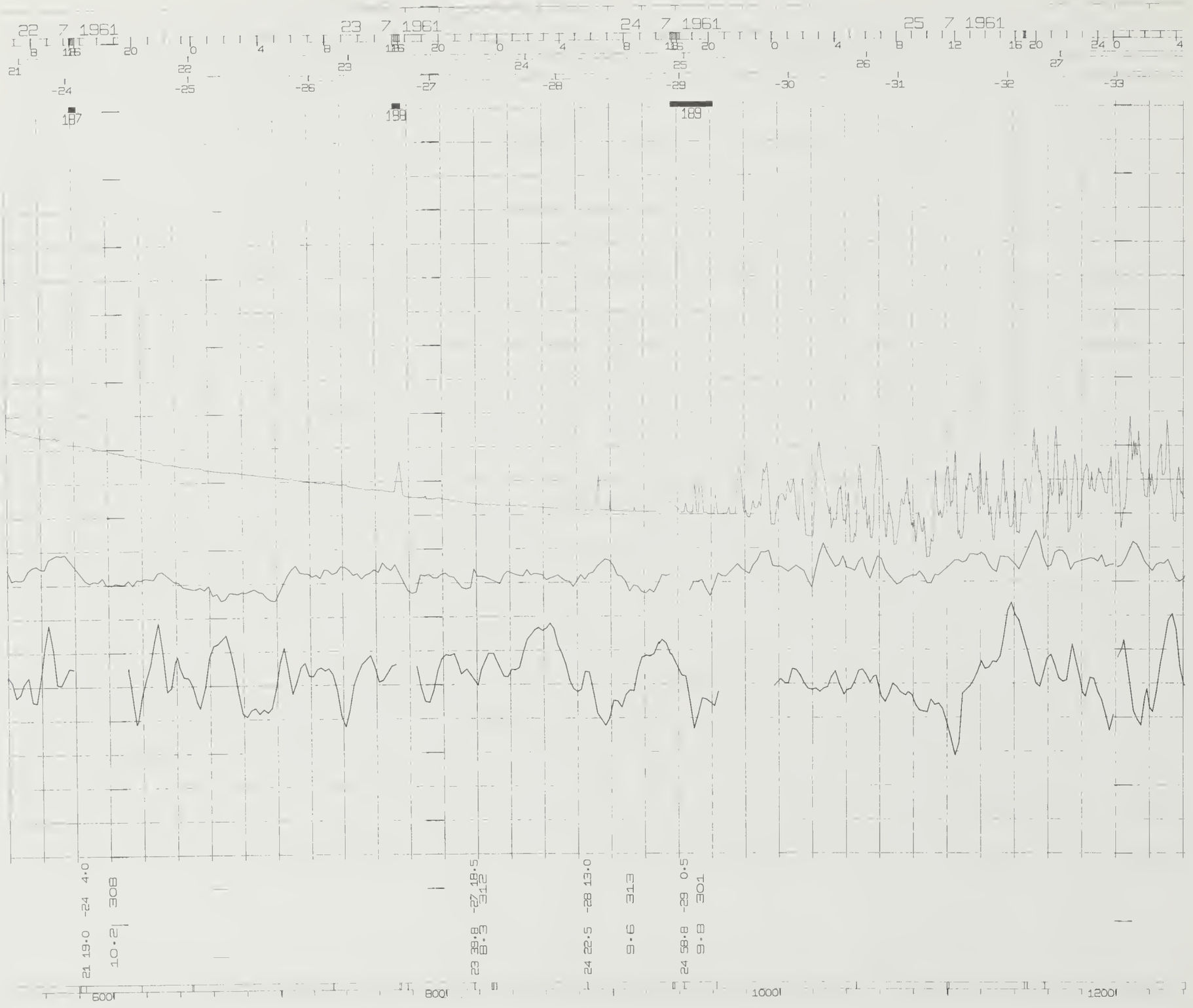

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177
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1600
1800
2000

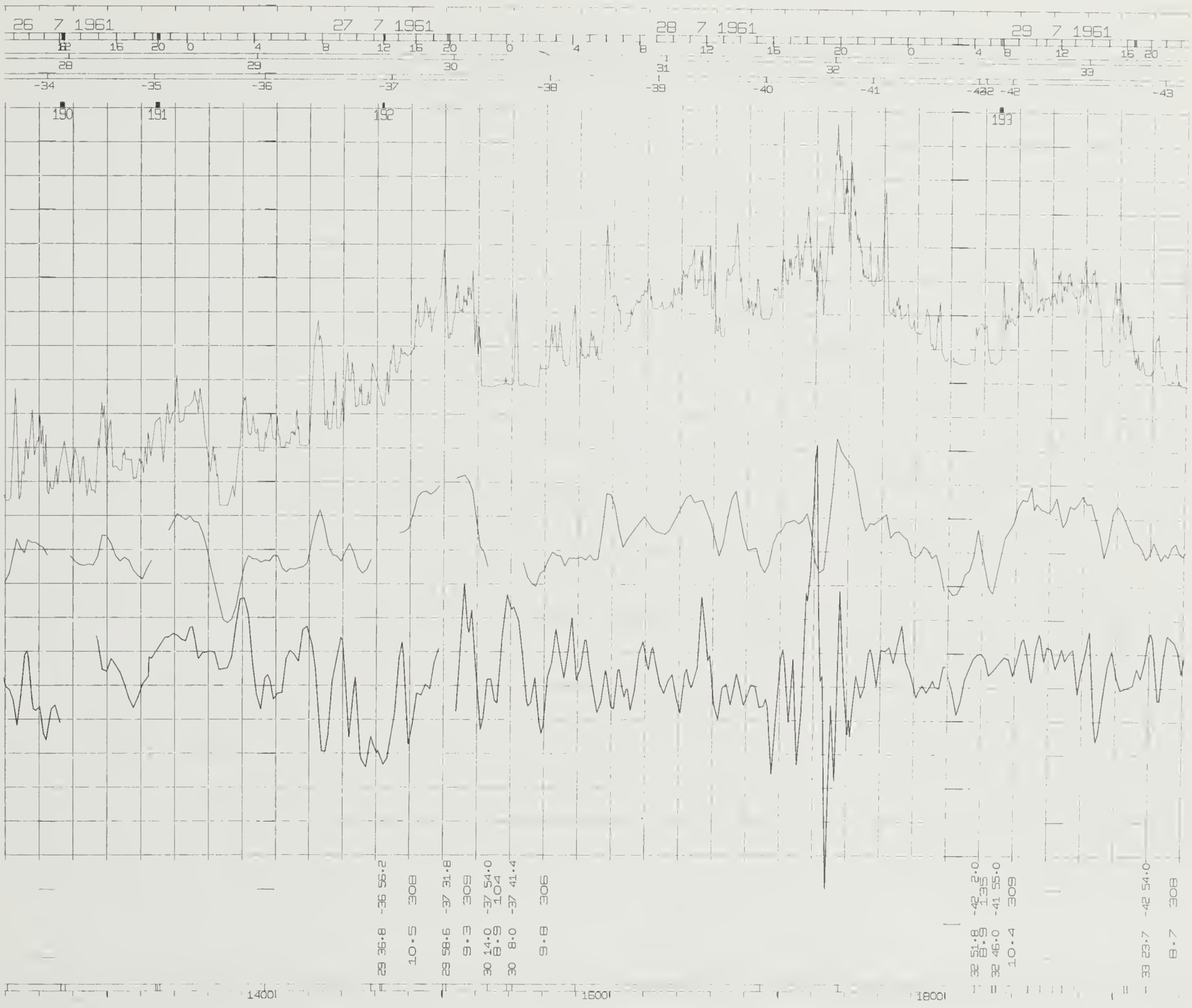

7 7 1961
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178
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8·1 48
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2600
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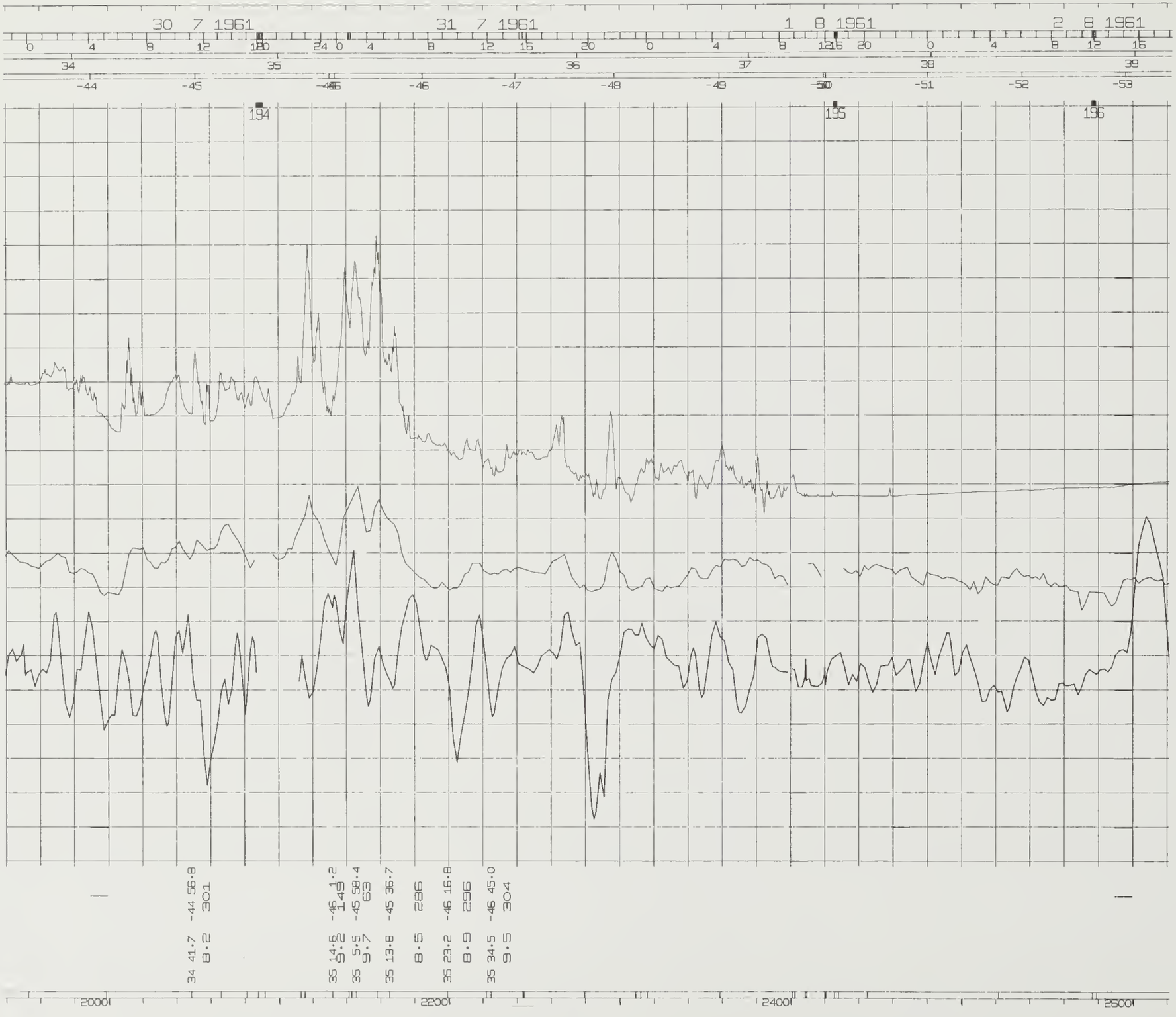

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3600

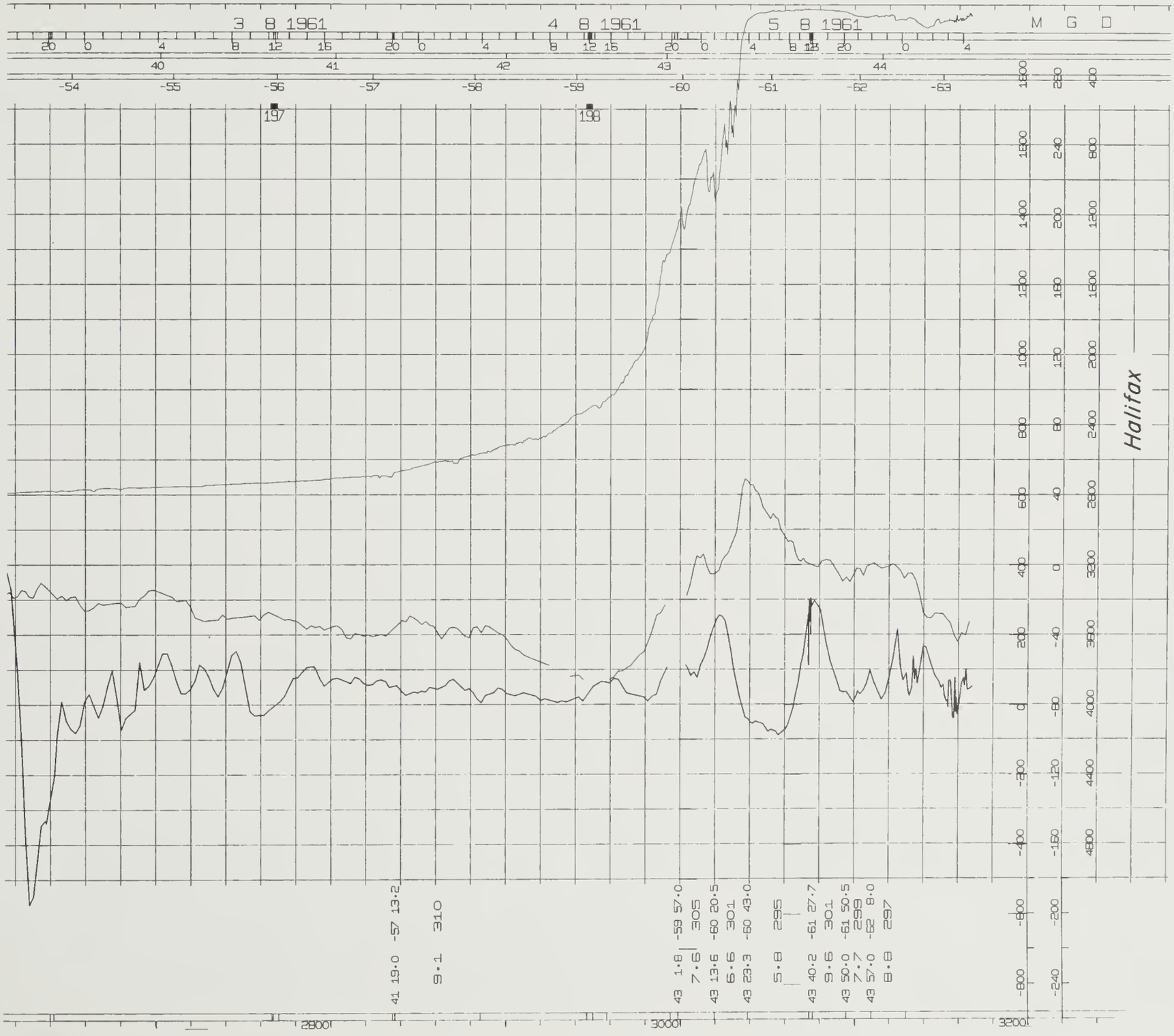

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M G D
184
185
Dakar

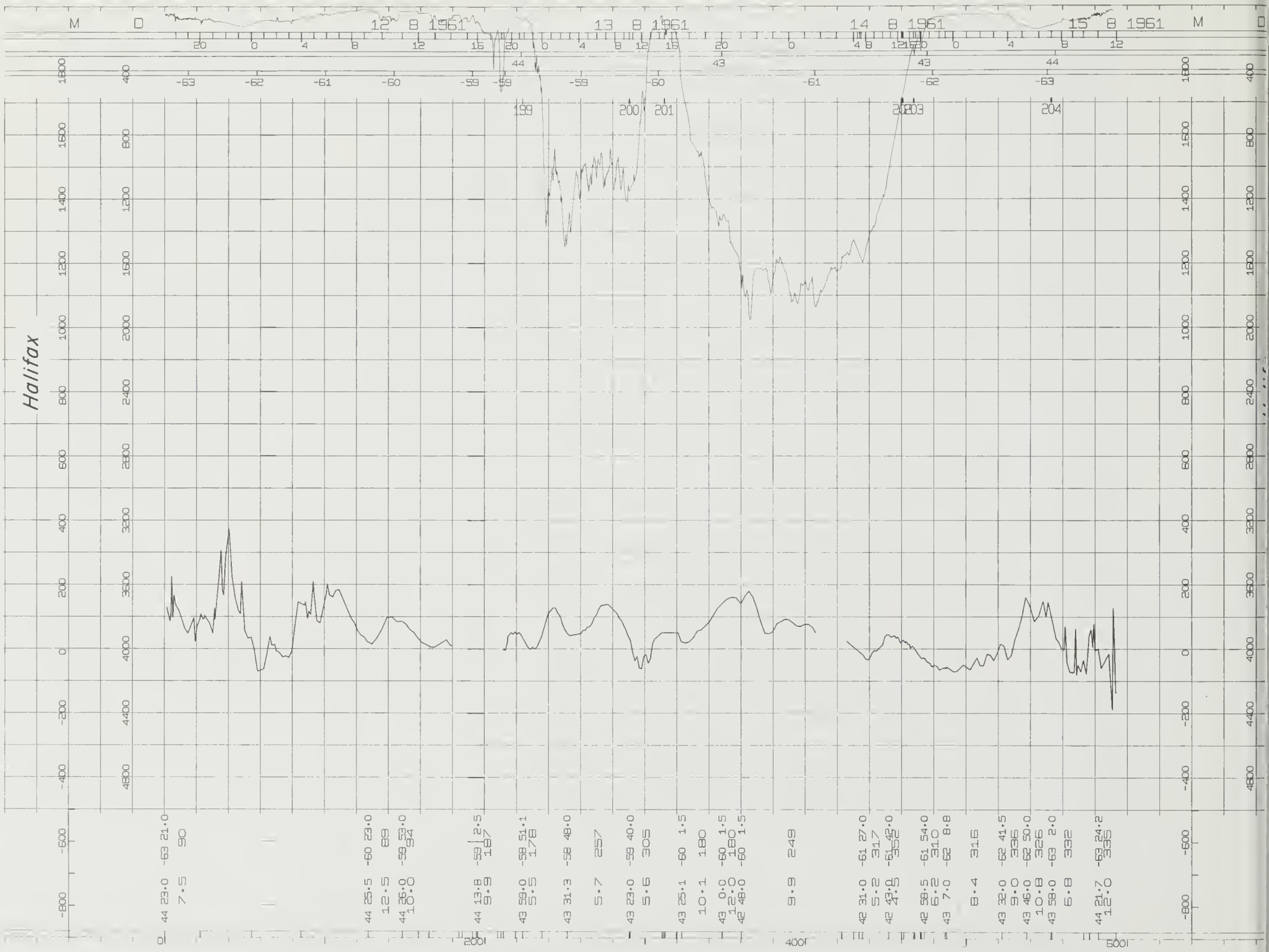

M G D 19 7 1961
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21 7 1961
Dakar
186

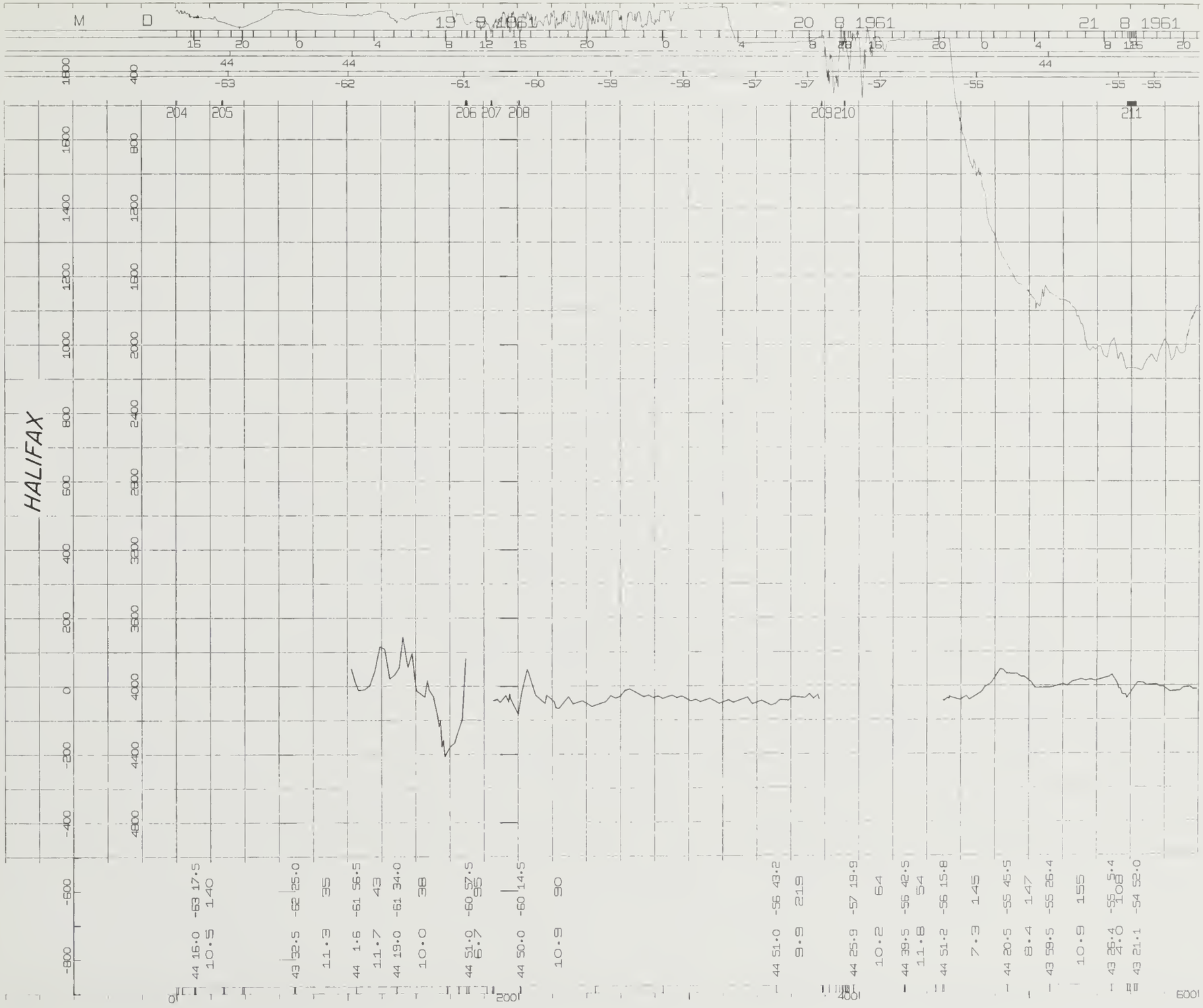

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23 7 1961
24 7 1961
25 7 1961
187
189
21 19·0 -24 4·0 308
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23 39·8 -27 18·5 312
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9·6
24 58·8 -29 0·5 301
9·8
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8000
10000
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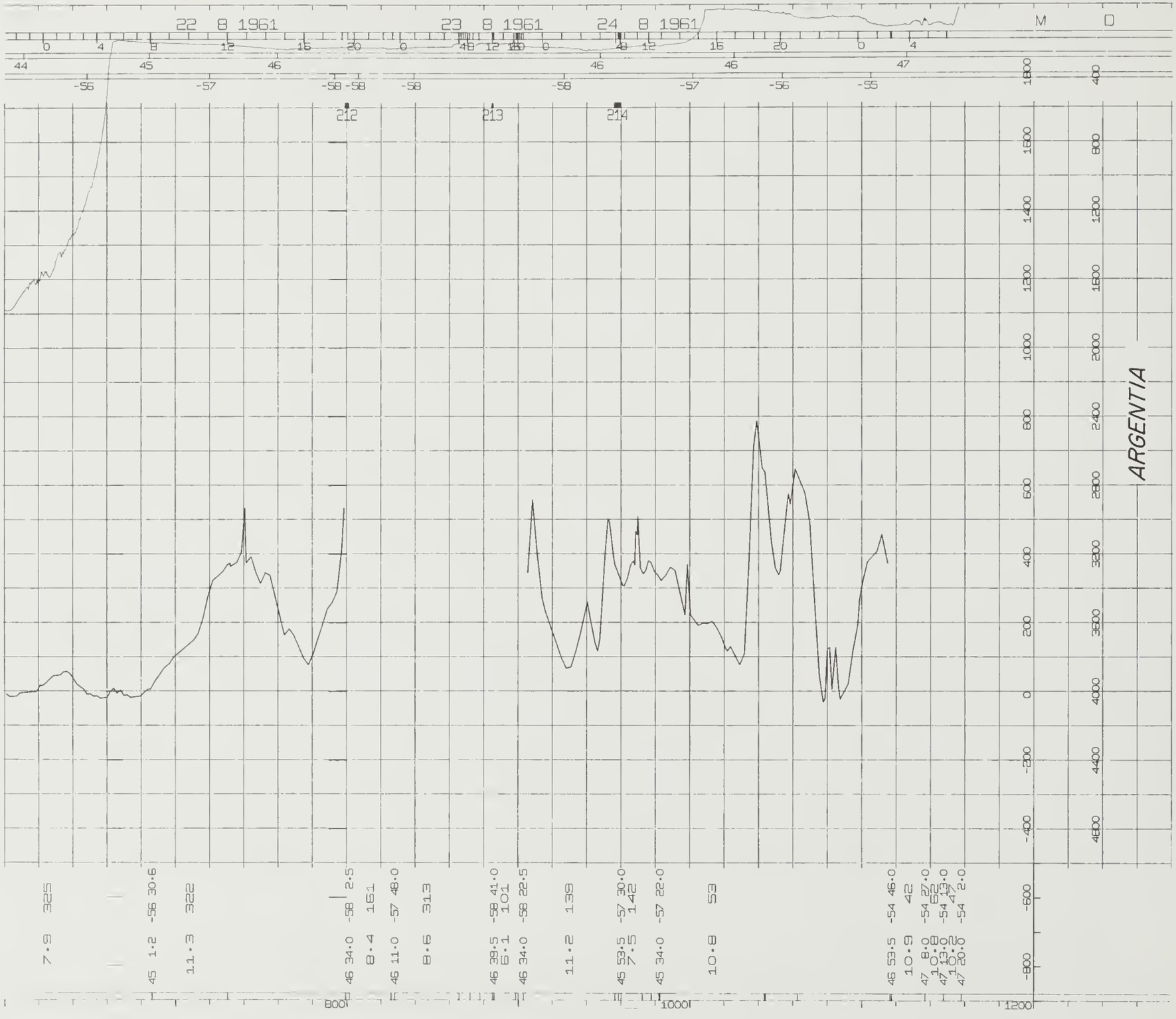

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28 7 1961
29 7 1961
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191
192
193
1400
1500
1800

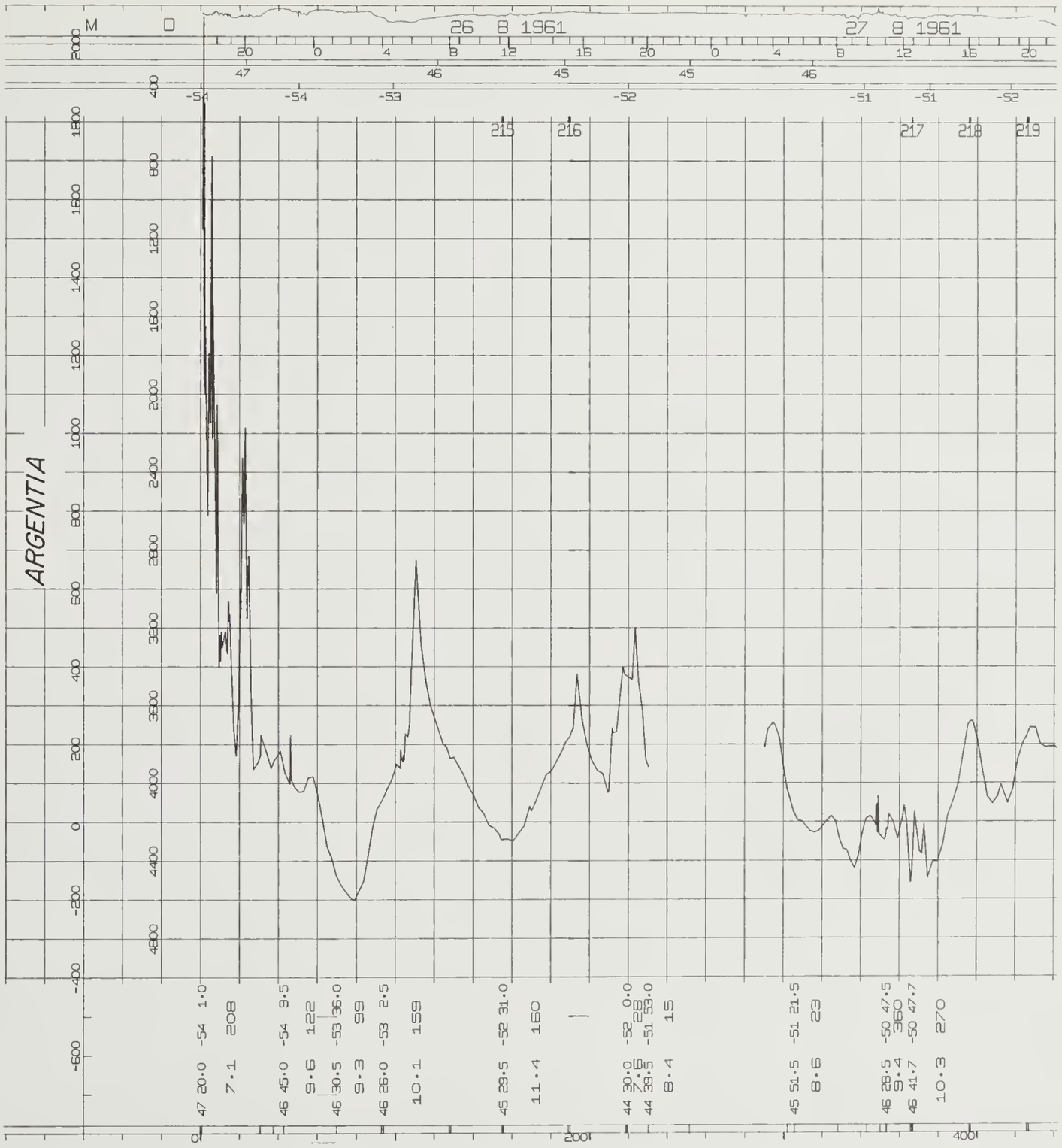

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9·2
35 14·6
-45 58·4
63
5·5
35 5·7
-45 36·7
286
8·5
35 13·8
-46 16·8
296
8·9
35 23·2
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2400
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3 8 1961
4 8 1961
5 8 1961
M G D
Halifax

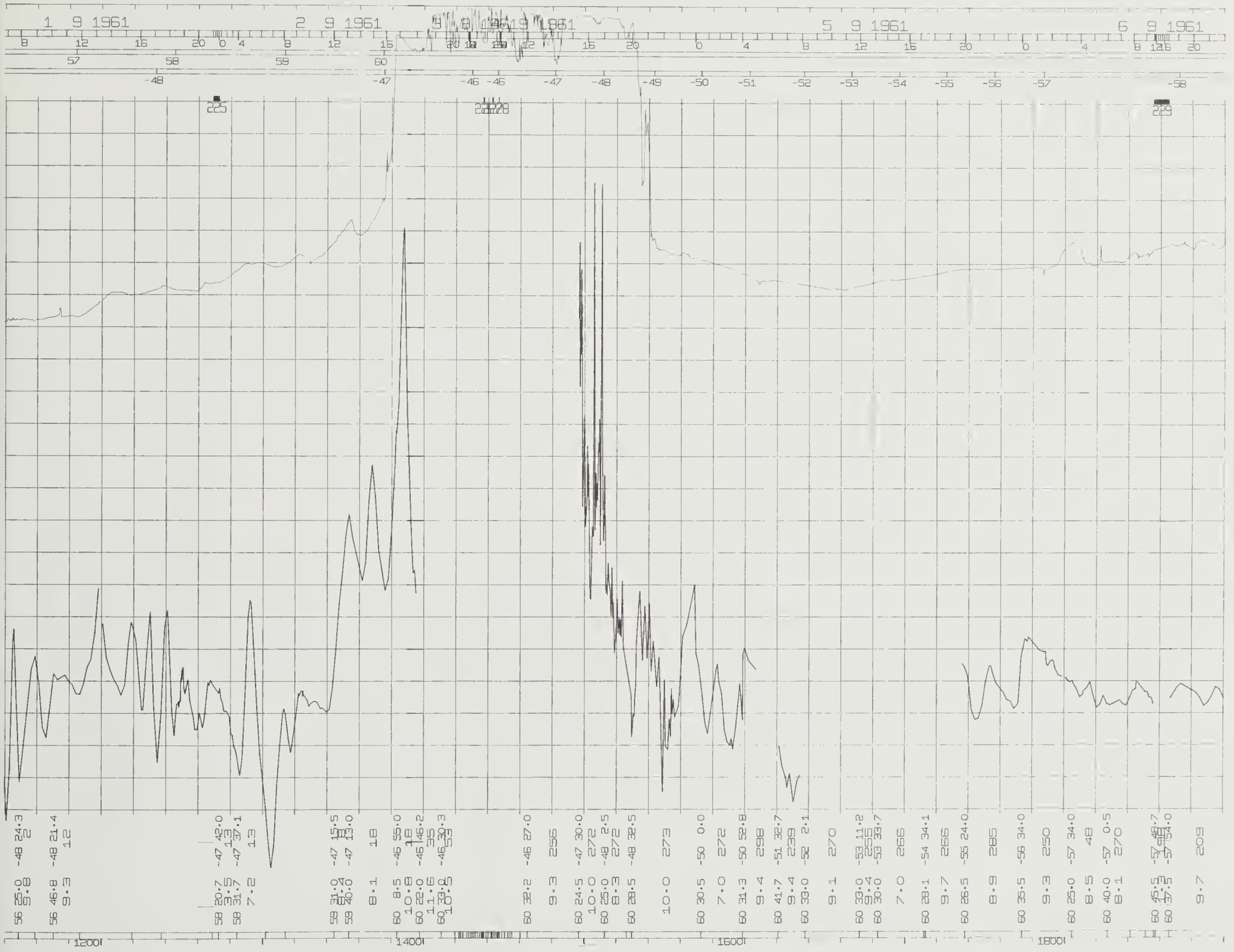

Halifax
M D 12 8 1961 13 8 1961 14 8 1961 15 8 1961 M D


HALIFAX
M D
19 8 1961
20 8 1961
21 8 1961

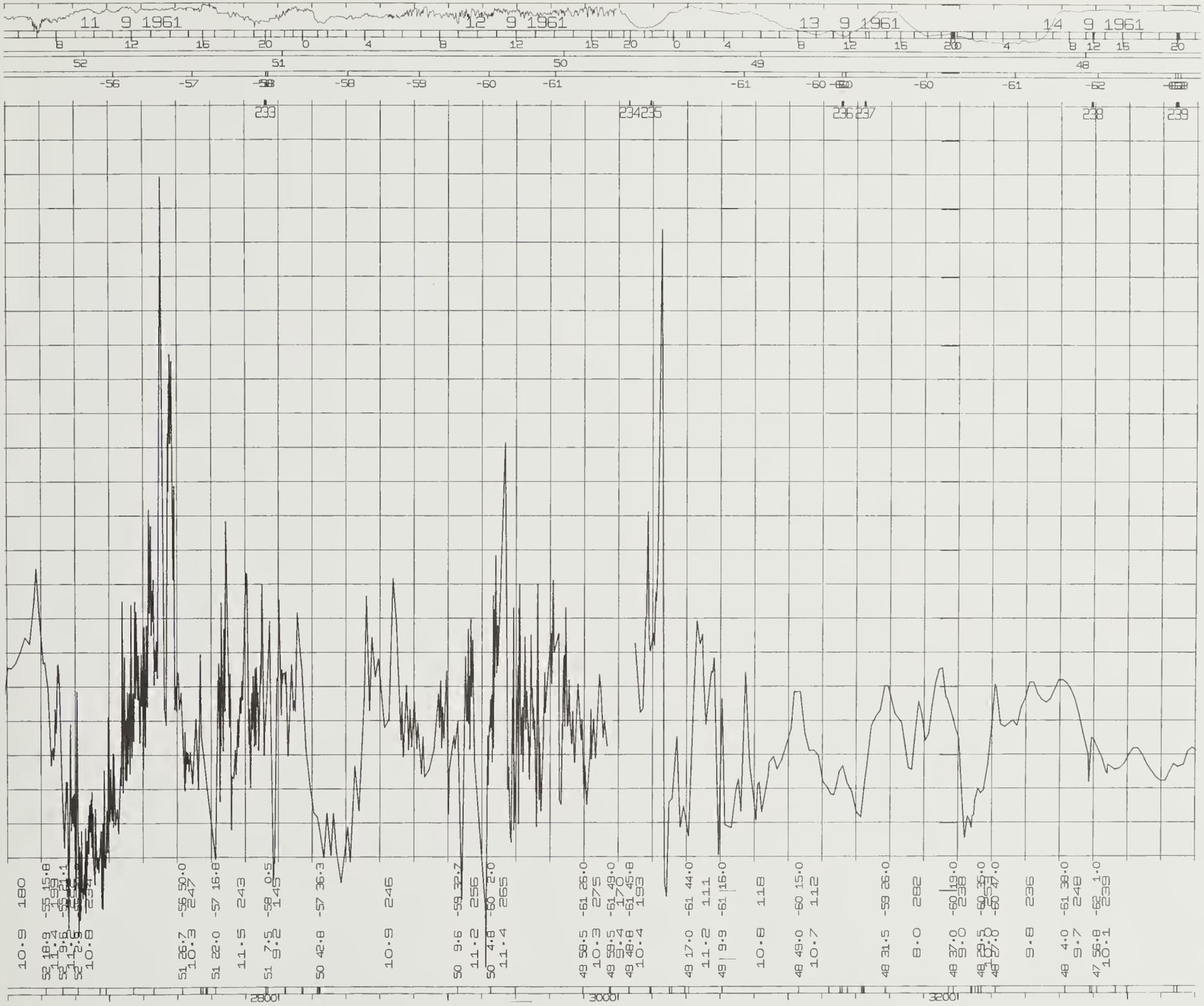

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M
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212
213
214
ARGENTIA

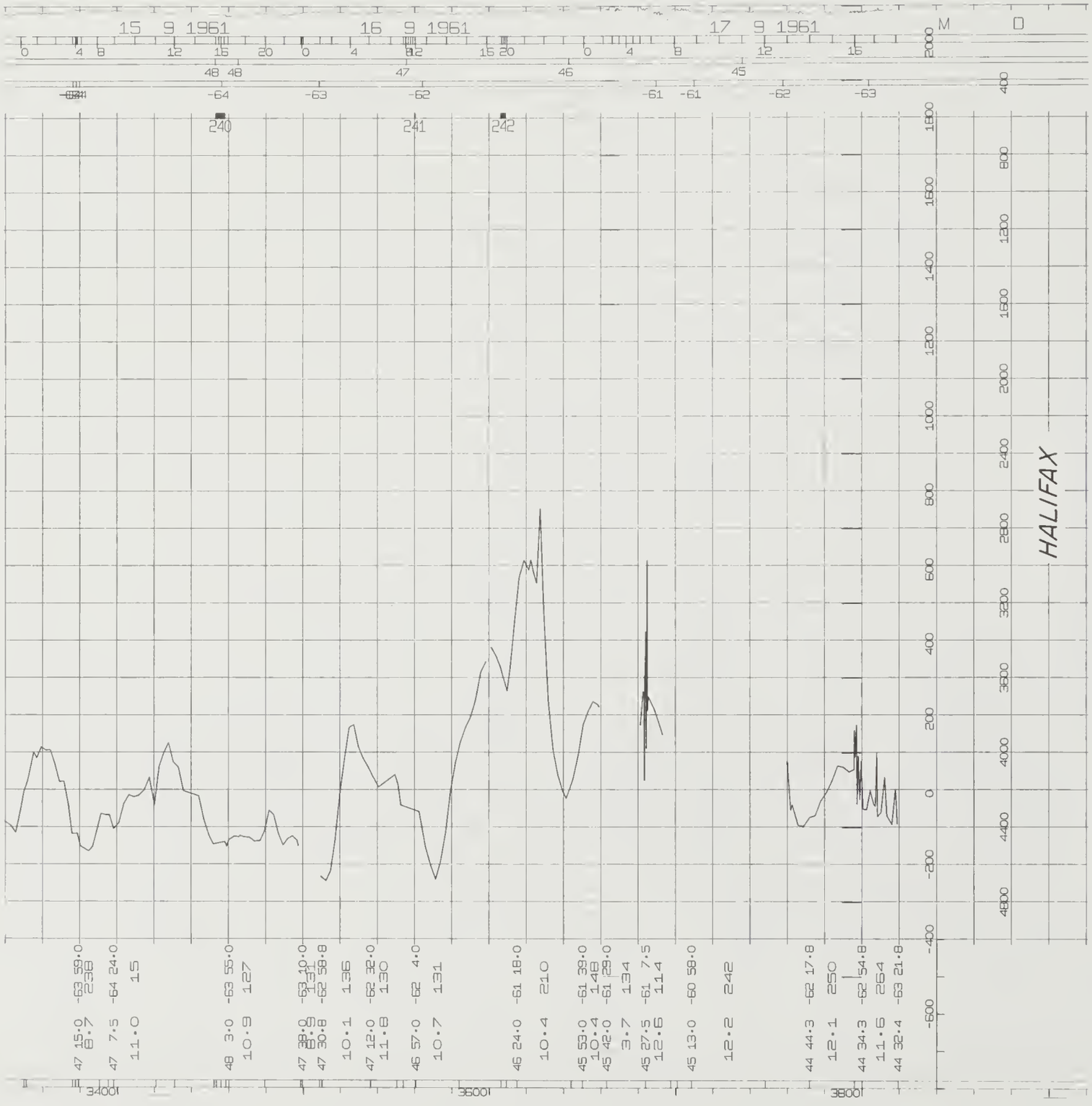

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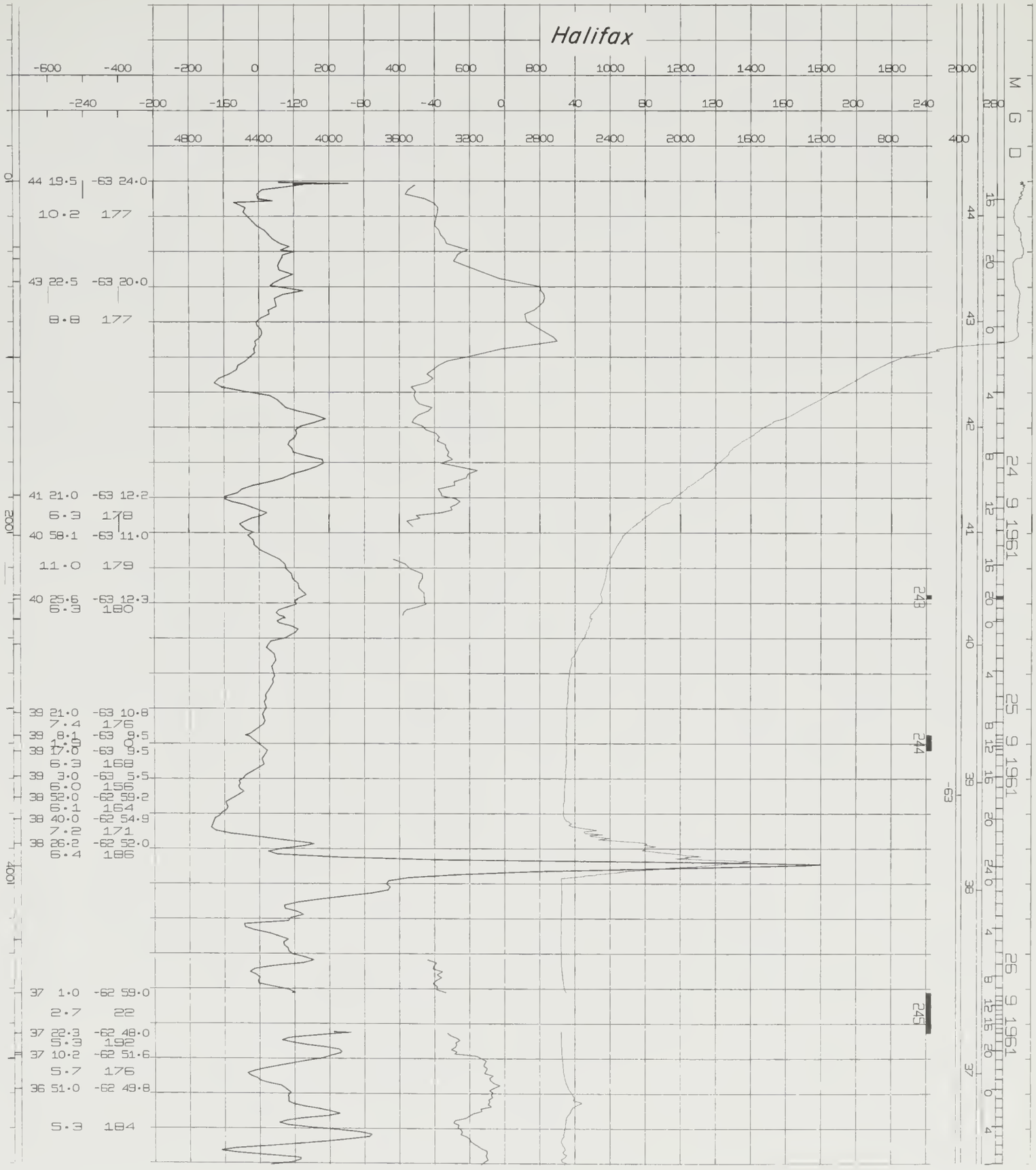

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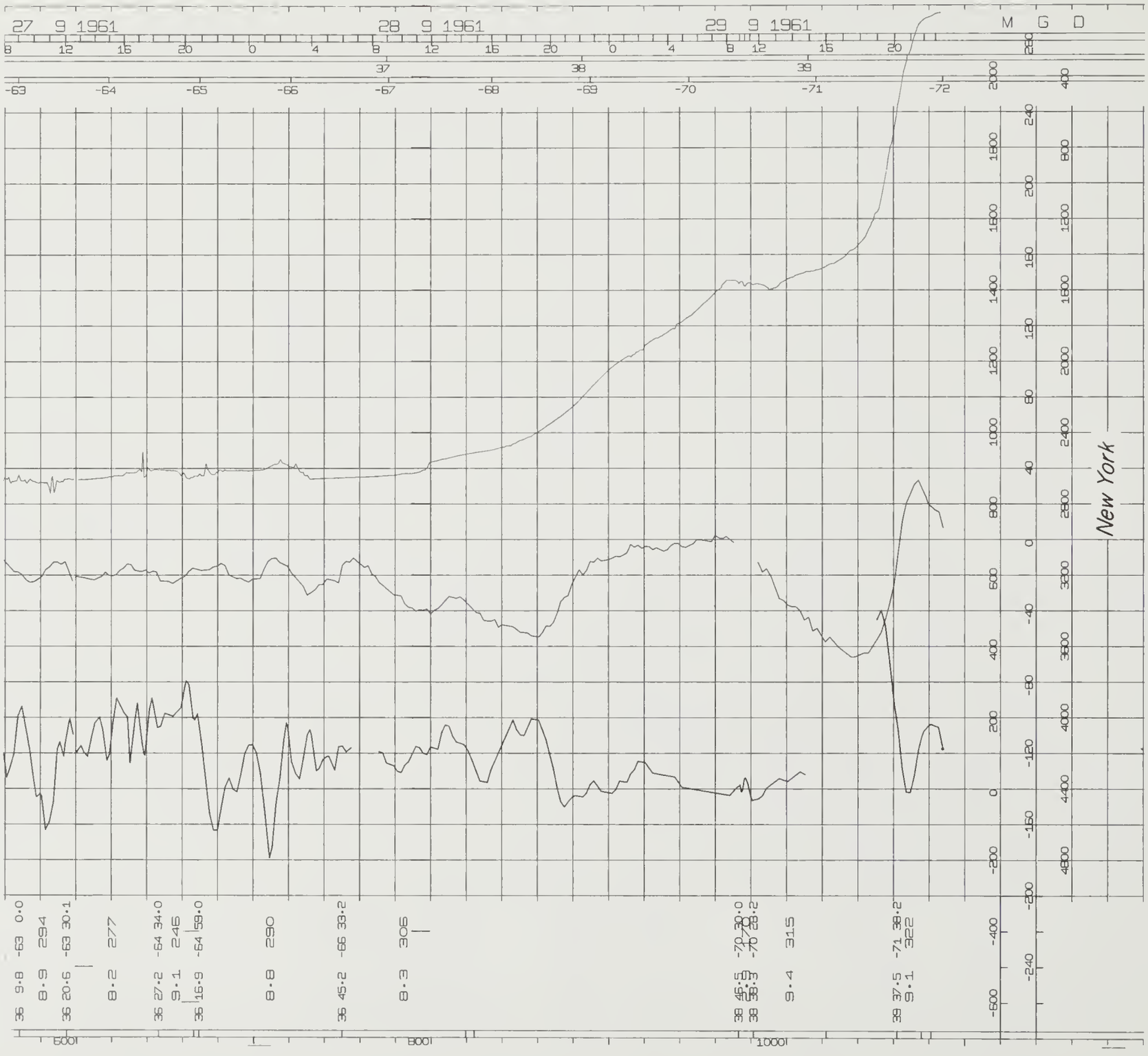

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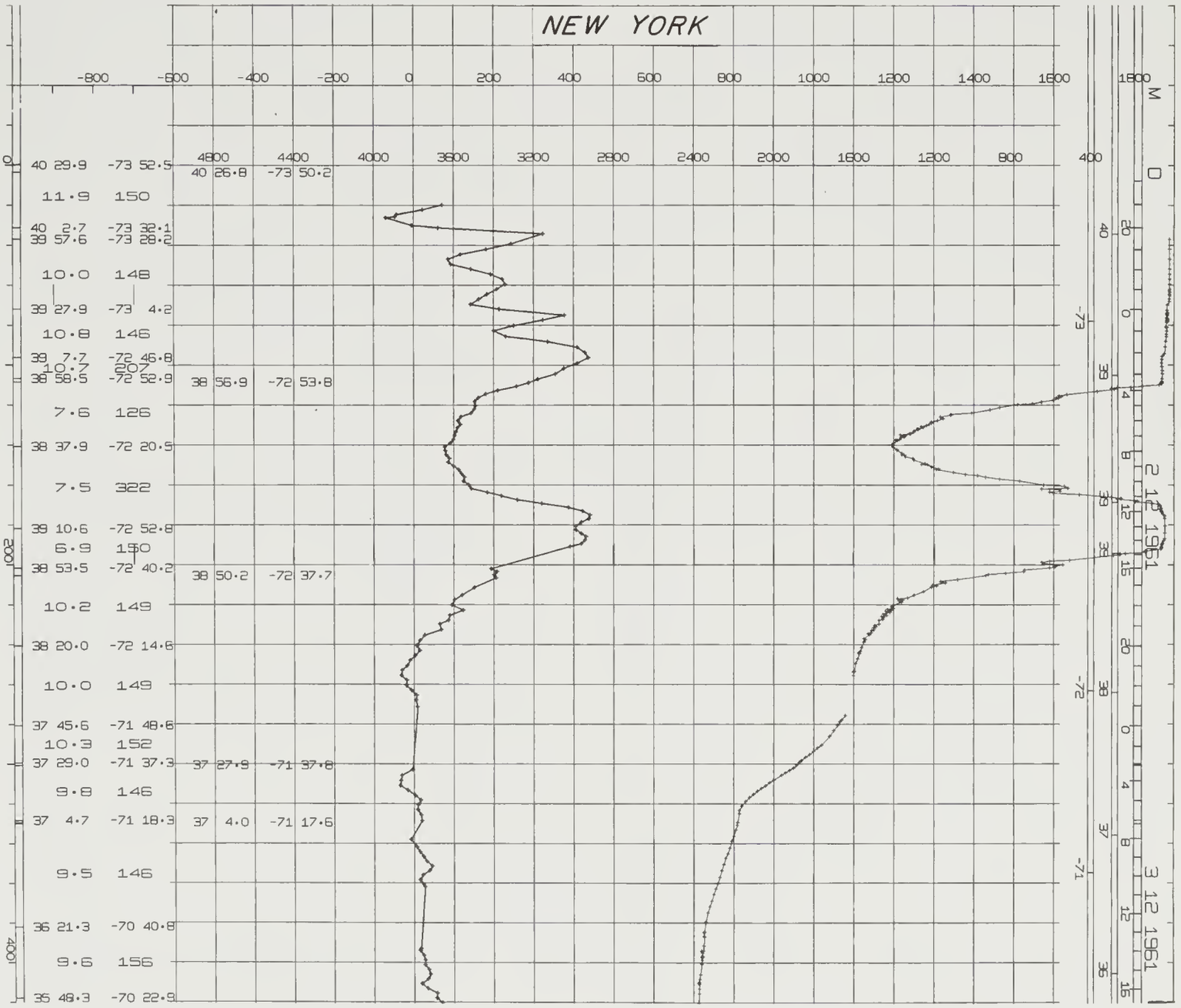

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2400
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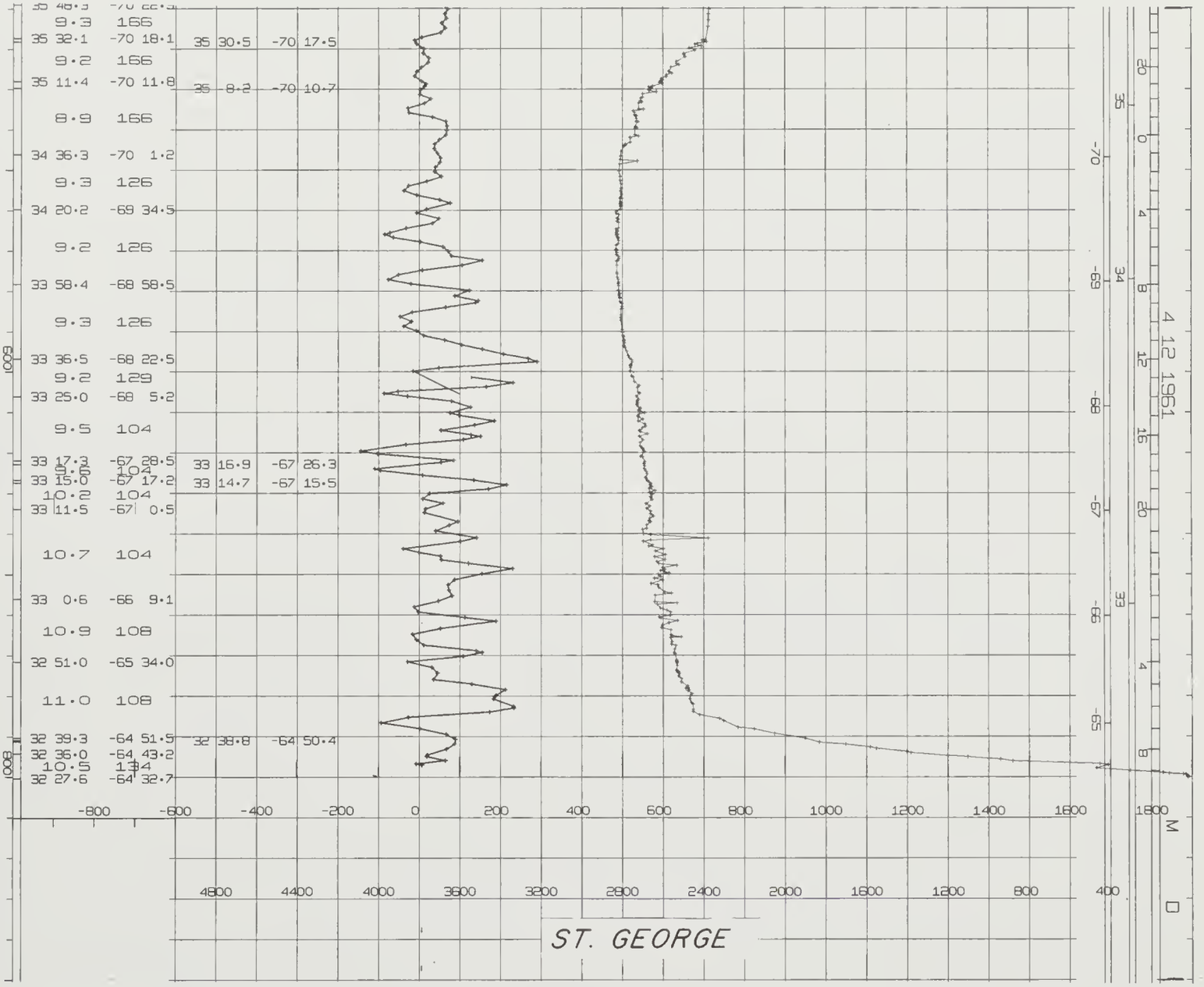

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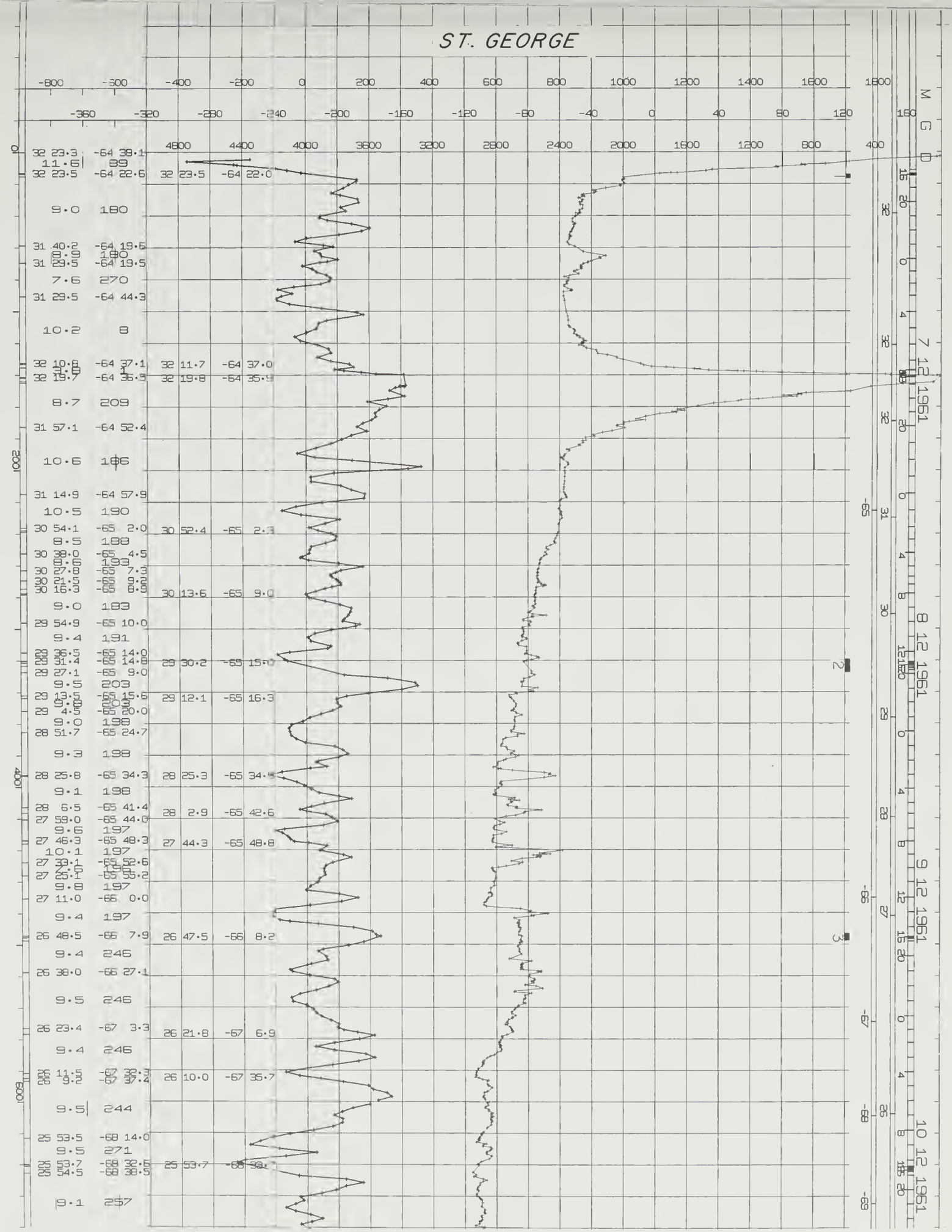

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M
D
240
241
242
HALIFAX

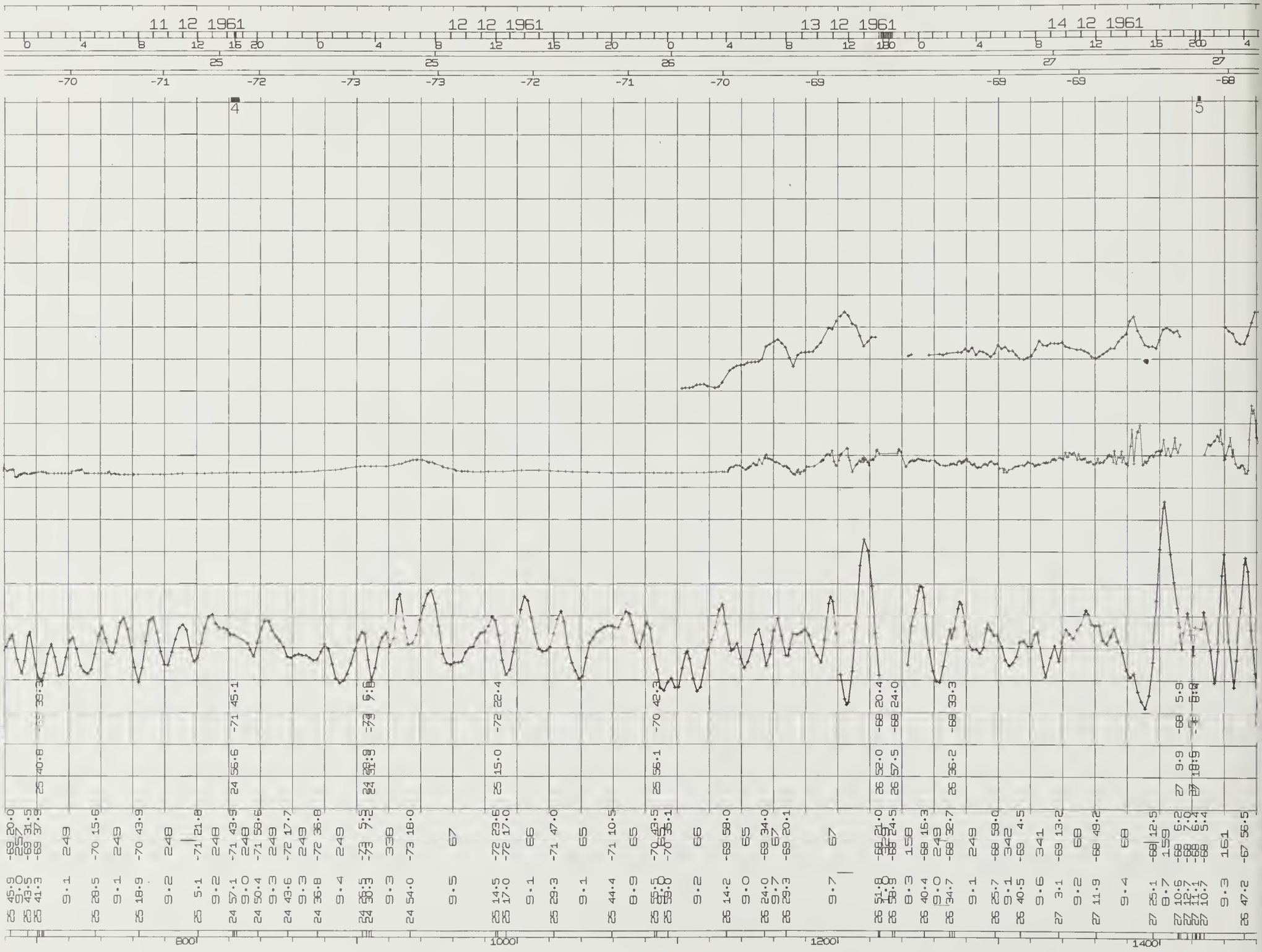

Halifax
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44 19.5 -63 24.0
10.2 177
43 22.5 -63 20.0
8.8 177
41 21.0 -63 12.2
6.3 178
40 58.1 -63 11.0
11.0 179
40 25.6 -63 12.3
6.3 180
38 21.0 -63 10.8
7.4 176
38 8.1 -63 9.5
39 17.0 -63 9.5
6.3 168
39 3.0 -63 5.5
6.0 156
38 52.0 -62 59.2
6.1 164
38 40.0 -62 54.9
7.2 171
38 26.2 -62 52.0
6.4 186
37 1.0 -62 59.0
2.7 22
37 22.3 -62 48.0
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5.3 184
M G D
24 9 1961
25 9 1961
26 9 1961

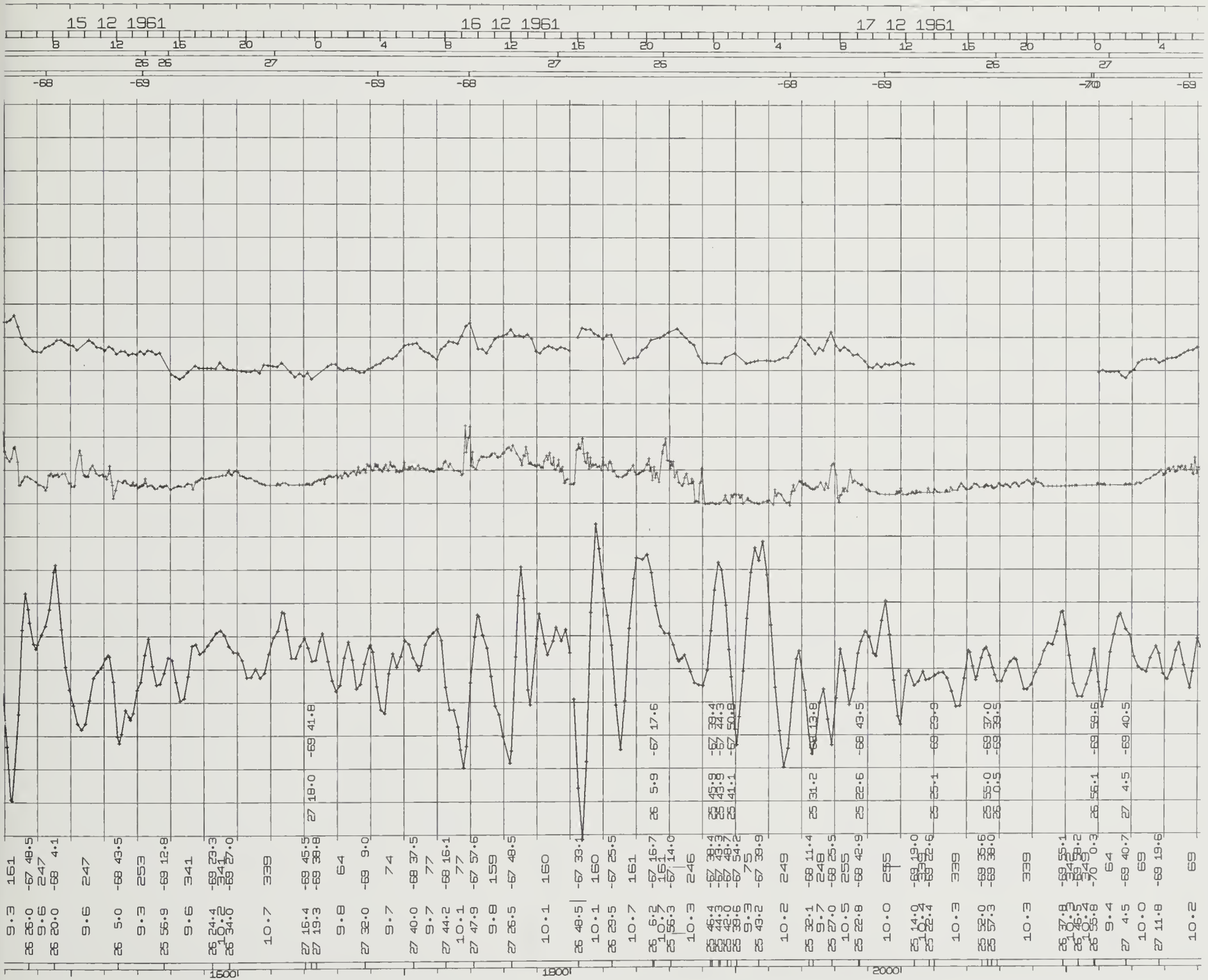

27 9 1961
28 9 1961
29 9 1961
M G D
New York


NEW YORK
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11.9 150
40 2.7 -73 32.1
39 57.6 -73 28.2
10.0 148
39 27.9 -73 4.2
10.8 146
39 7.7 -72 46.8
10.7 207
38 58.5 -72 52.9
7.6 126
38 37.9 -72 20.5
7.5 322
39 10.6 -72 52.8
6.9 150
38 53.5 -72 40.2
10.2 149
38 20.0 -72 14.6
10.0 149
37 45.6 -71 48.6
10.3 152
37 29.0 -71 37.3
9.8 146
37 4.7 -71 18.3
9.5 146
36 21.3 -70 40.8
9.6 156
35 48.3 -70 22.9
40 26.8 -73 50.2
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37 4.0 -71 17.6
M D
2 12 1961
3 12 1961

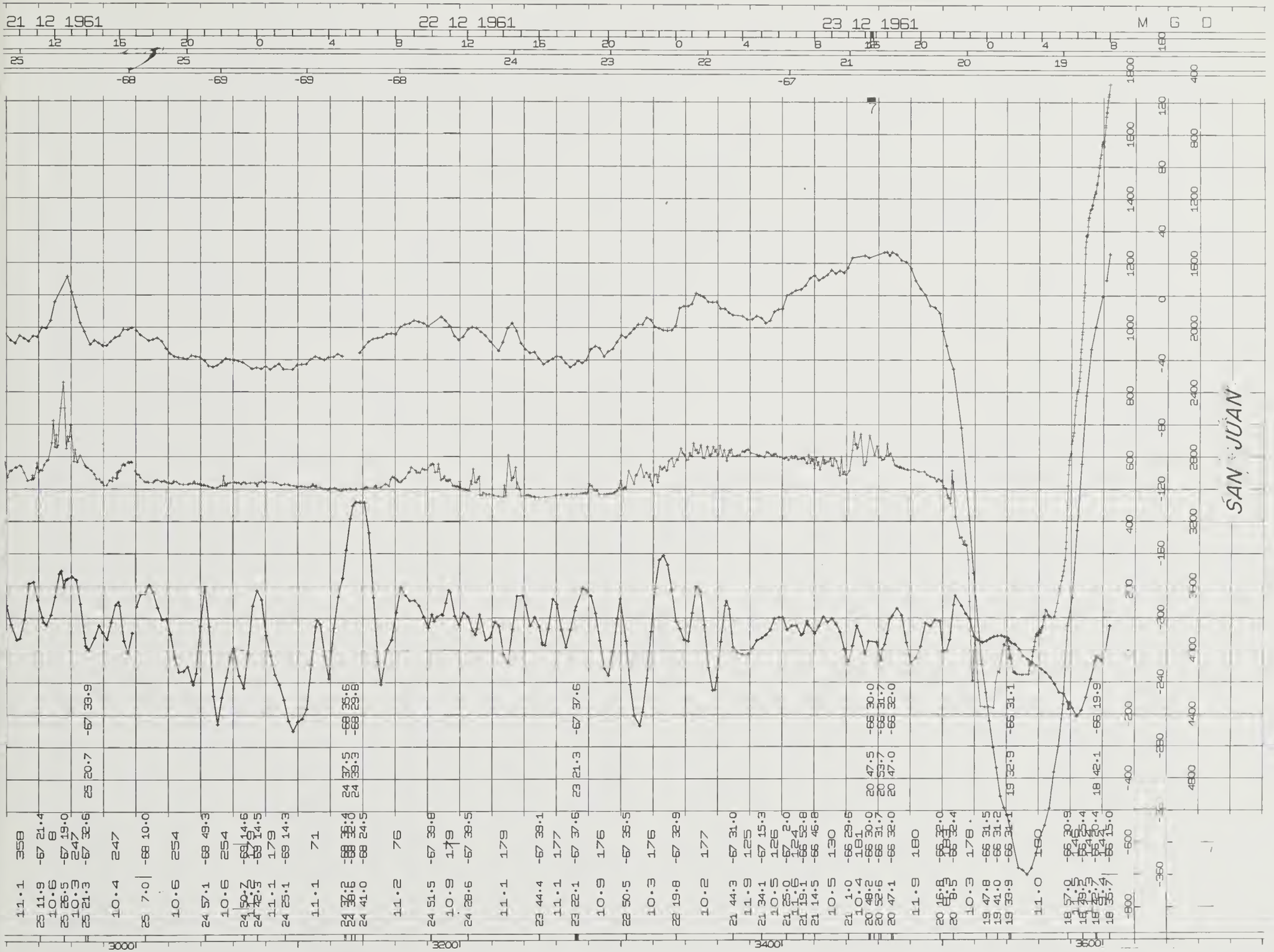

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34 36.3 -70 1.2
9.3 126
34 20.2 -69 34.5
9.2 126
33 58.4 -68 58.5
9.3 126
33 36.5 -68 22.5
9.2 129
33 25.0 -68 5.2
9.5 104
33 17.3 -67 28.5
33 16.9 -67 26.3
9.6 104
33 15.0 -67 17.2
33 14.7 -67 15.5
10.2 104
33 11.5 -67 0.5
10.7 104
33 0.6 -66 9.1
10.9 108
32 51.0 -65 34.0
11.0 108
32 39.3 -64 51.5
32 38.8 -64 50.4
32 36.0 -64 43.2
10.5 134
32 27.6 -64 32.7
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ST. GEORGE
4 12 1961
M
D

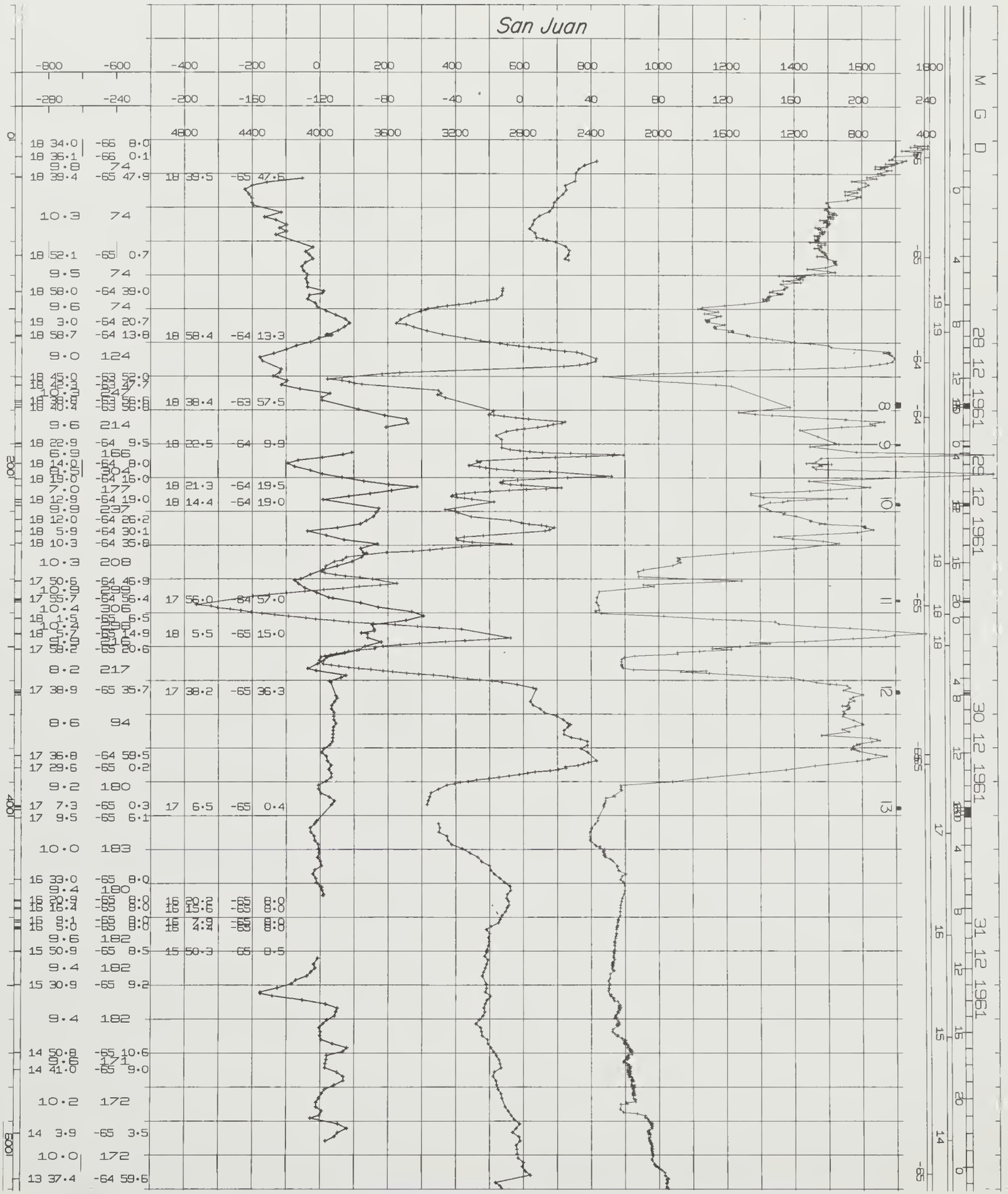

ST. GEORGE
M G D
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10 12 1961

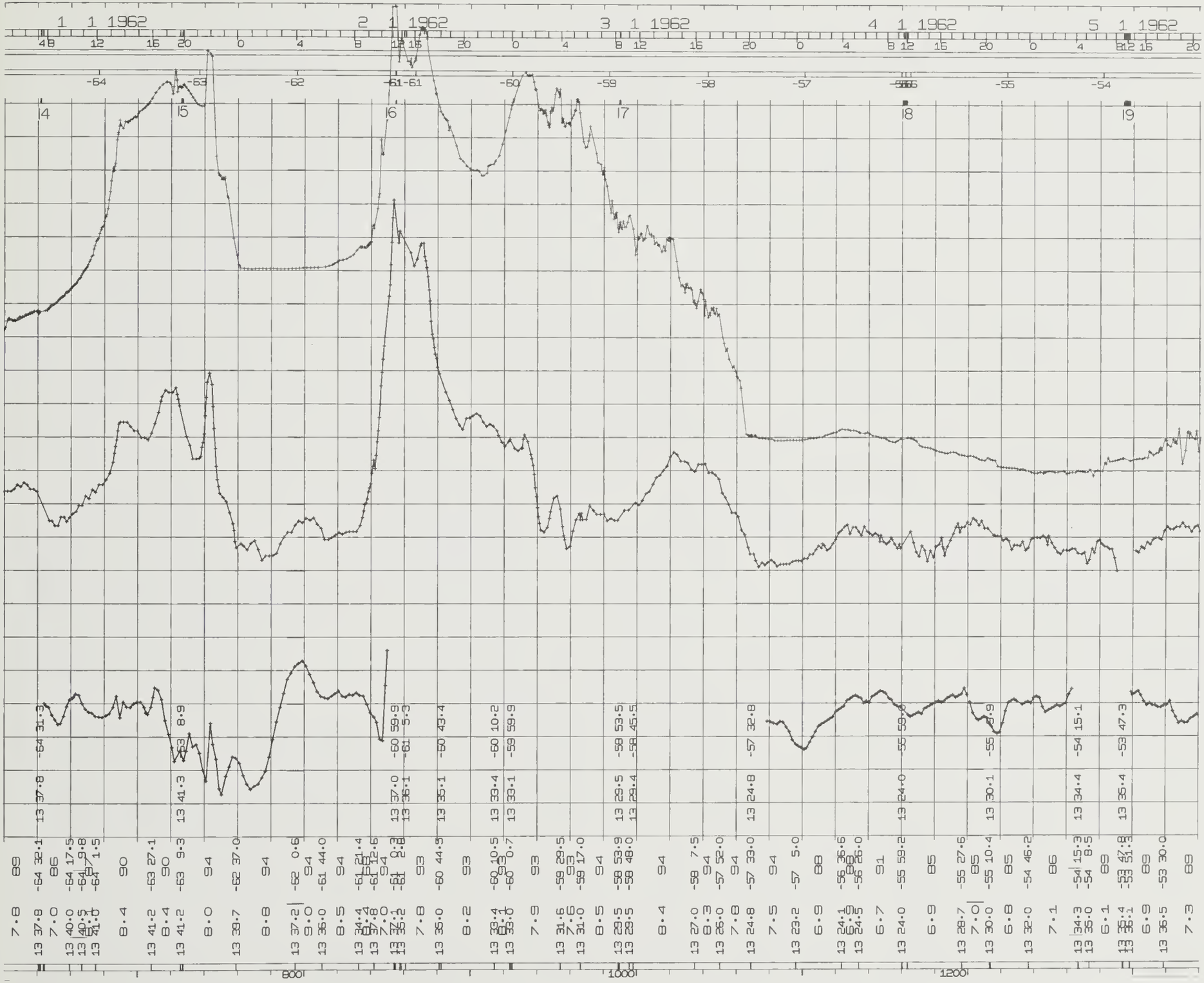

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-70 -71 -72 -73 -73 -72 -71 -70 -69 -69 -69 -68
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5
800
1000
1200
1400


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16 12 1961
17 12 1961

18 12 1961
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20 12 1961

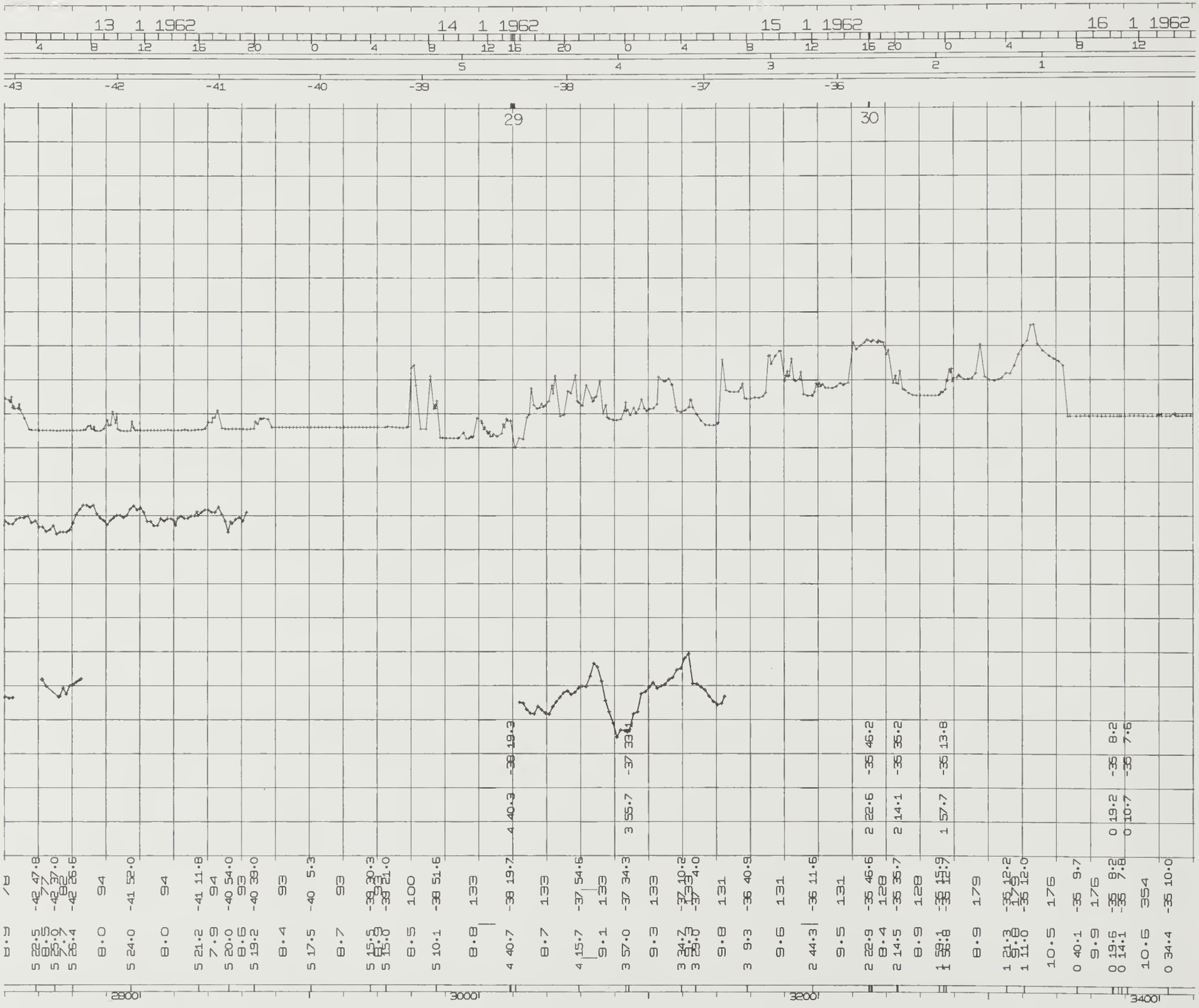

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M G D
SAN JUAN


San Juan
M G D
28 12 1961
29 12 1961
30 12 1961
31 12 1961


1 1 1962
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3 1 1962
4 1 1962
5 1 1962
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19

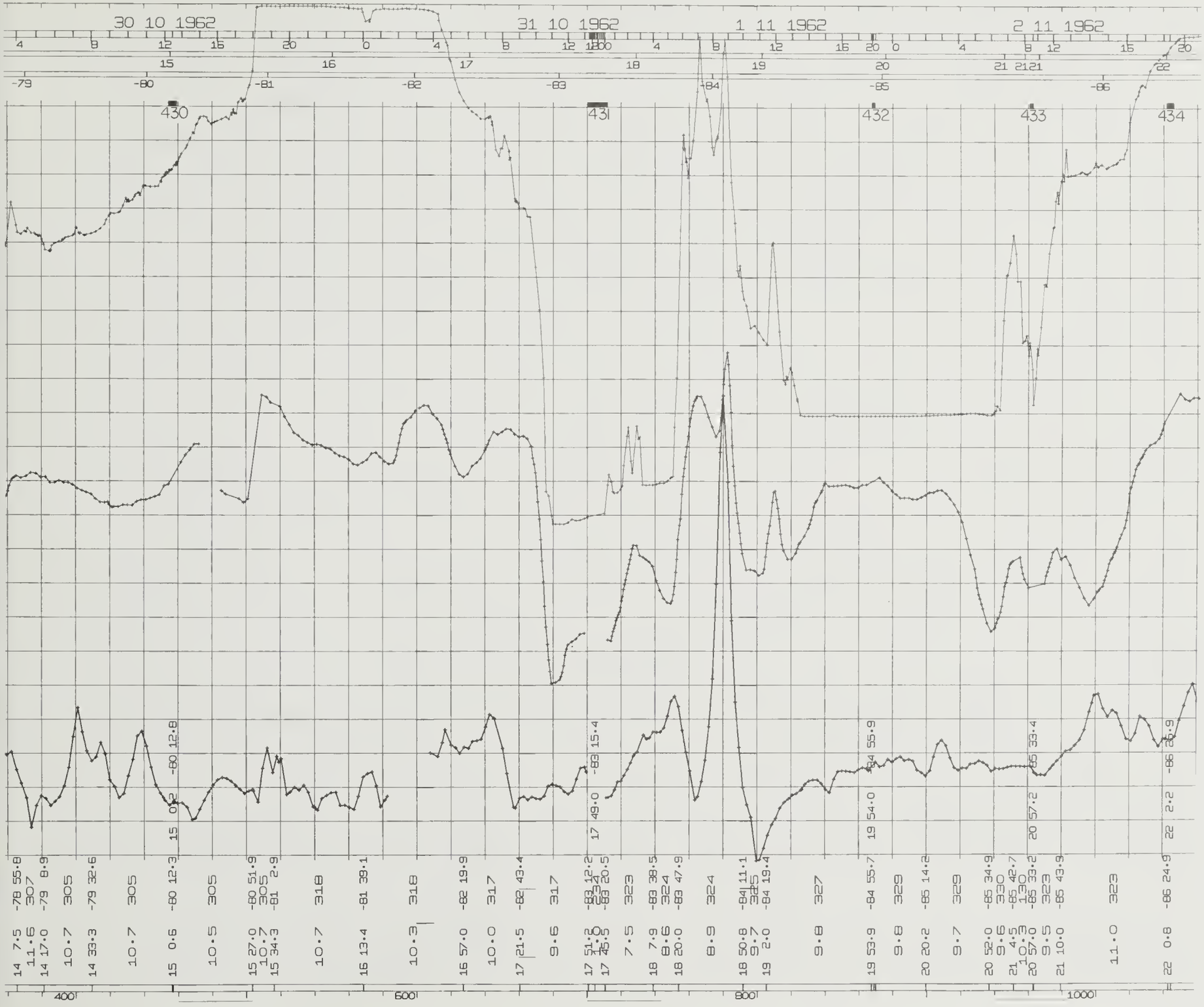
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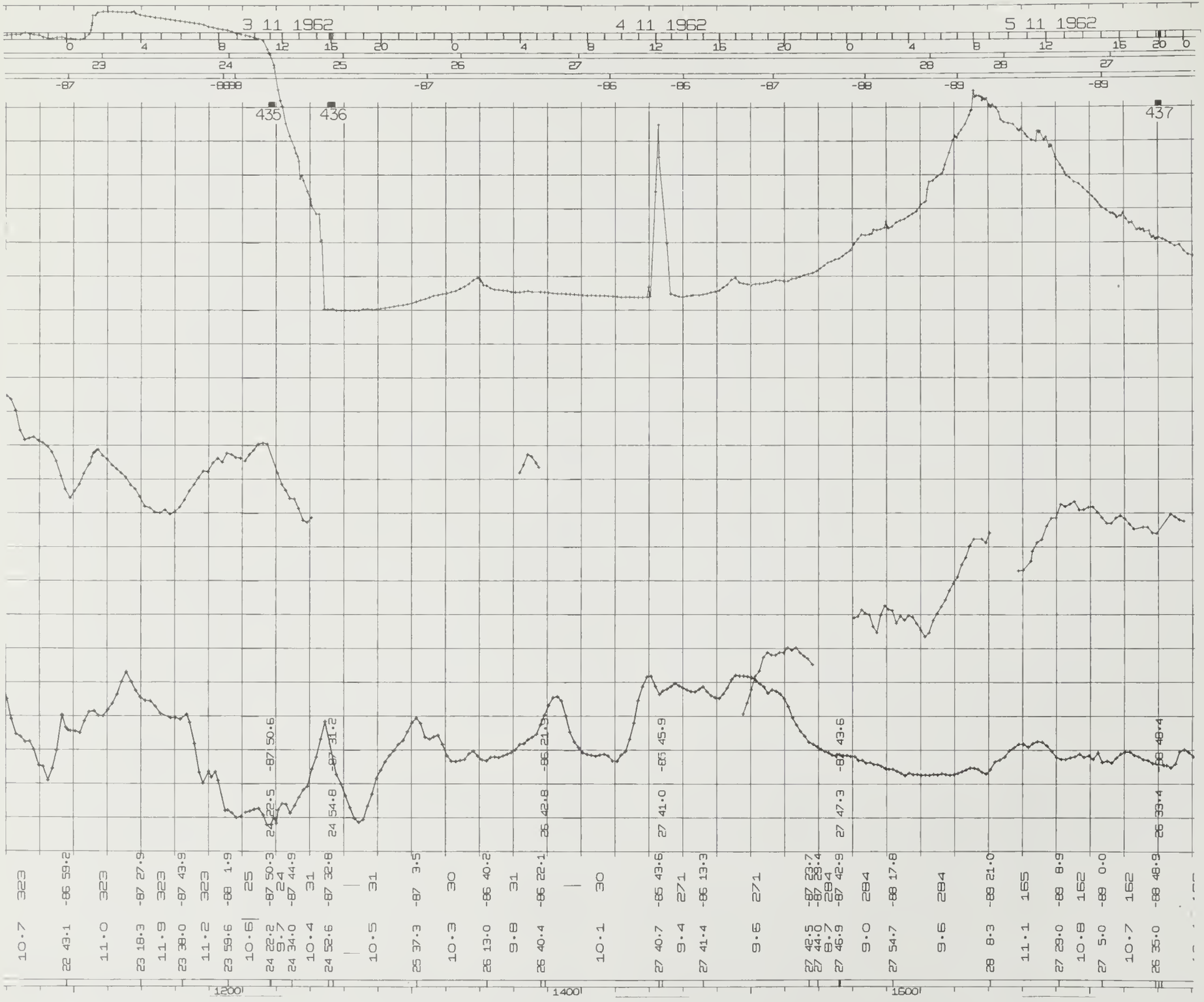
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22001
24001
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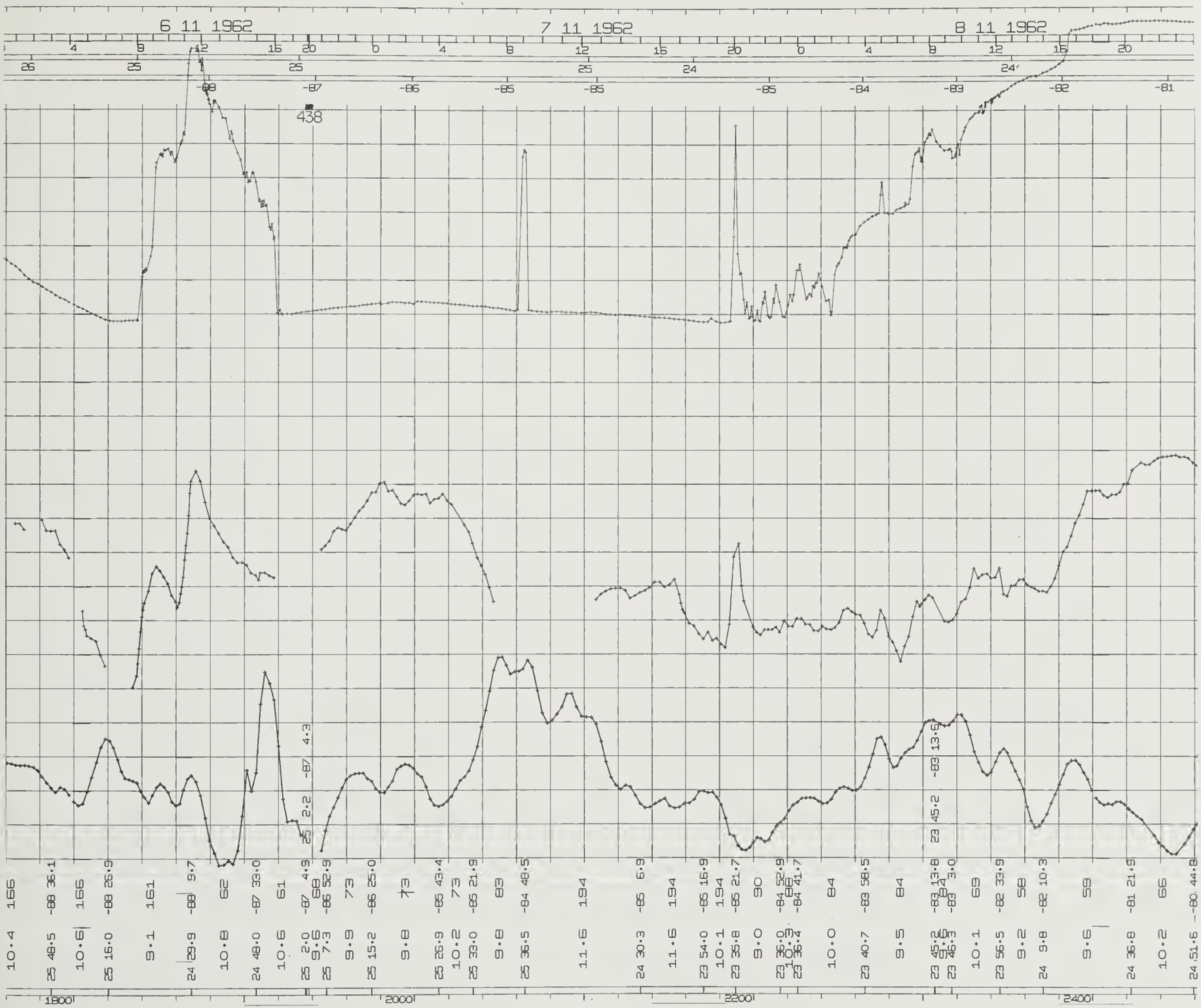

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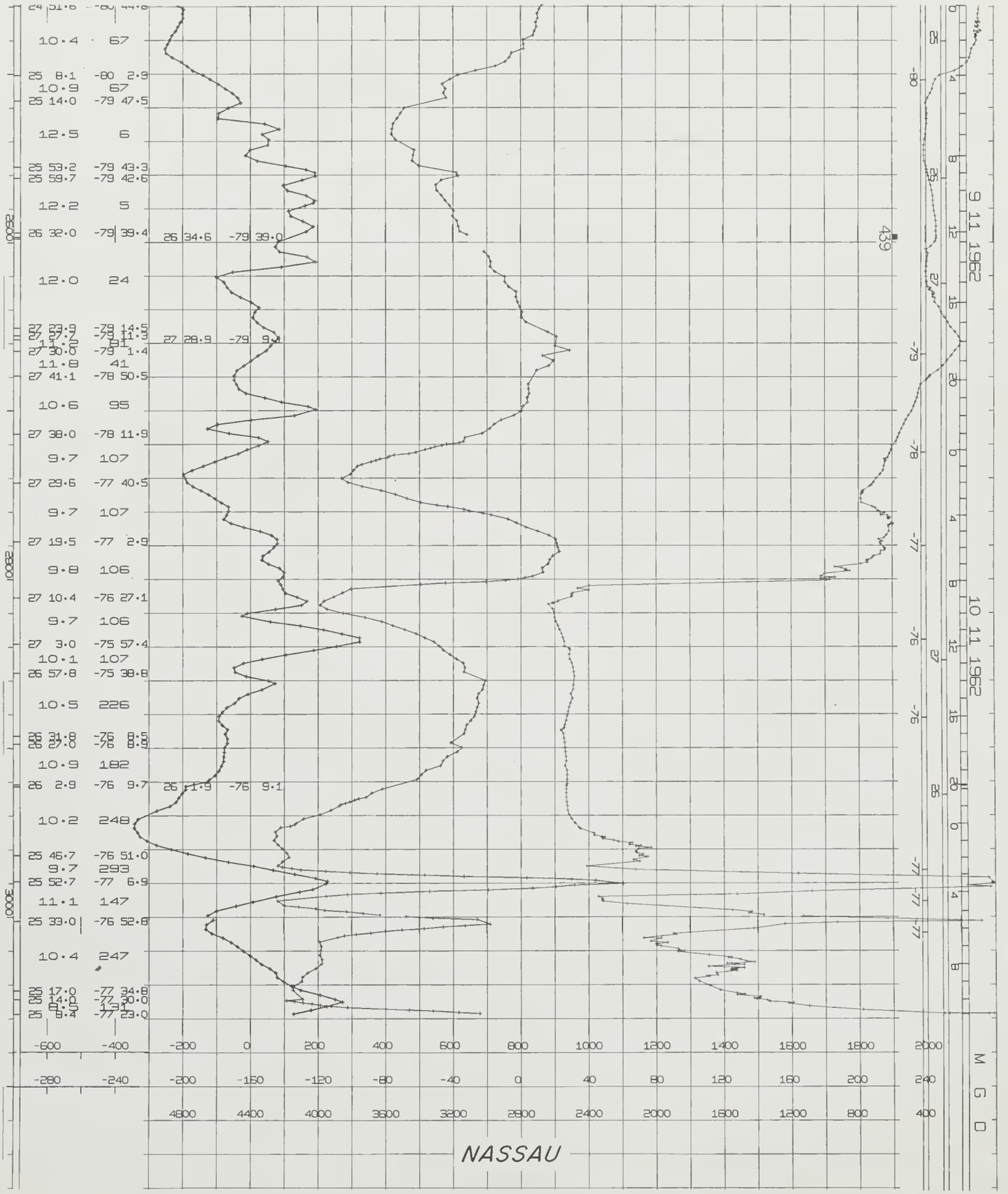
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M G D
31
32
Recife

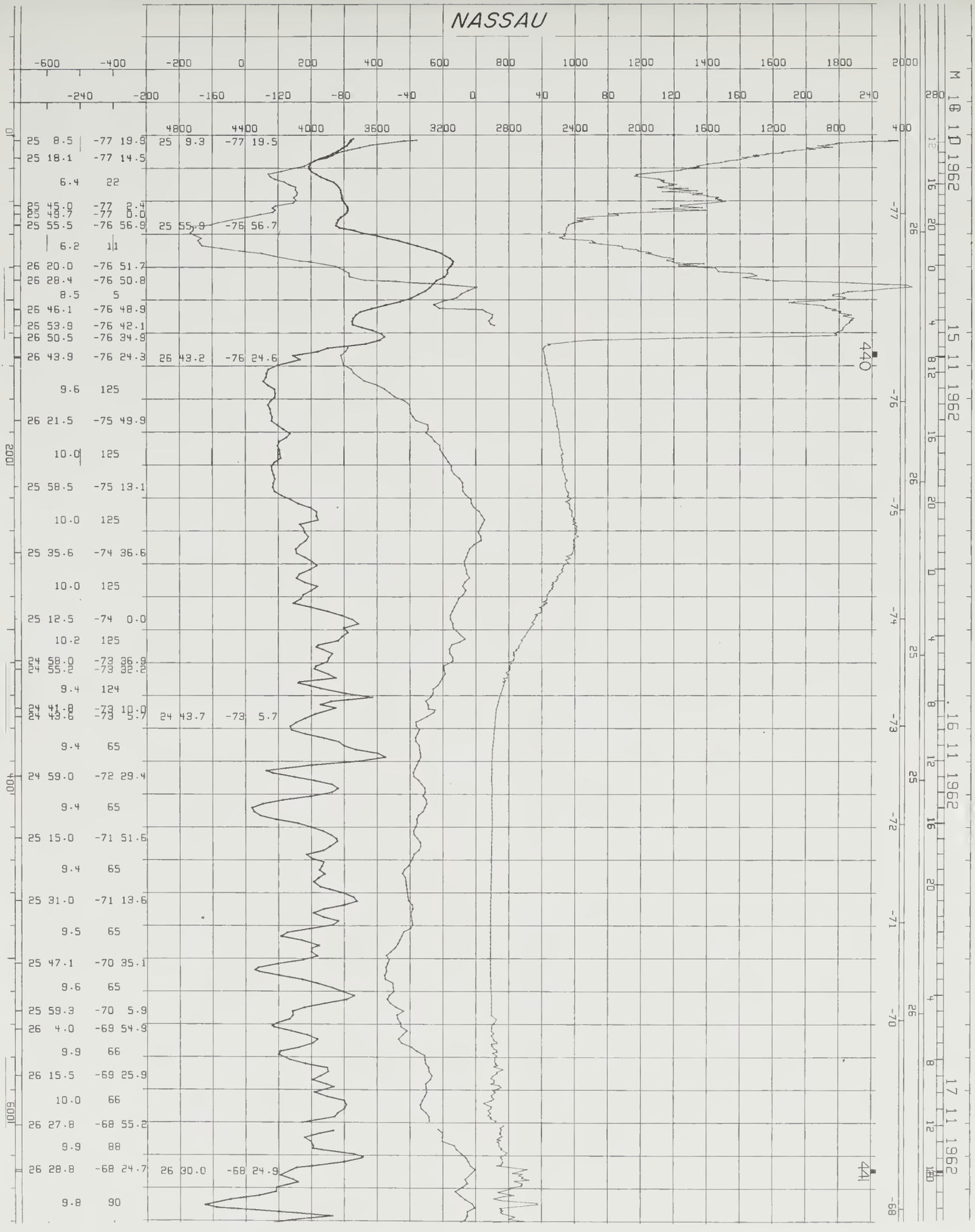
M 28 10 1962
29 10 1962
Cristobal
429

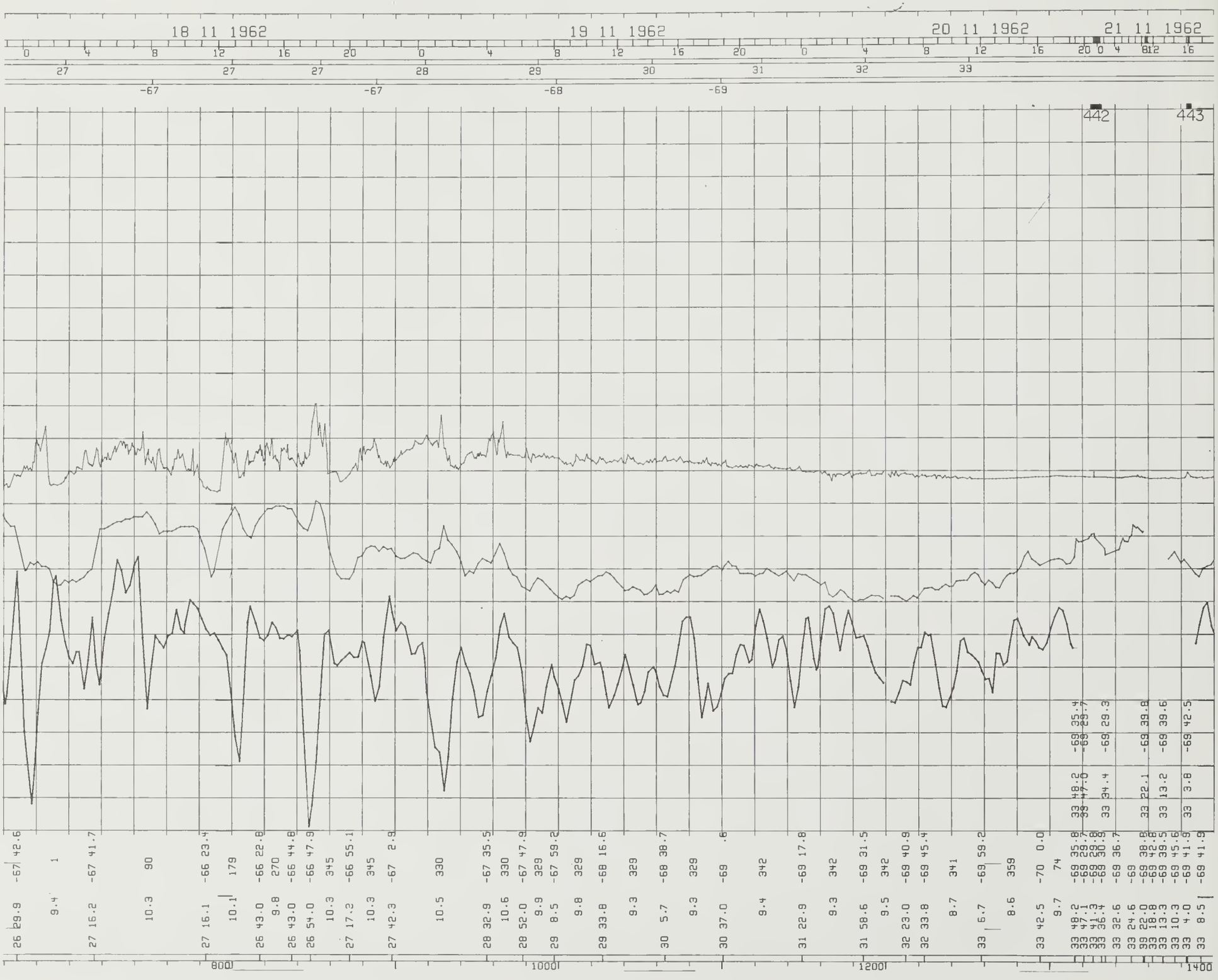

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2 11 1962
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432
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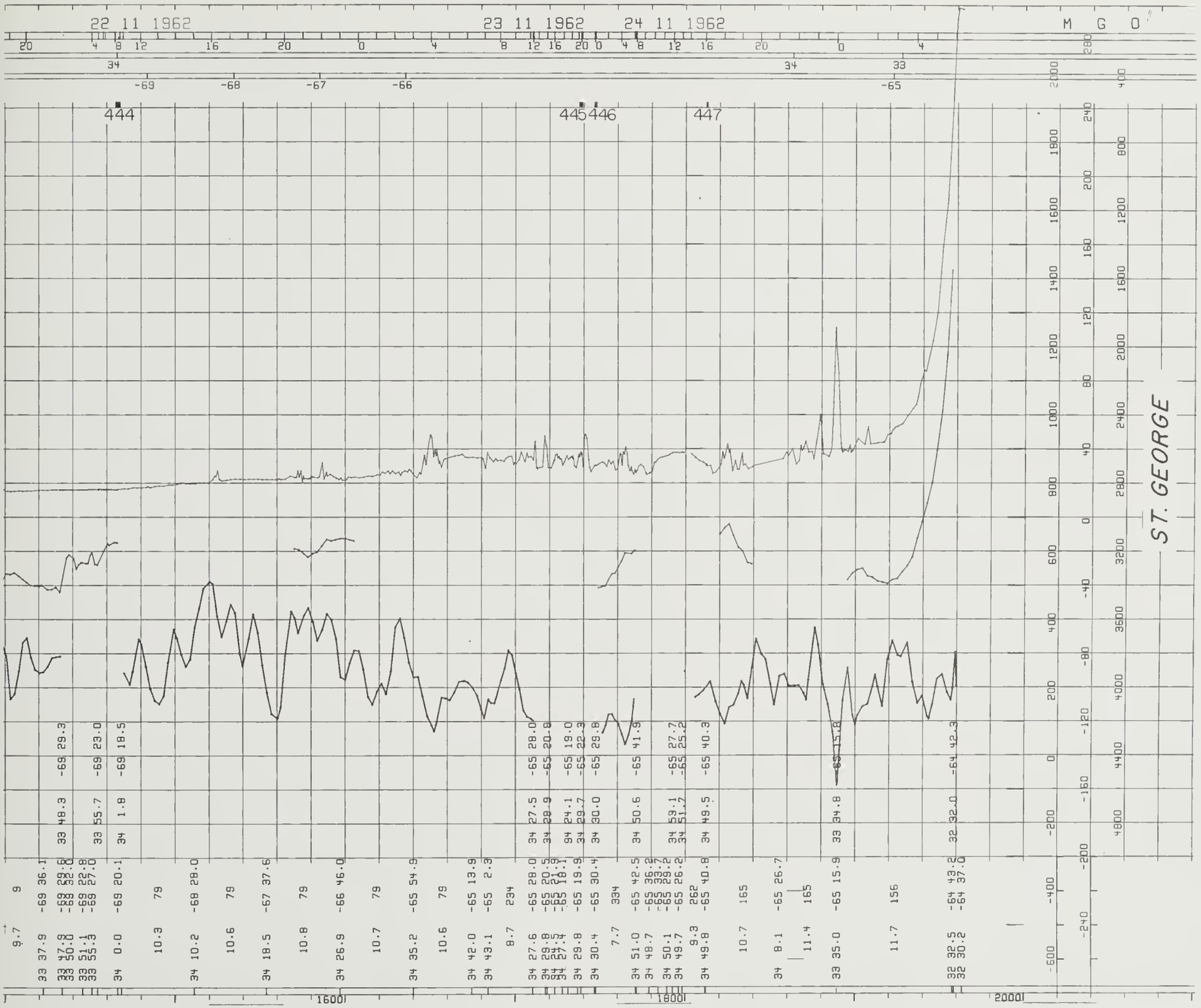

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1200
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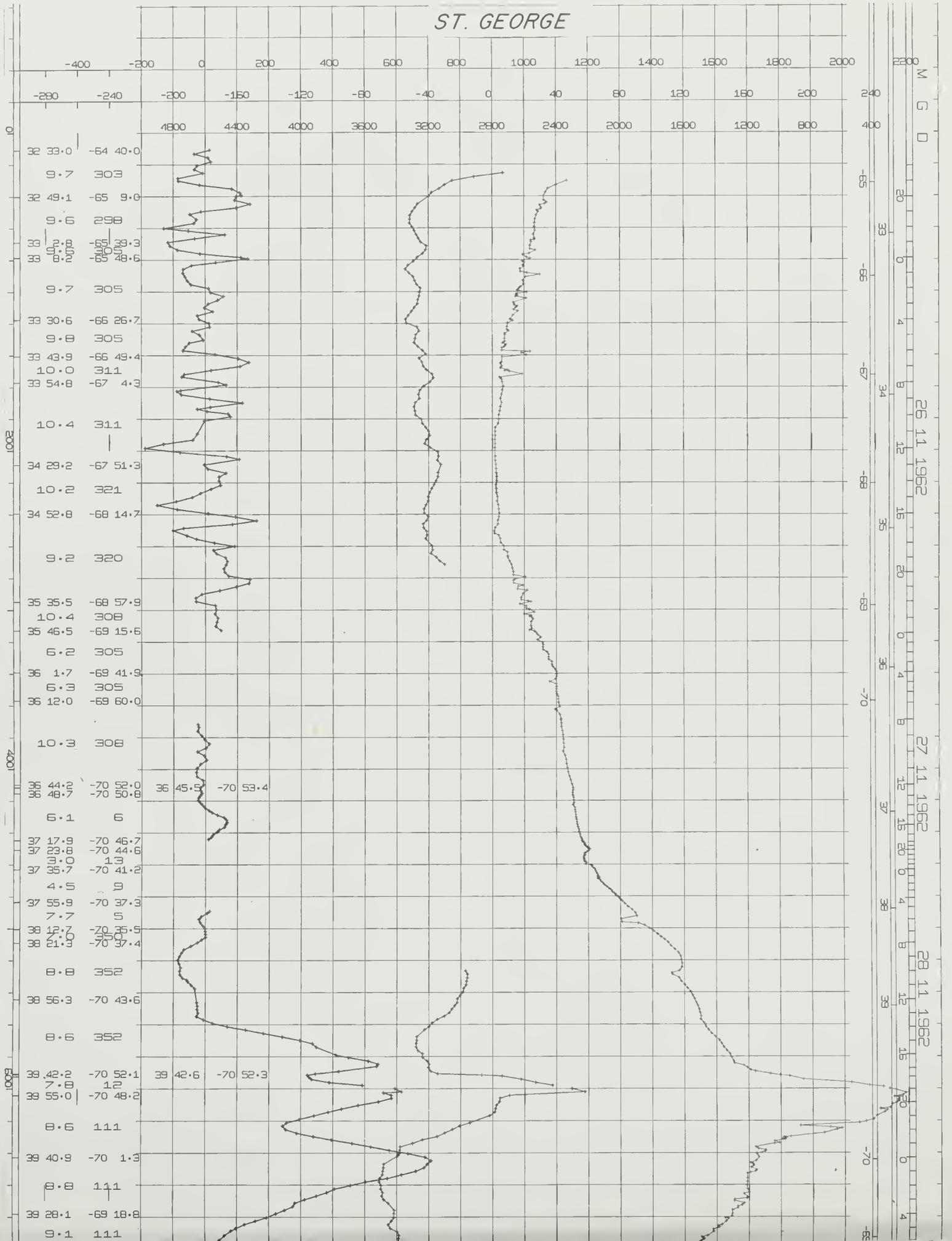

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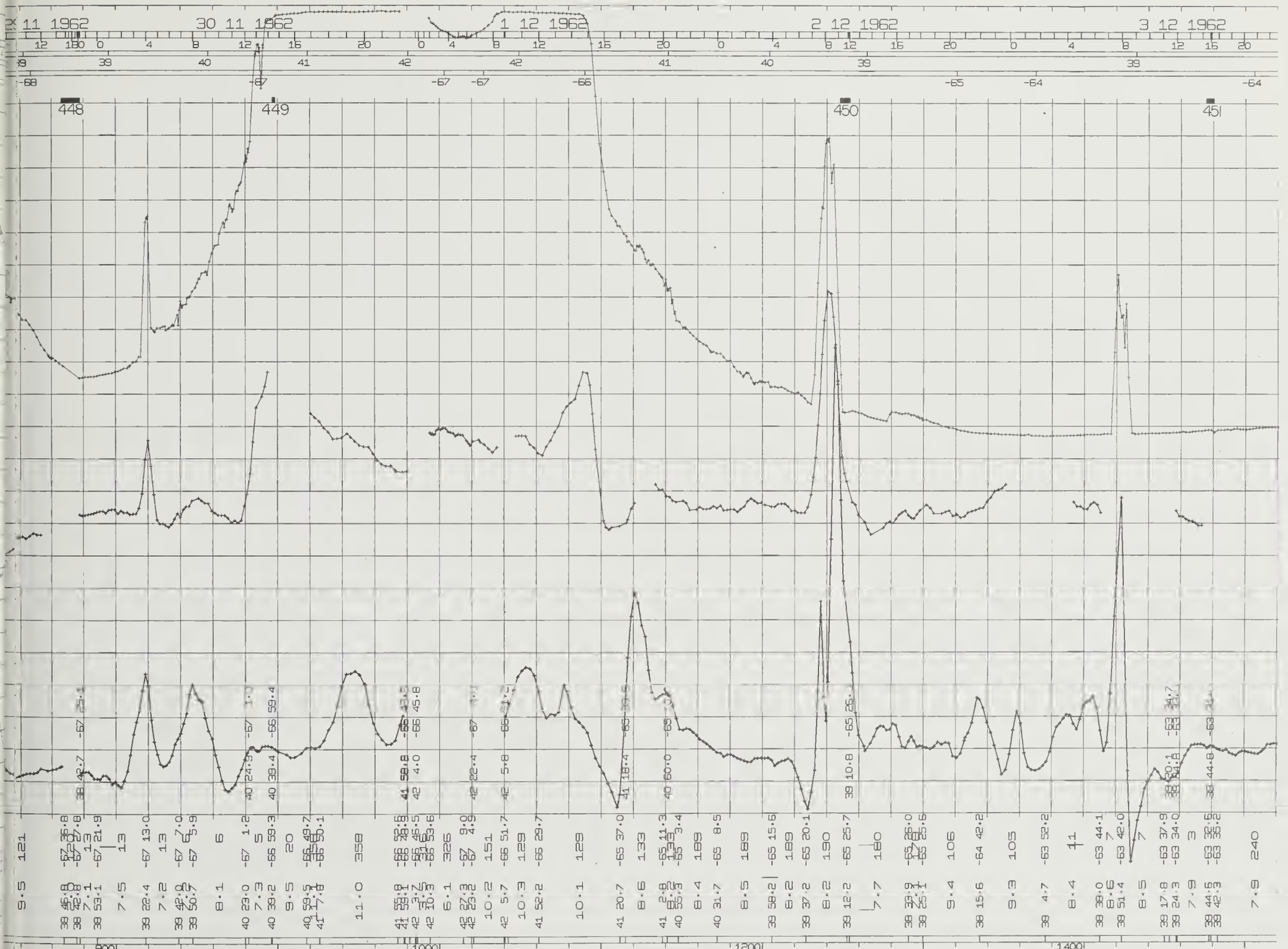

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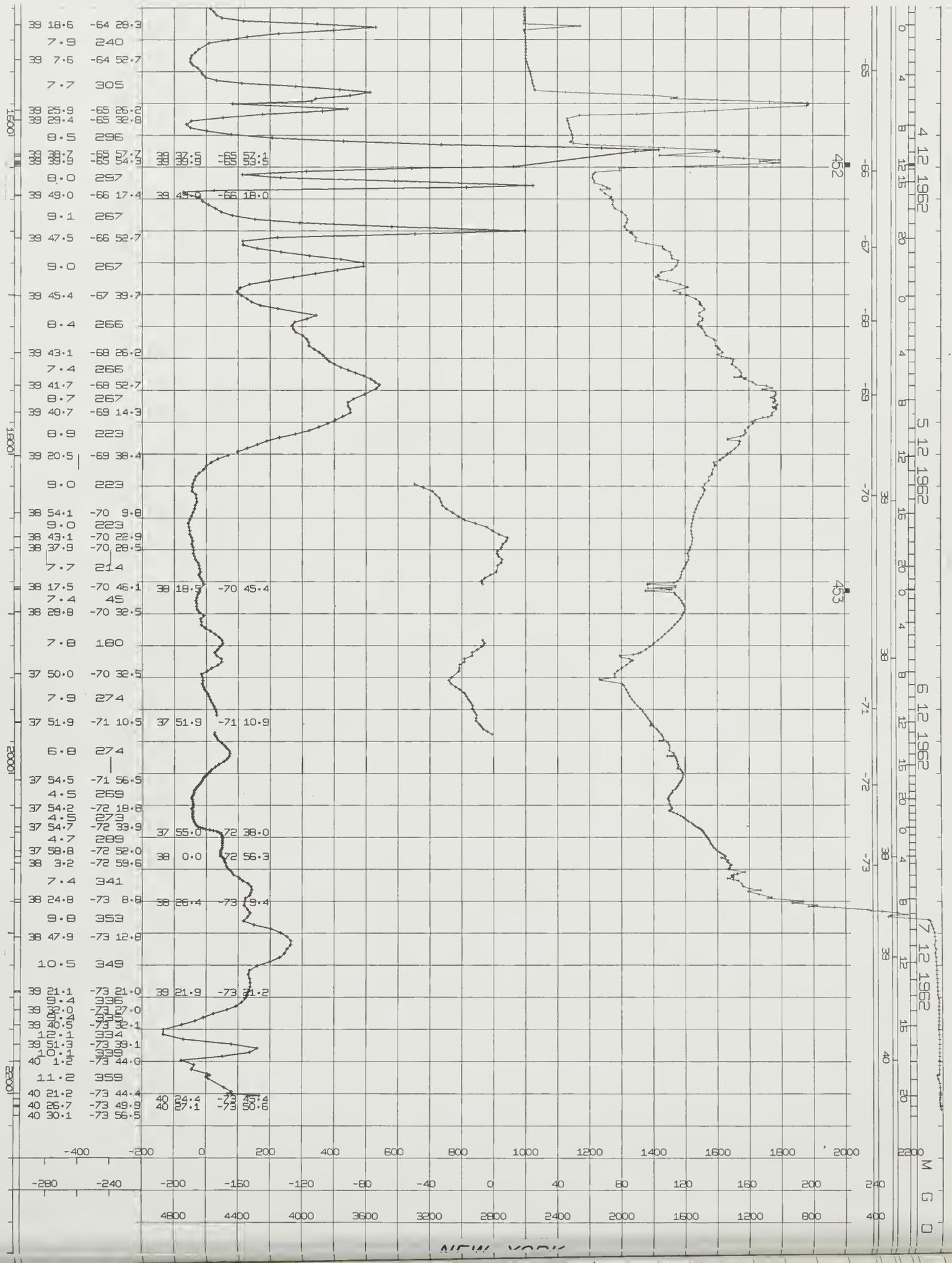

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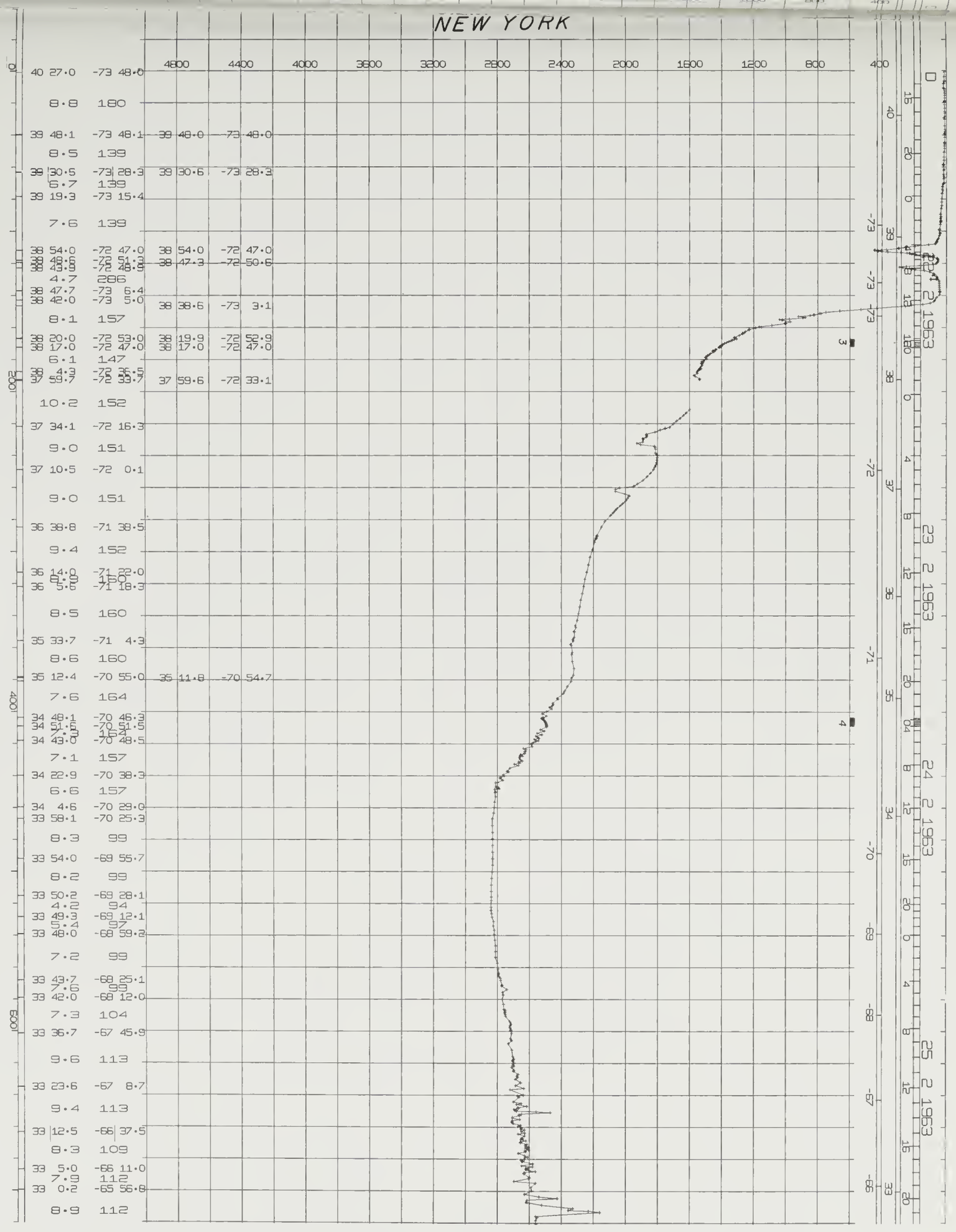

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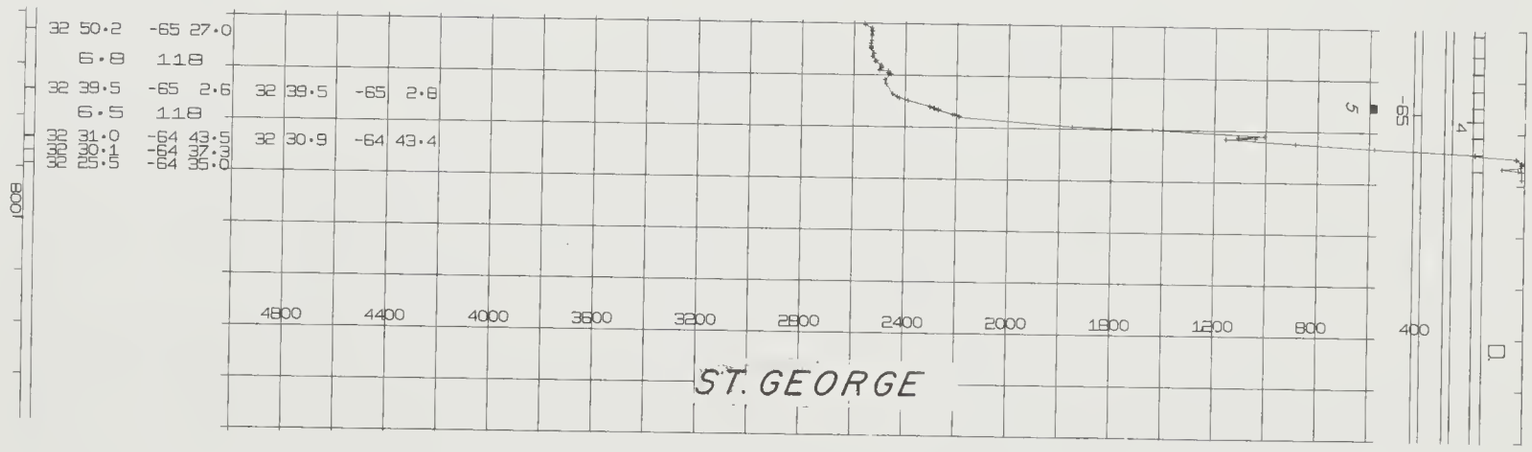

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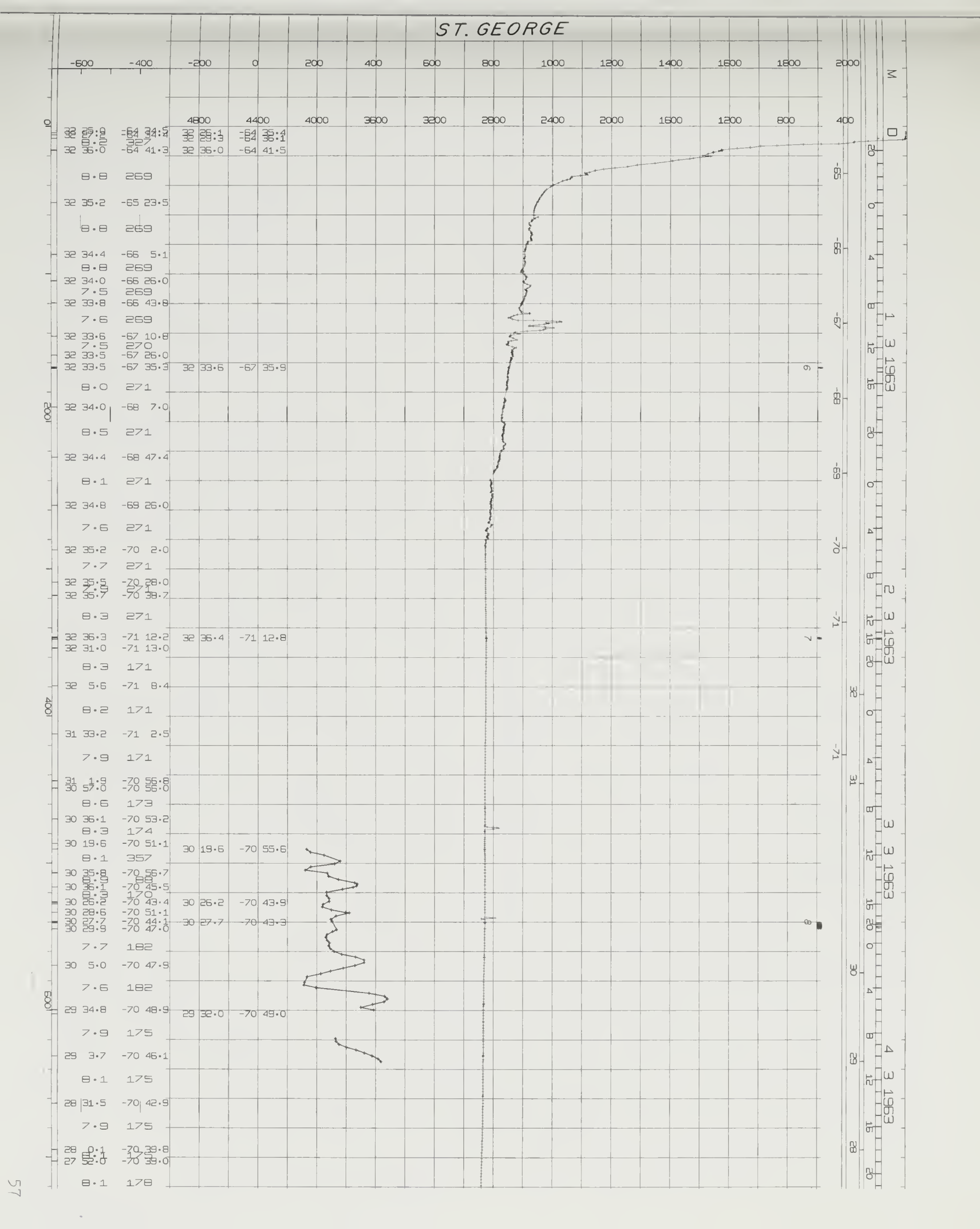

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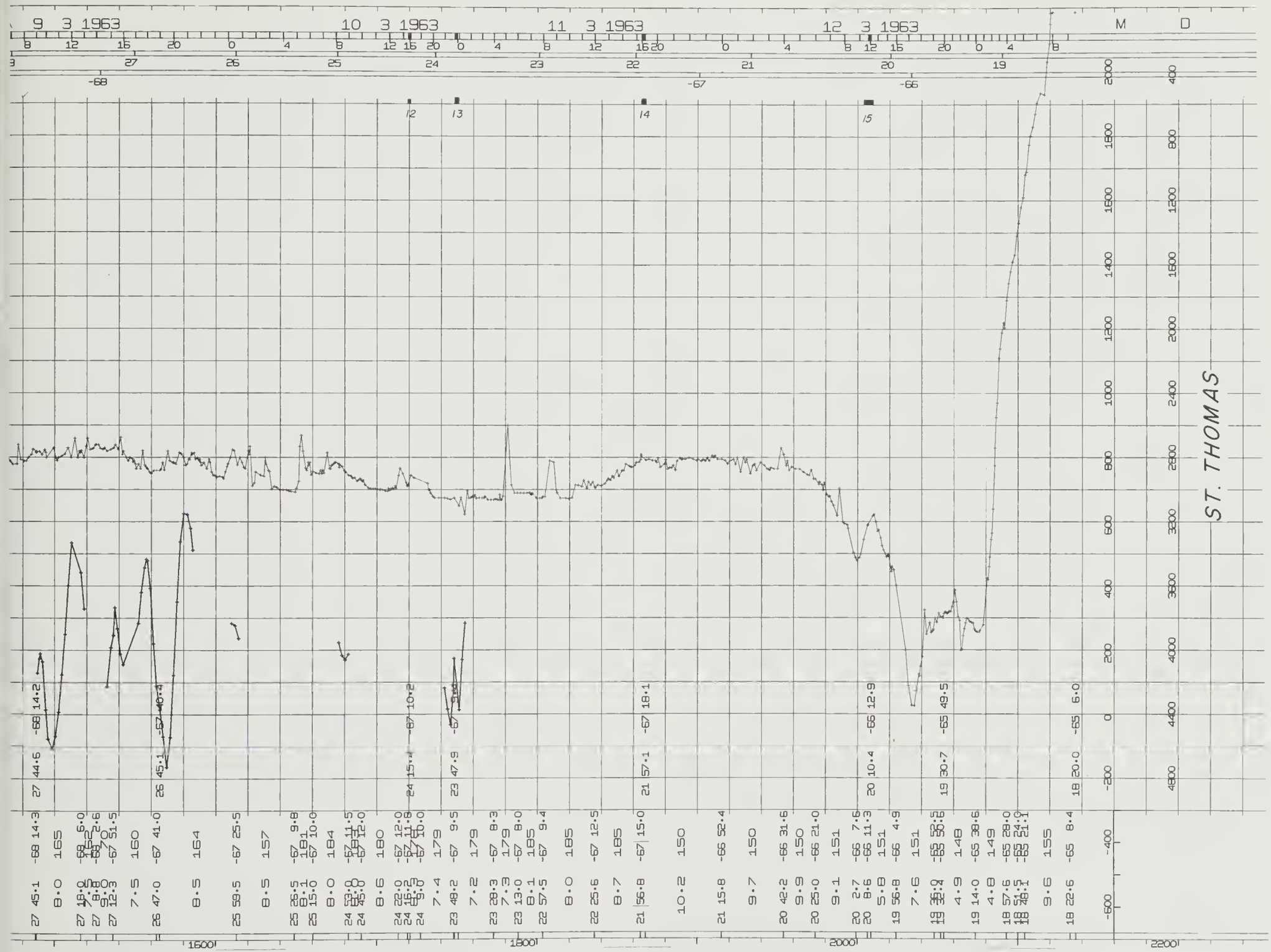

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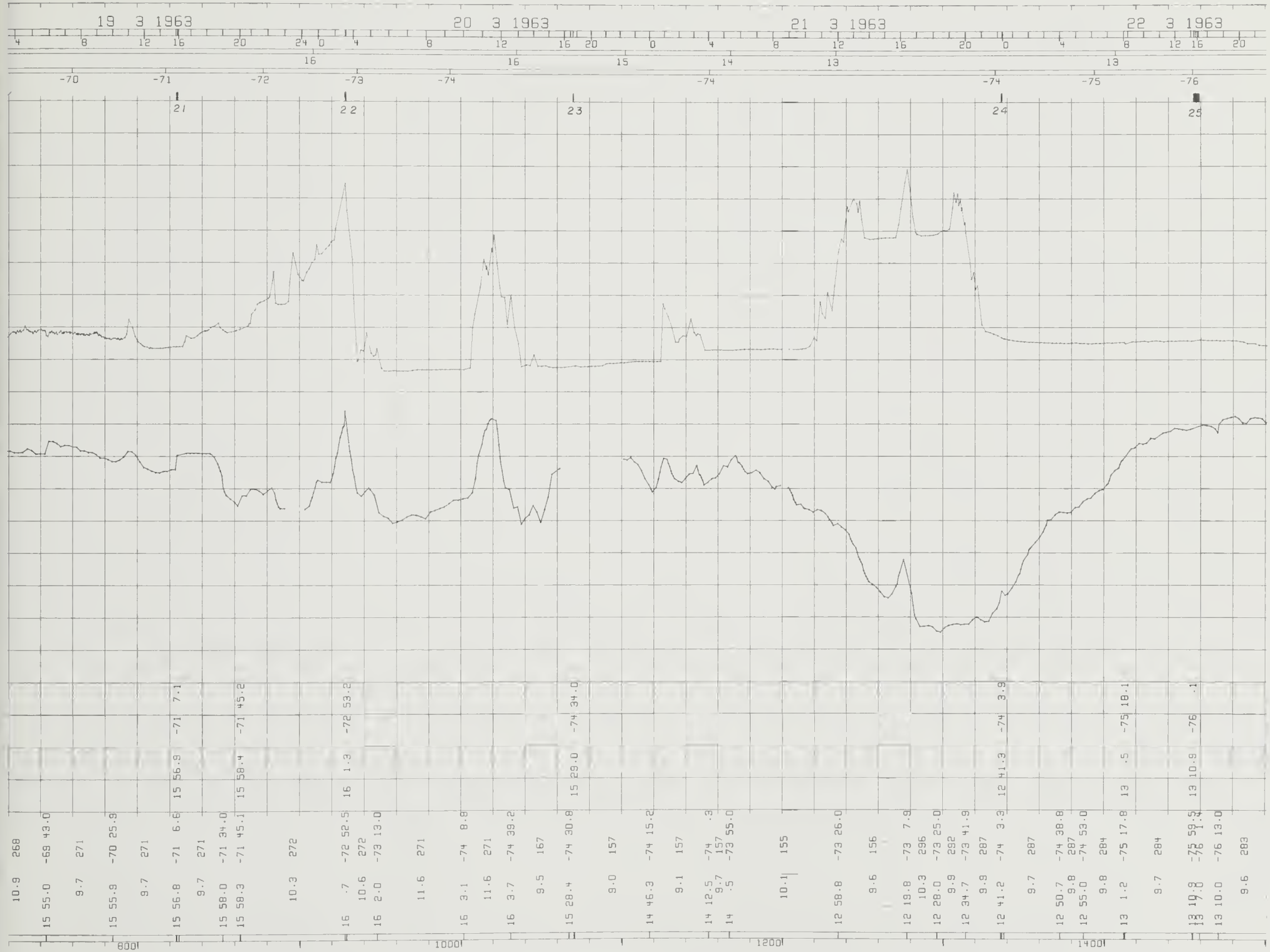

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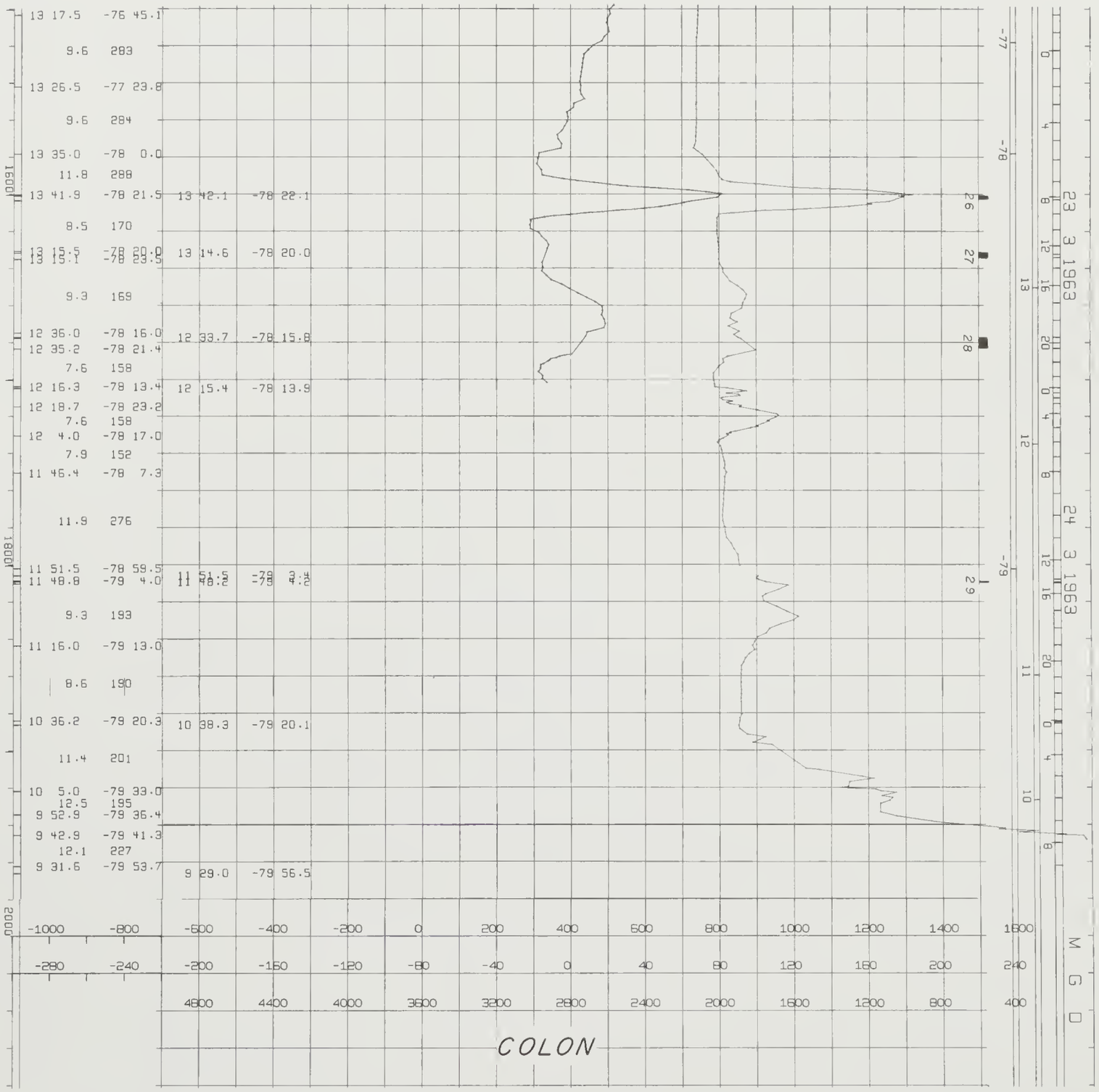

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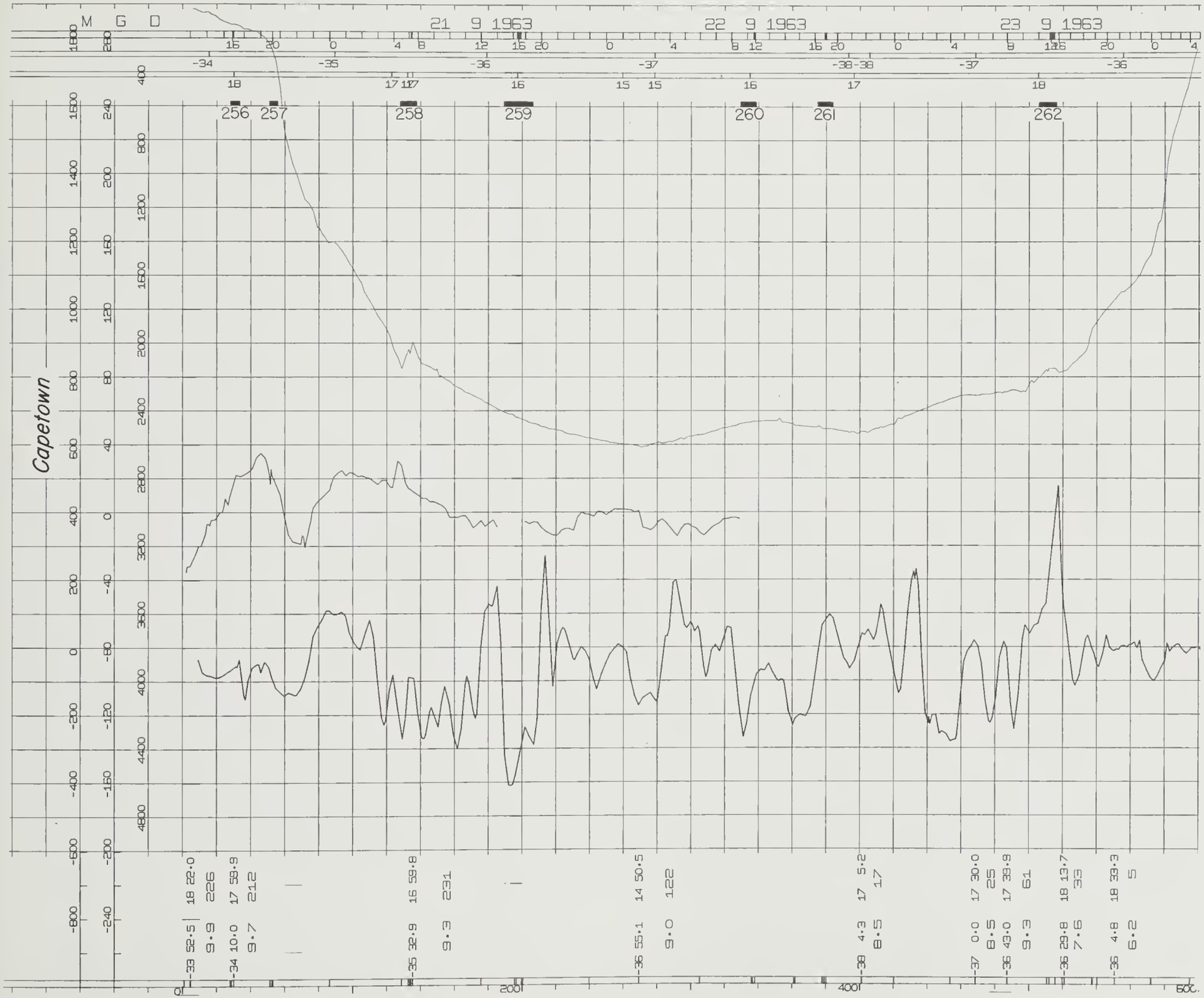
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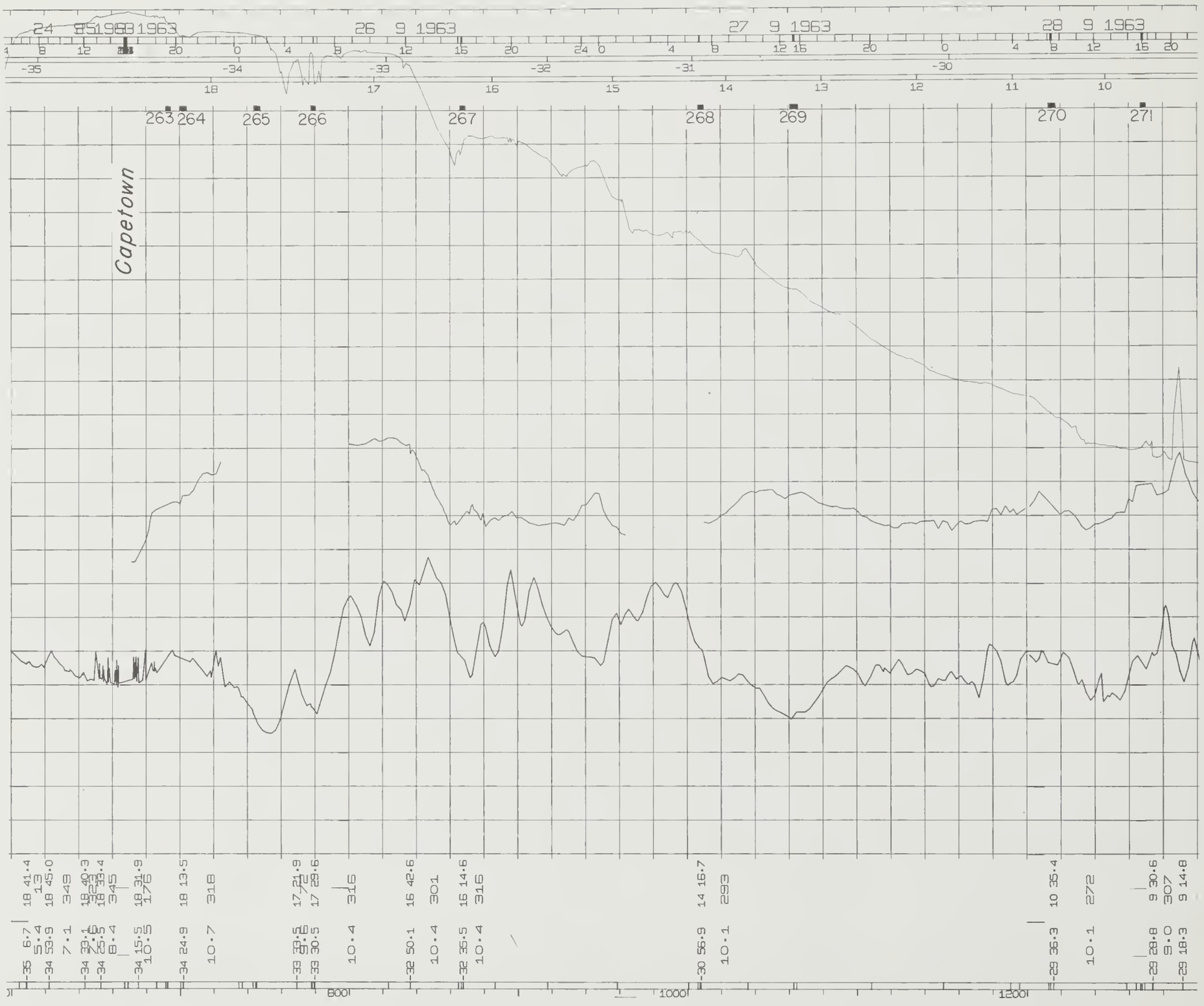

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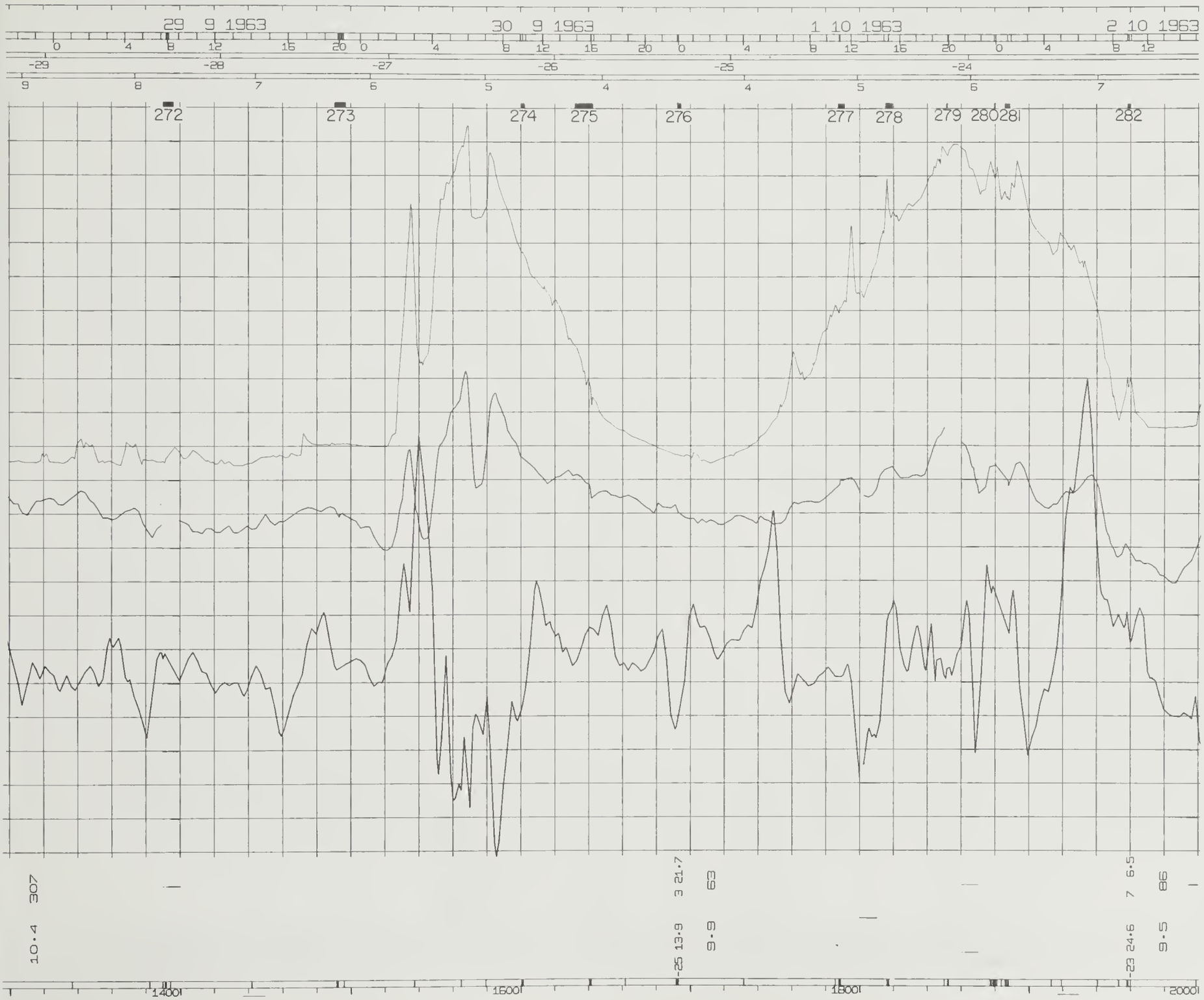
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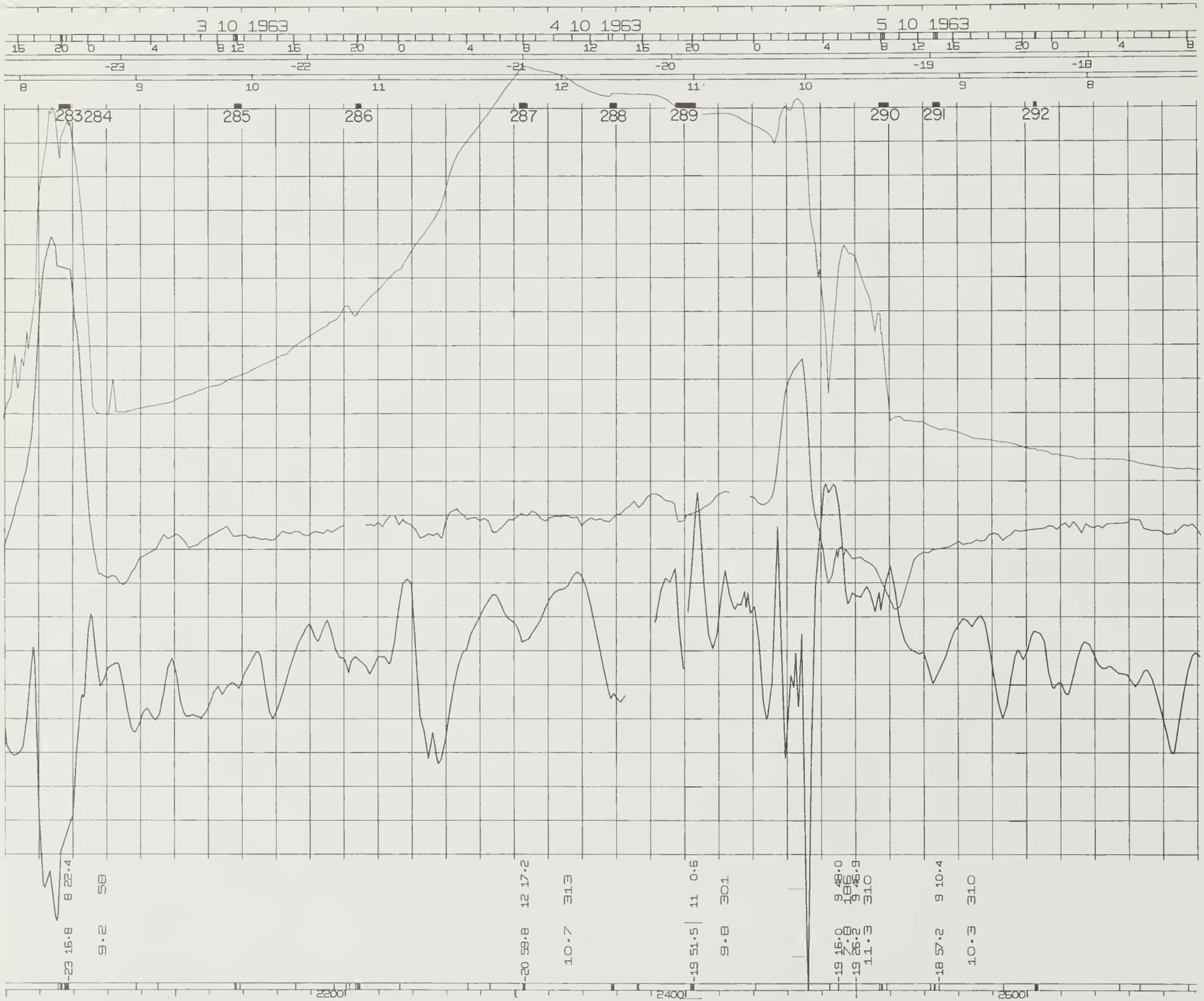

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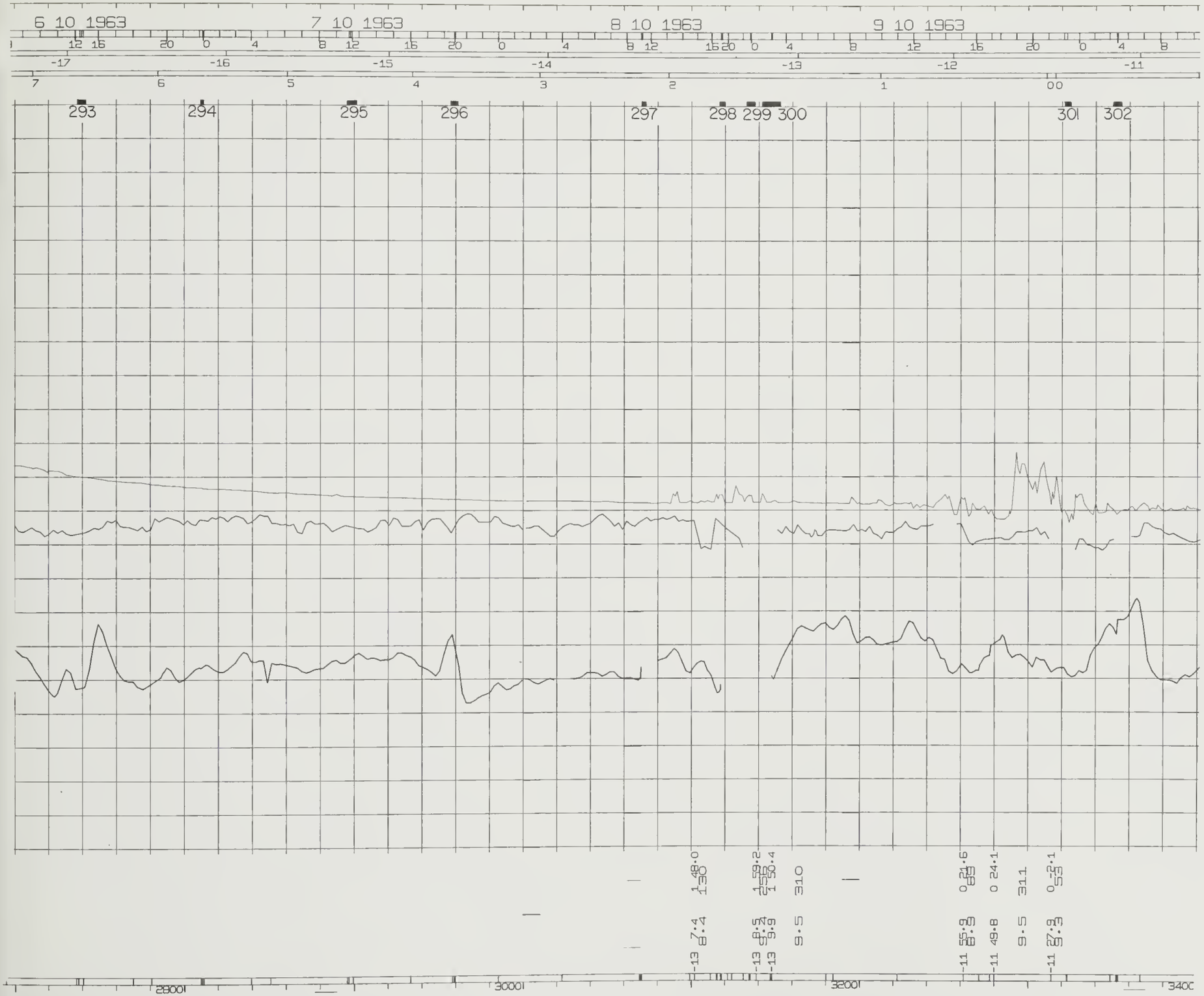

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11 48.2 -79 4.2
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11 16.0 -79 13.0
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10 38.3 -79 20.1
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9 42.9 -79 41.3
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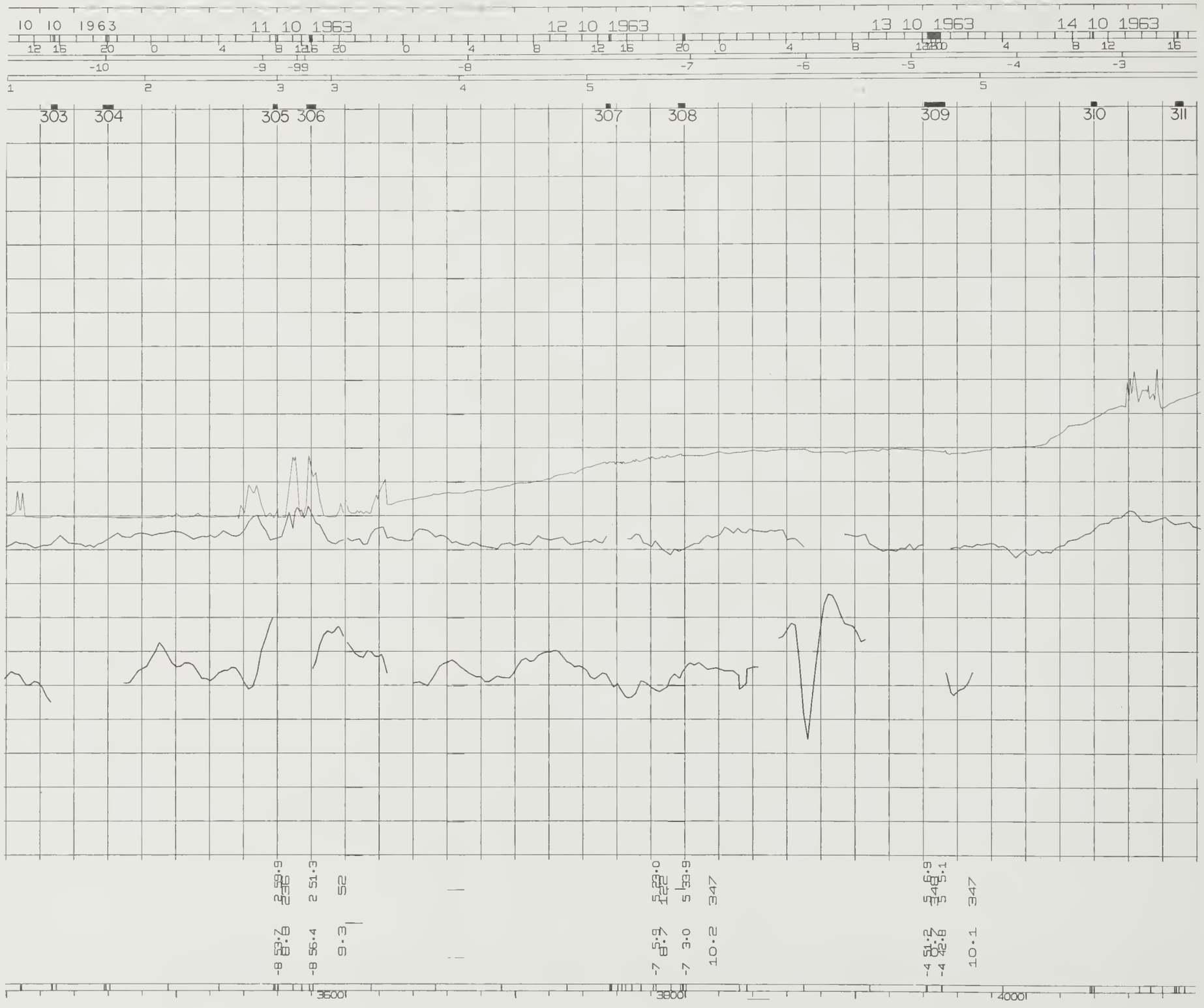

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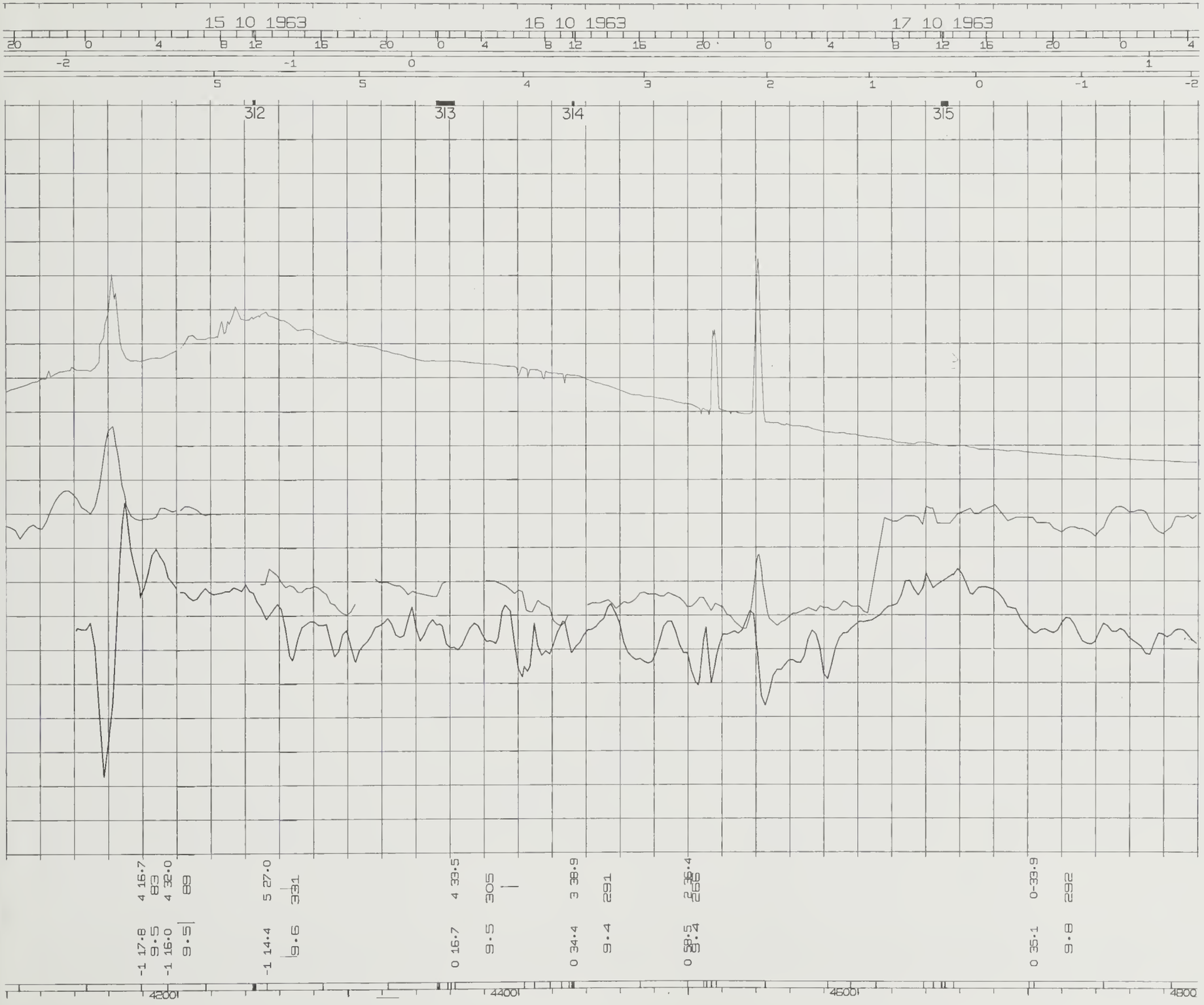

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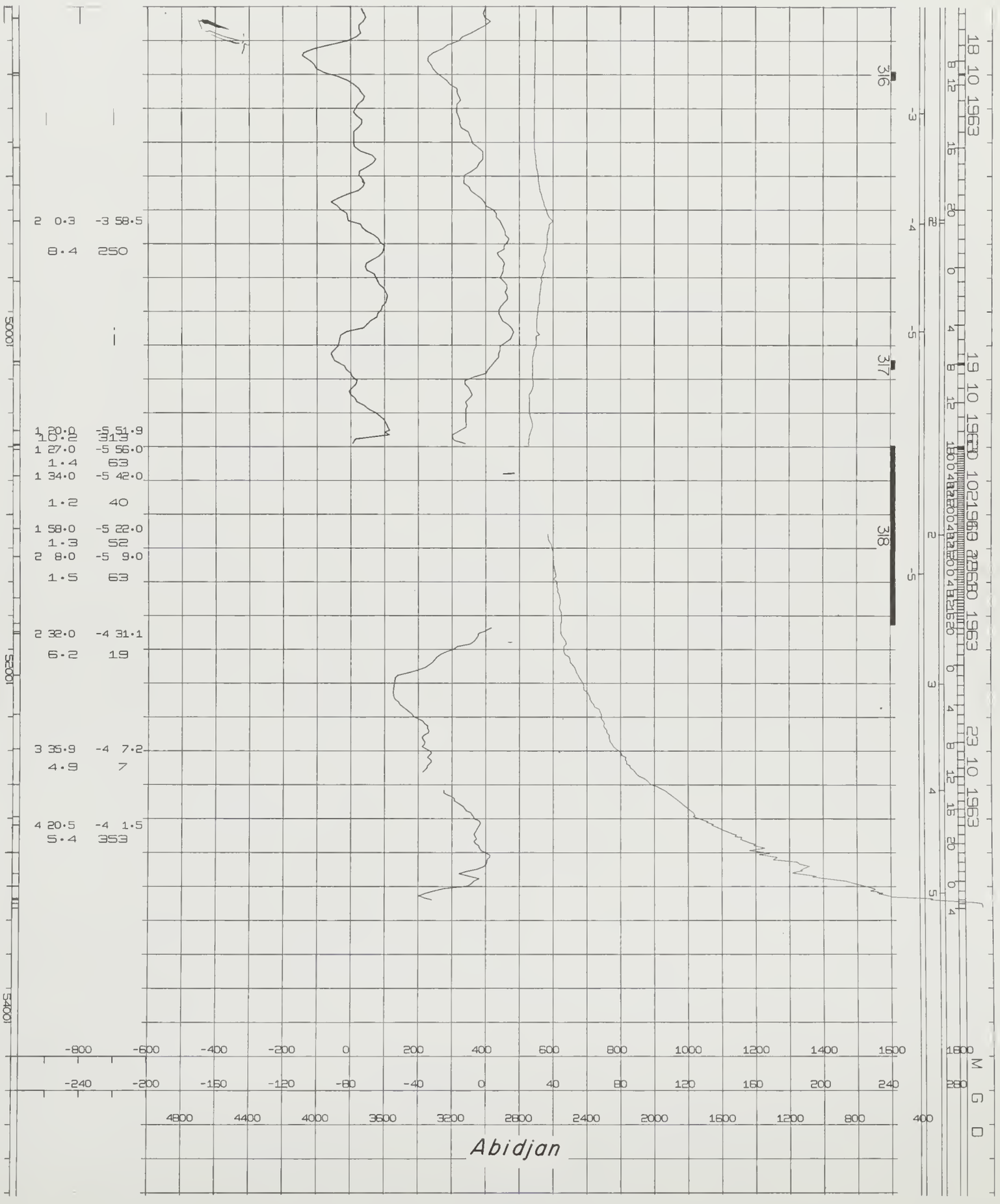

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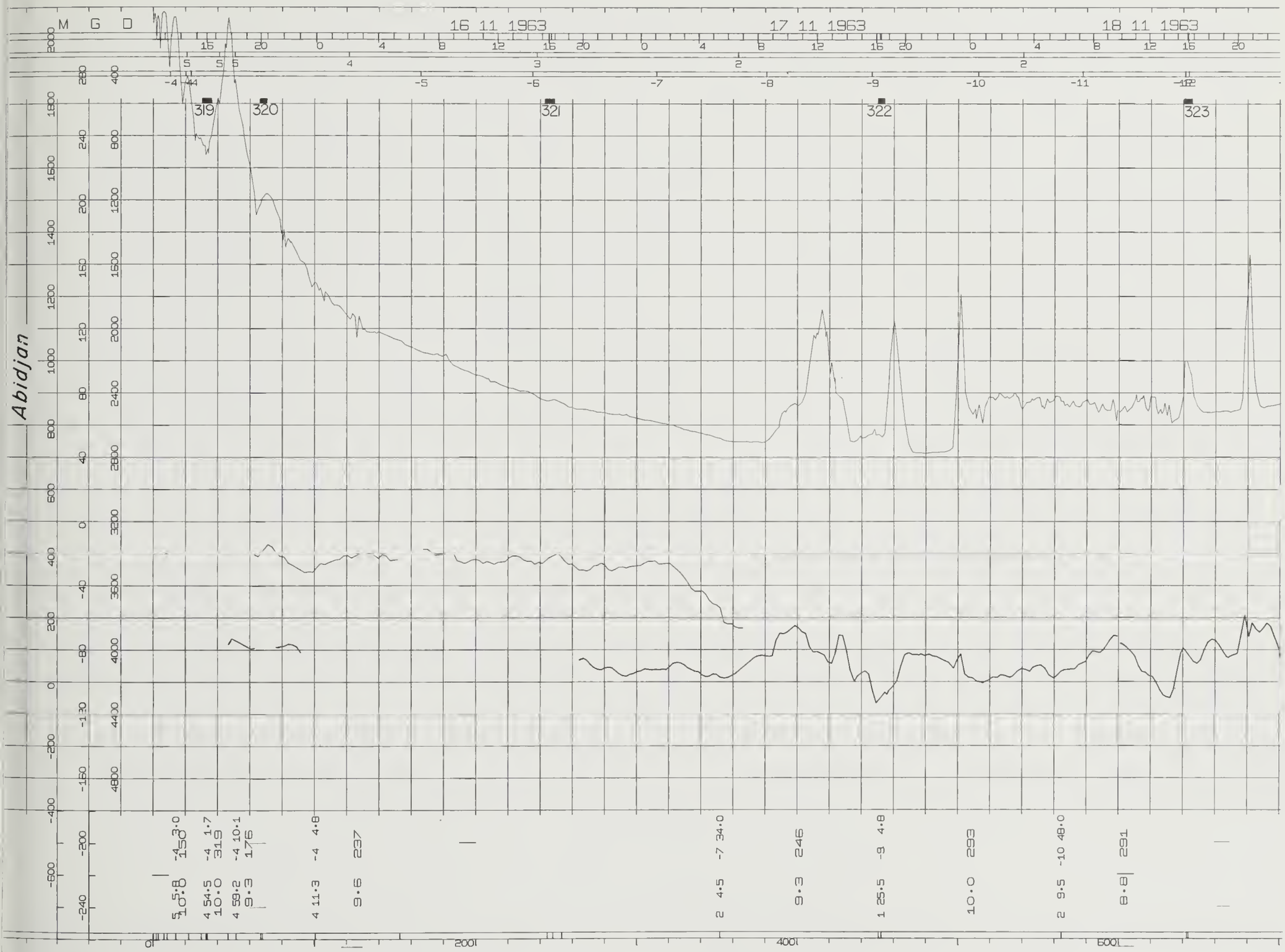

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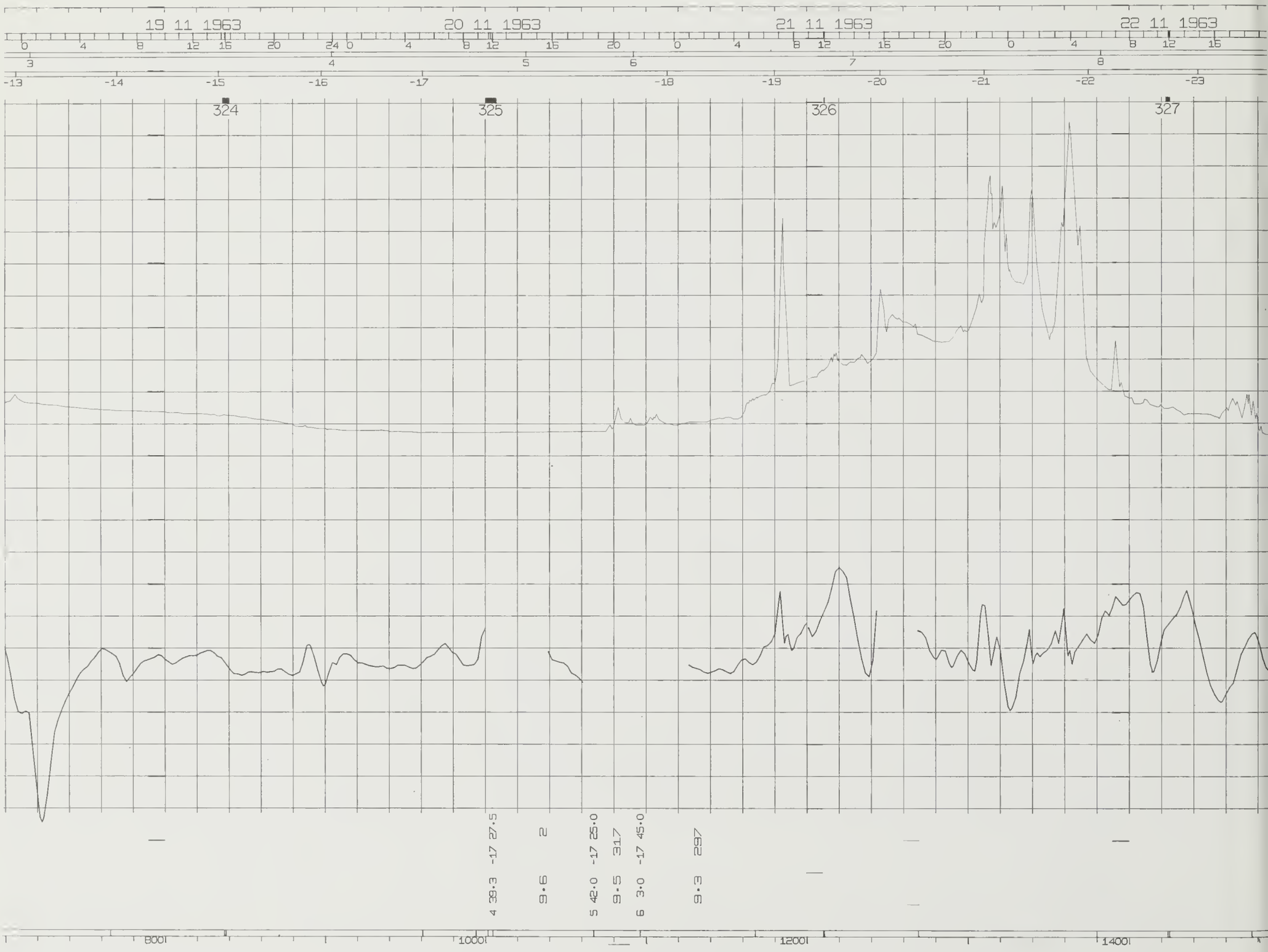

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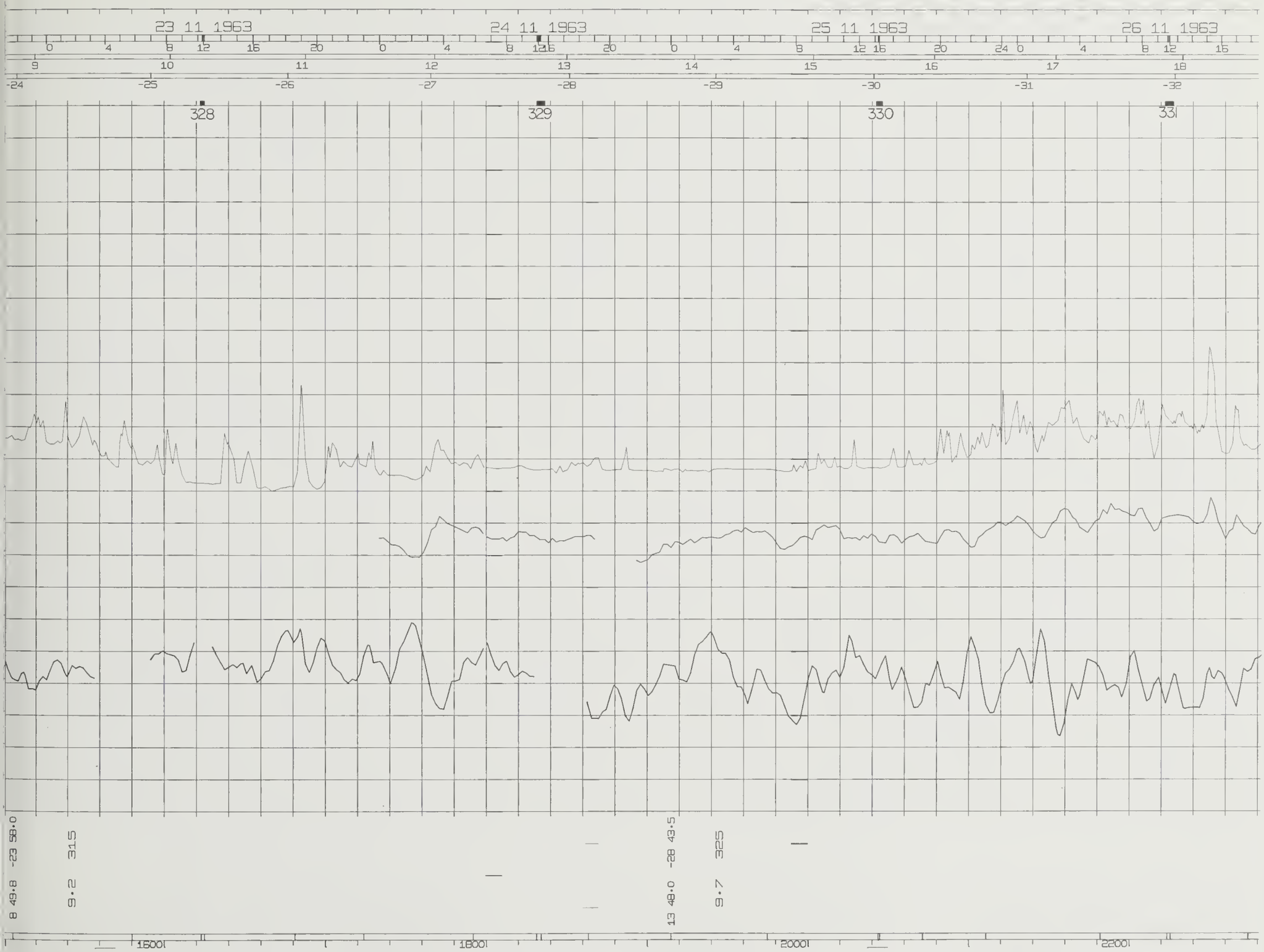

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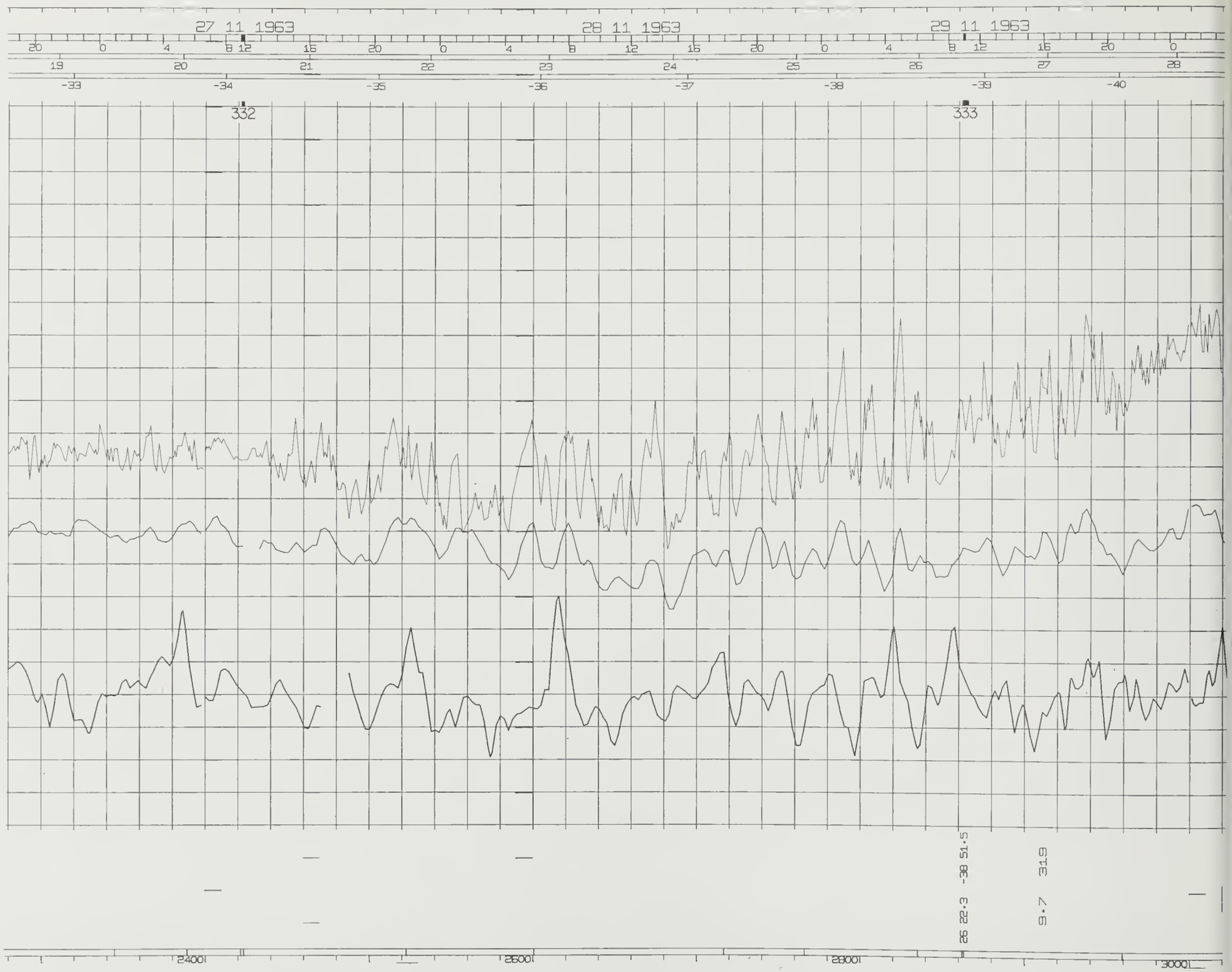

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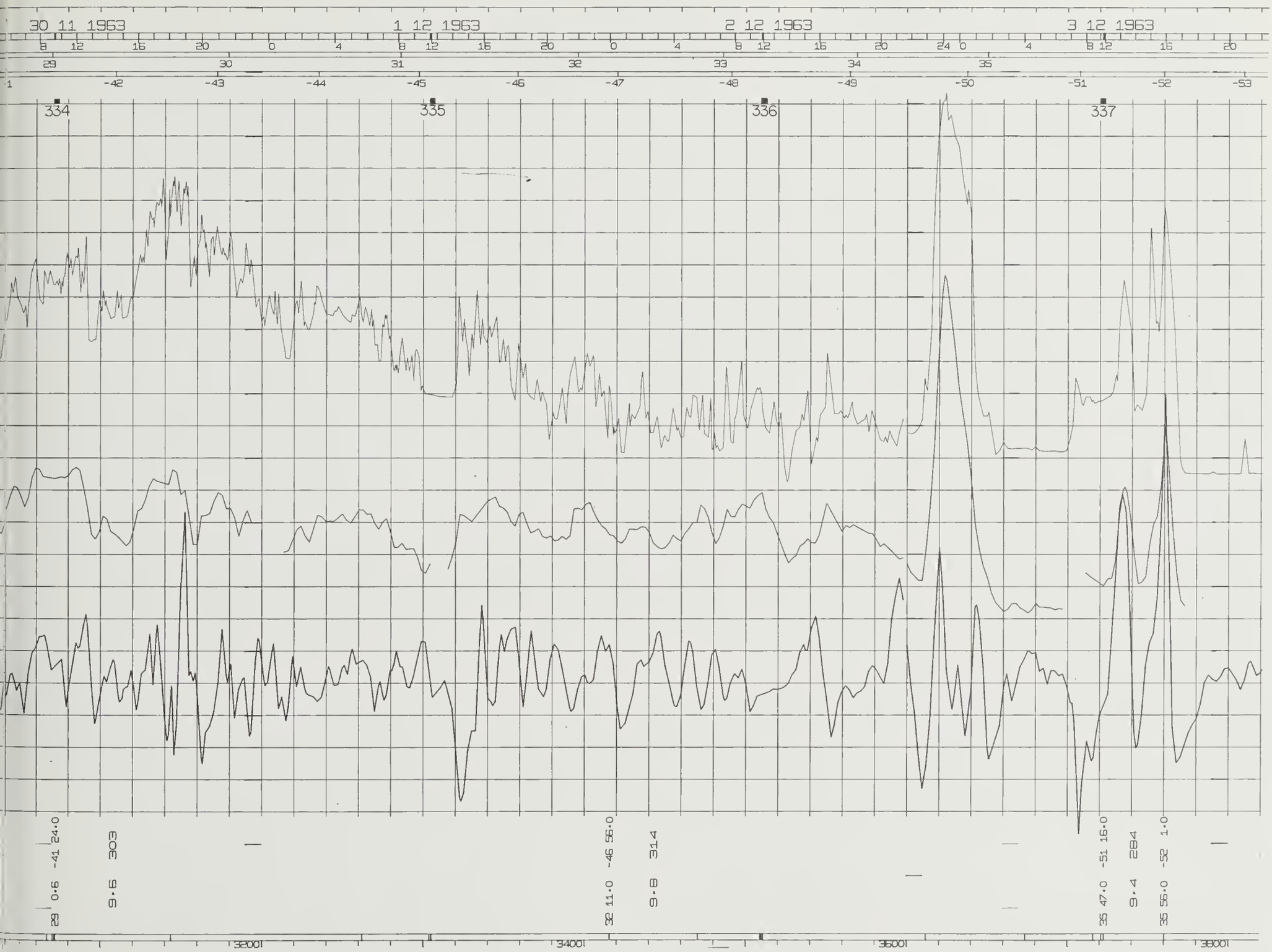

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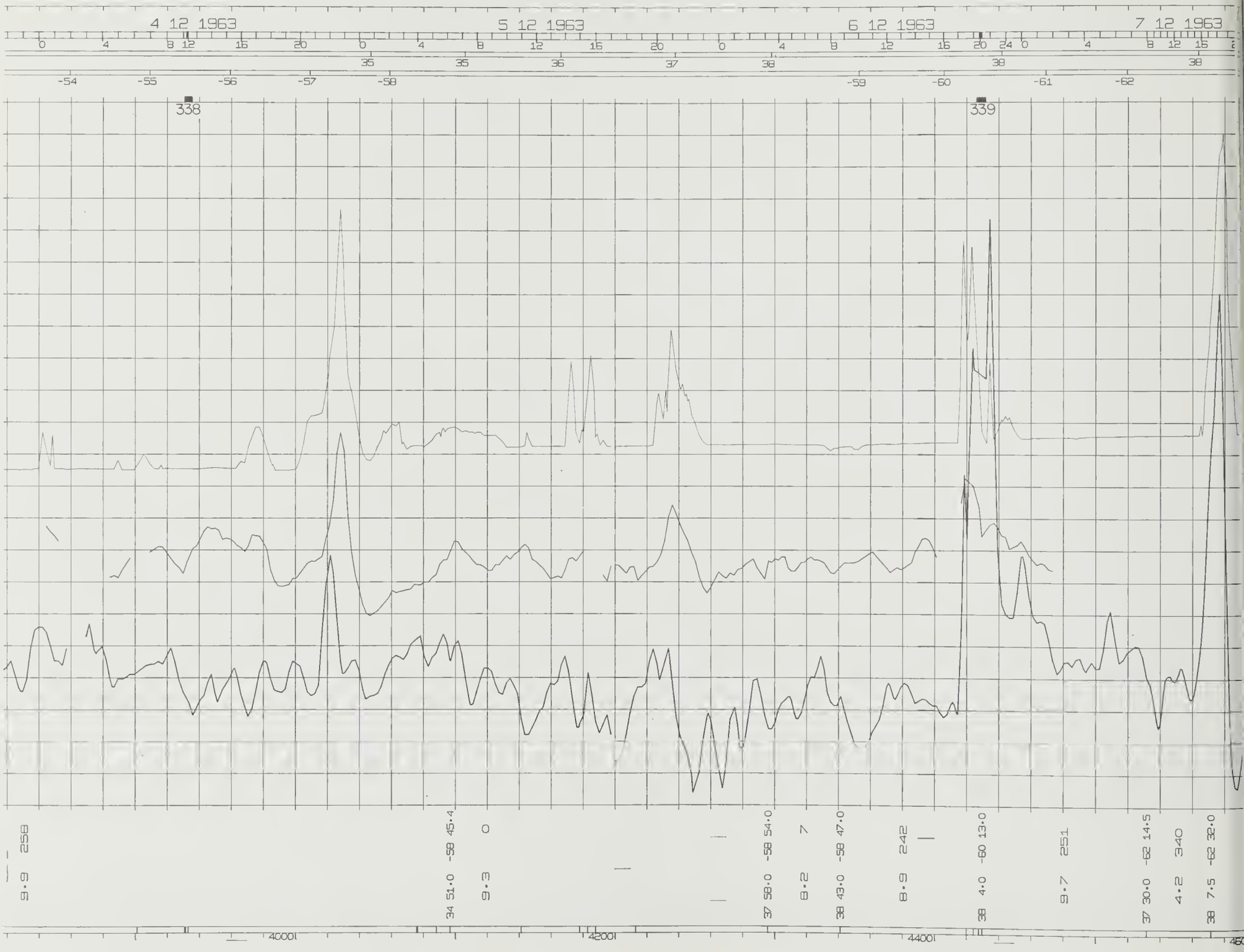

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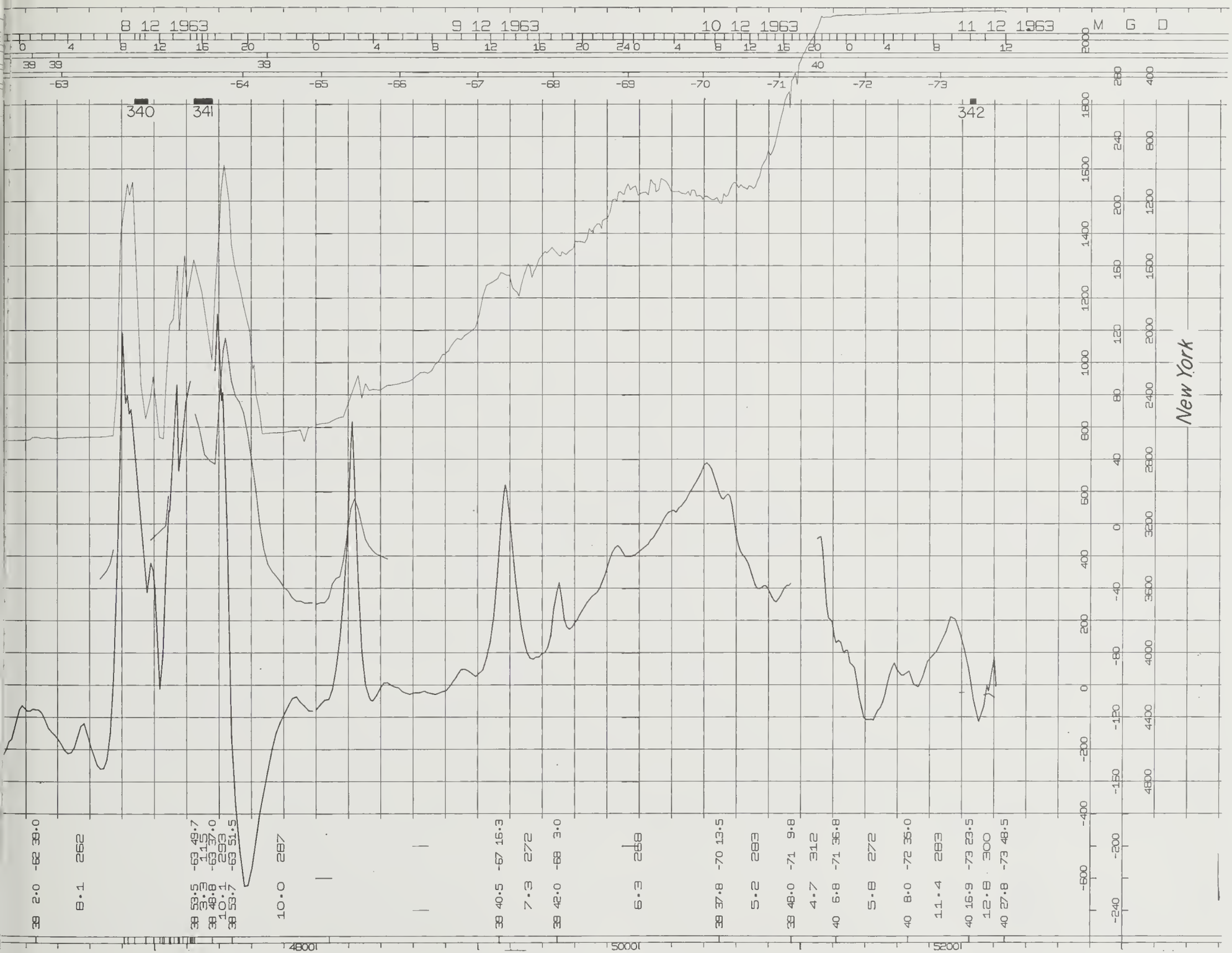

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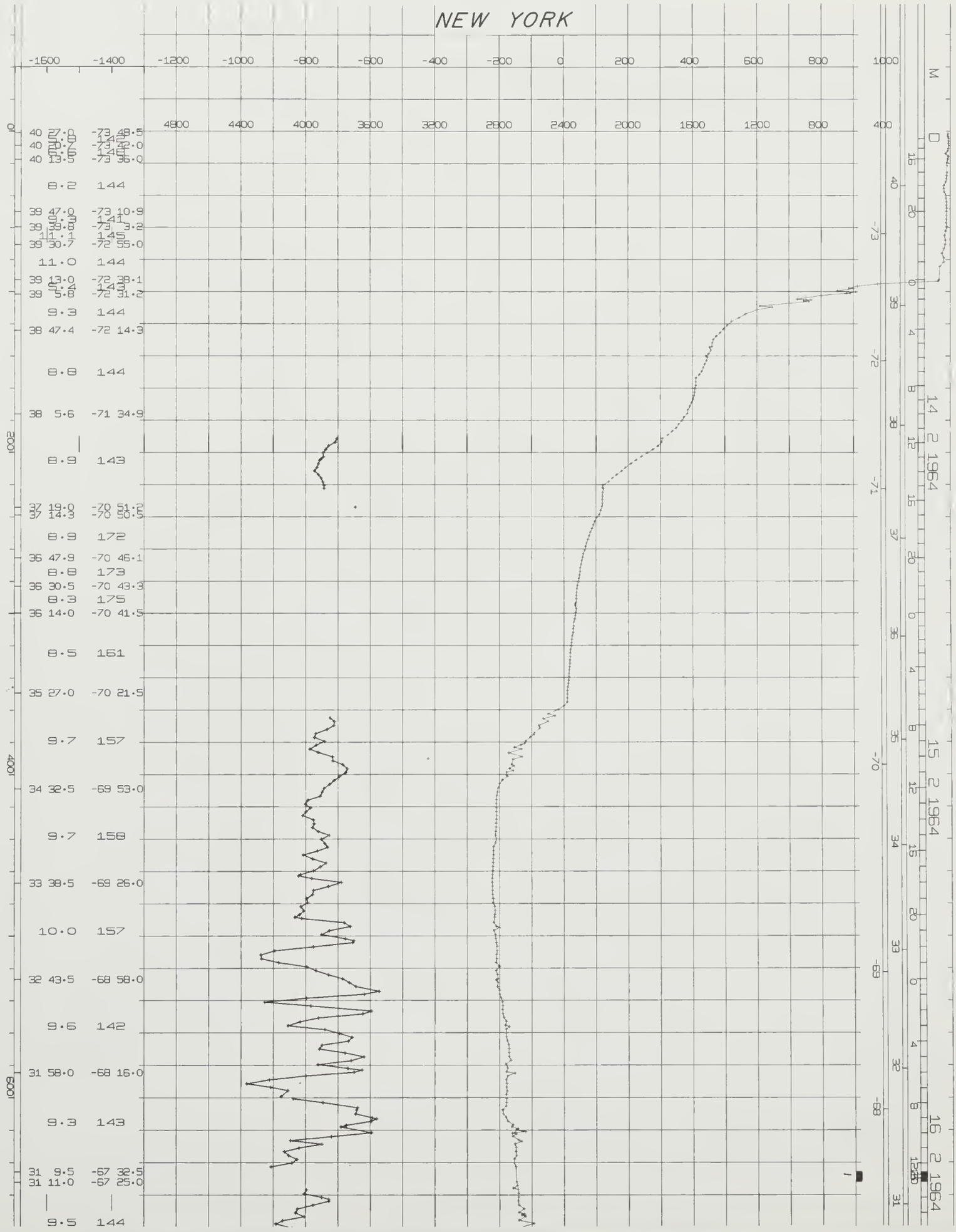

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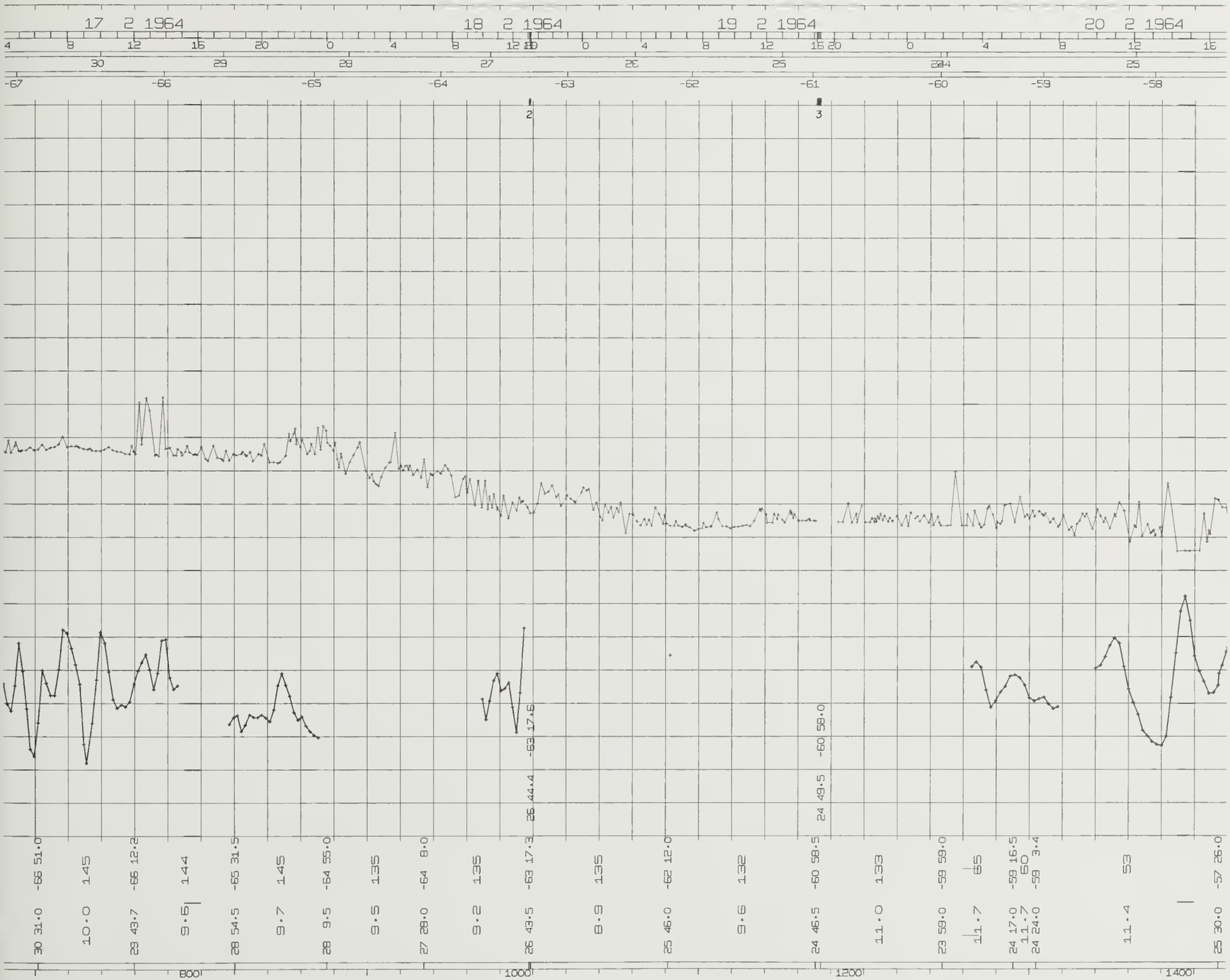

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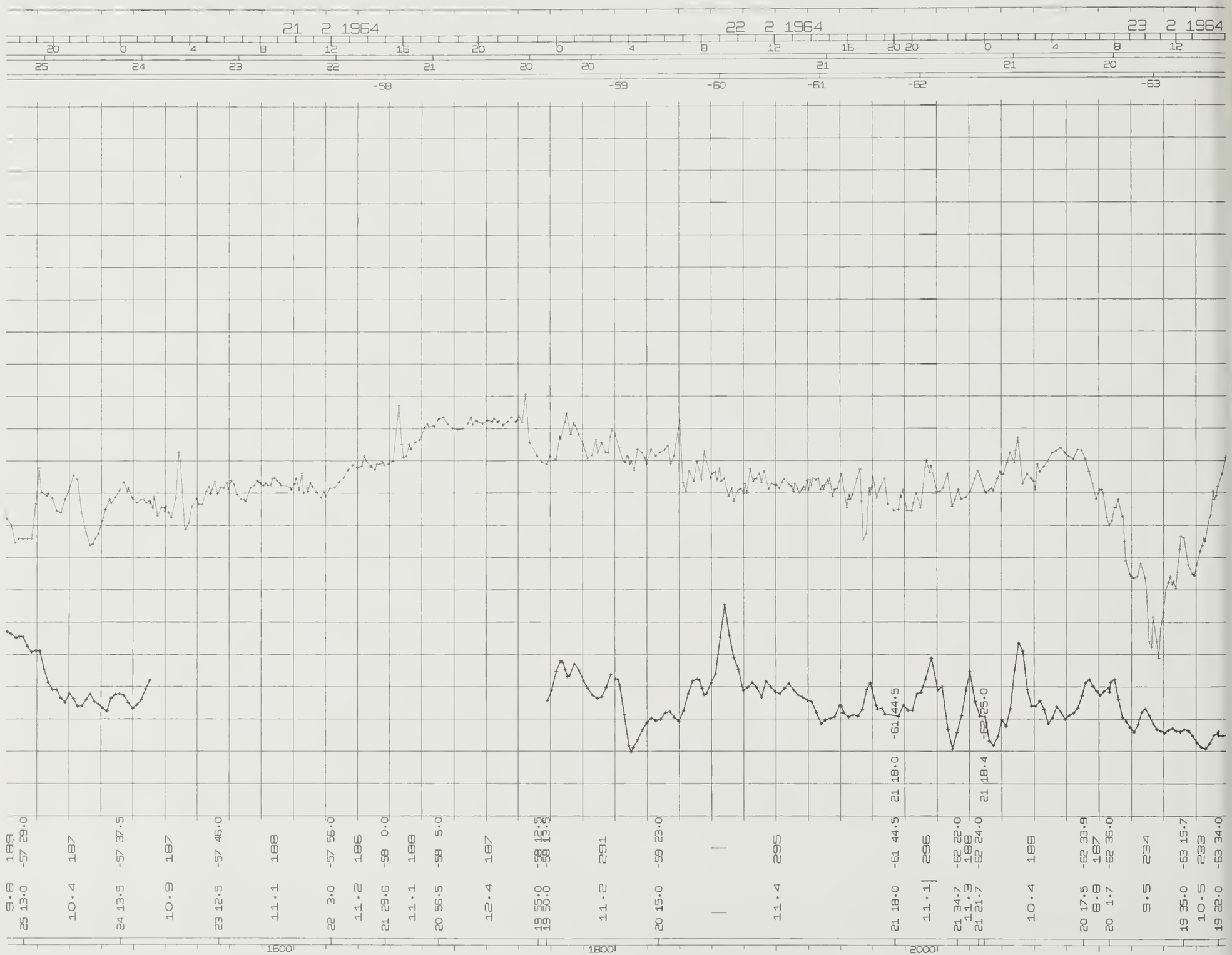

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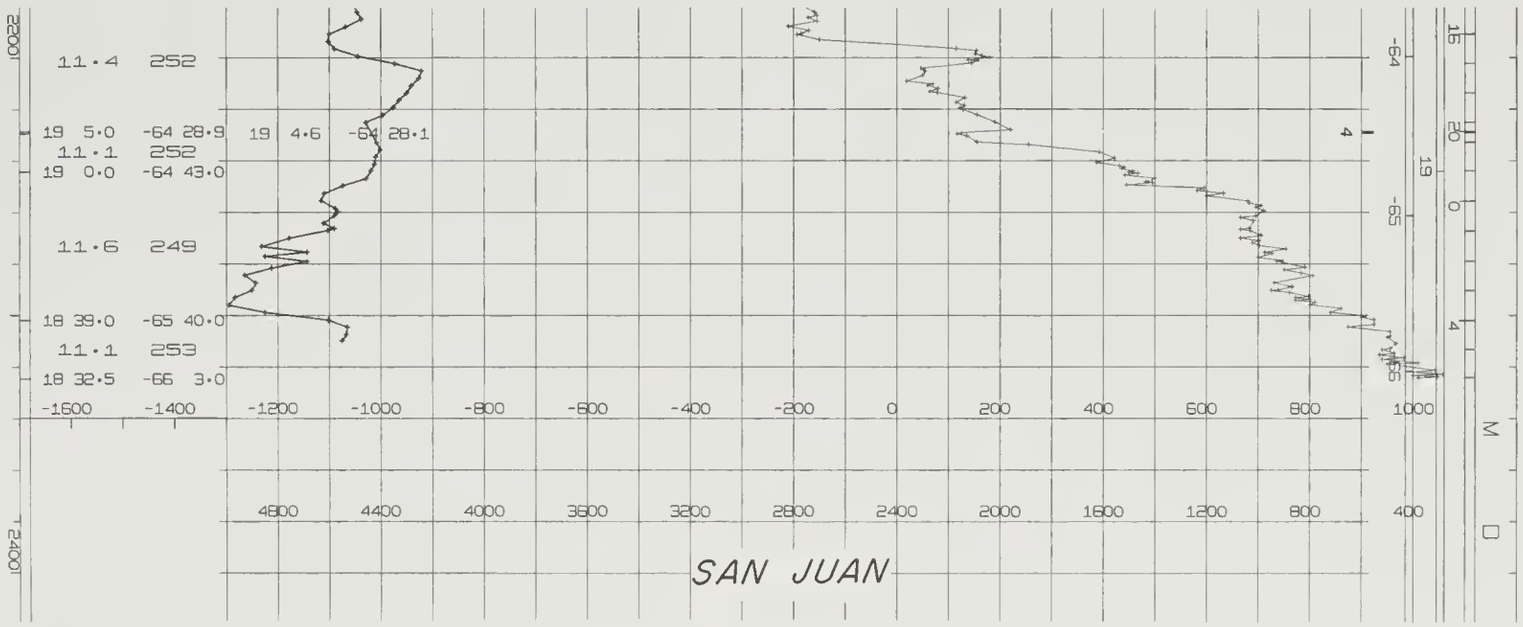

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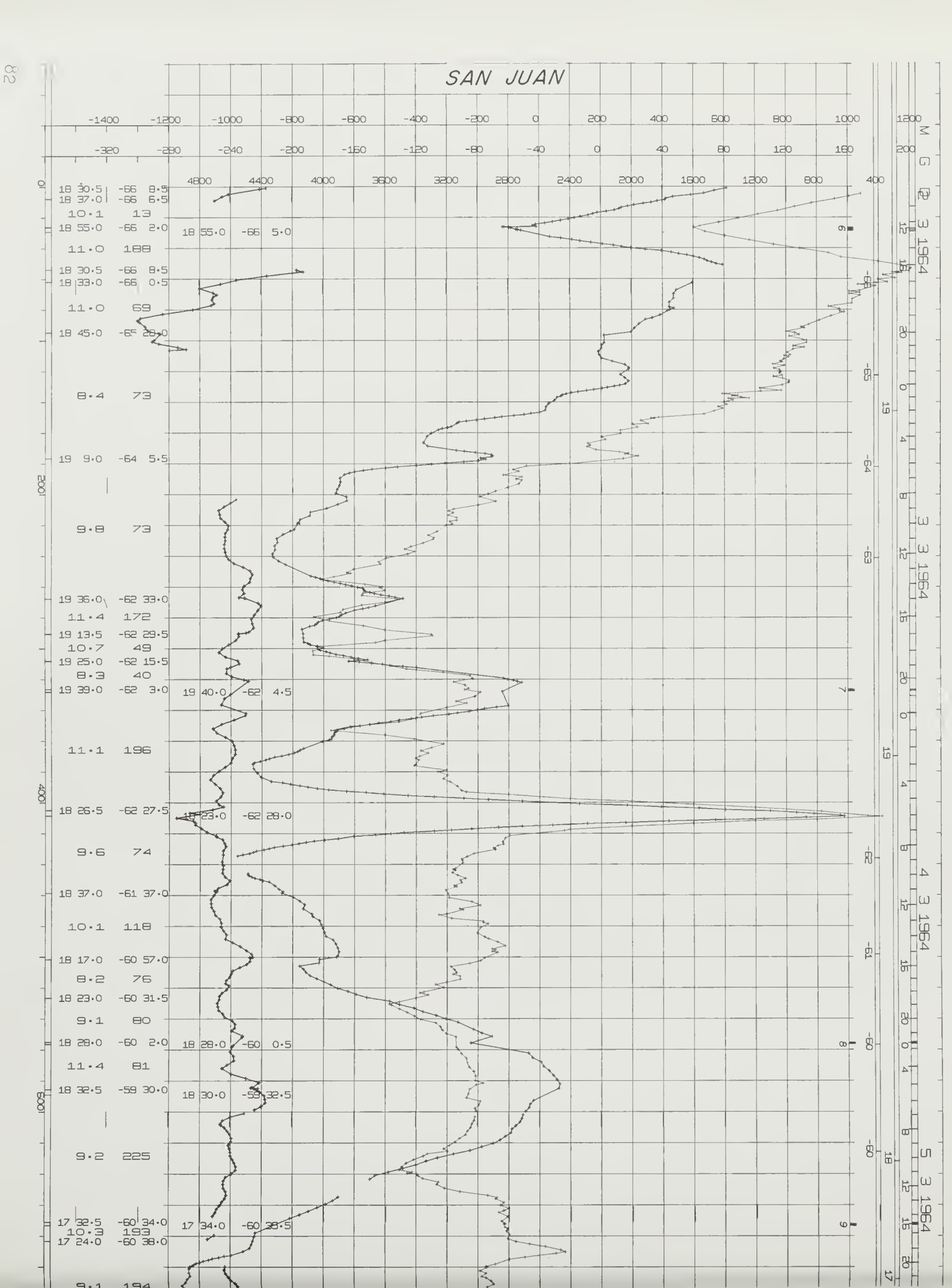

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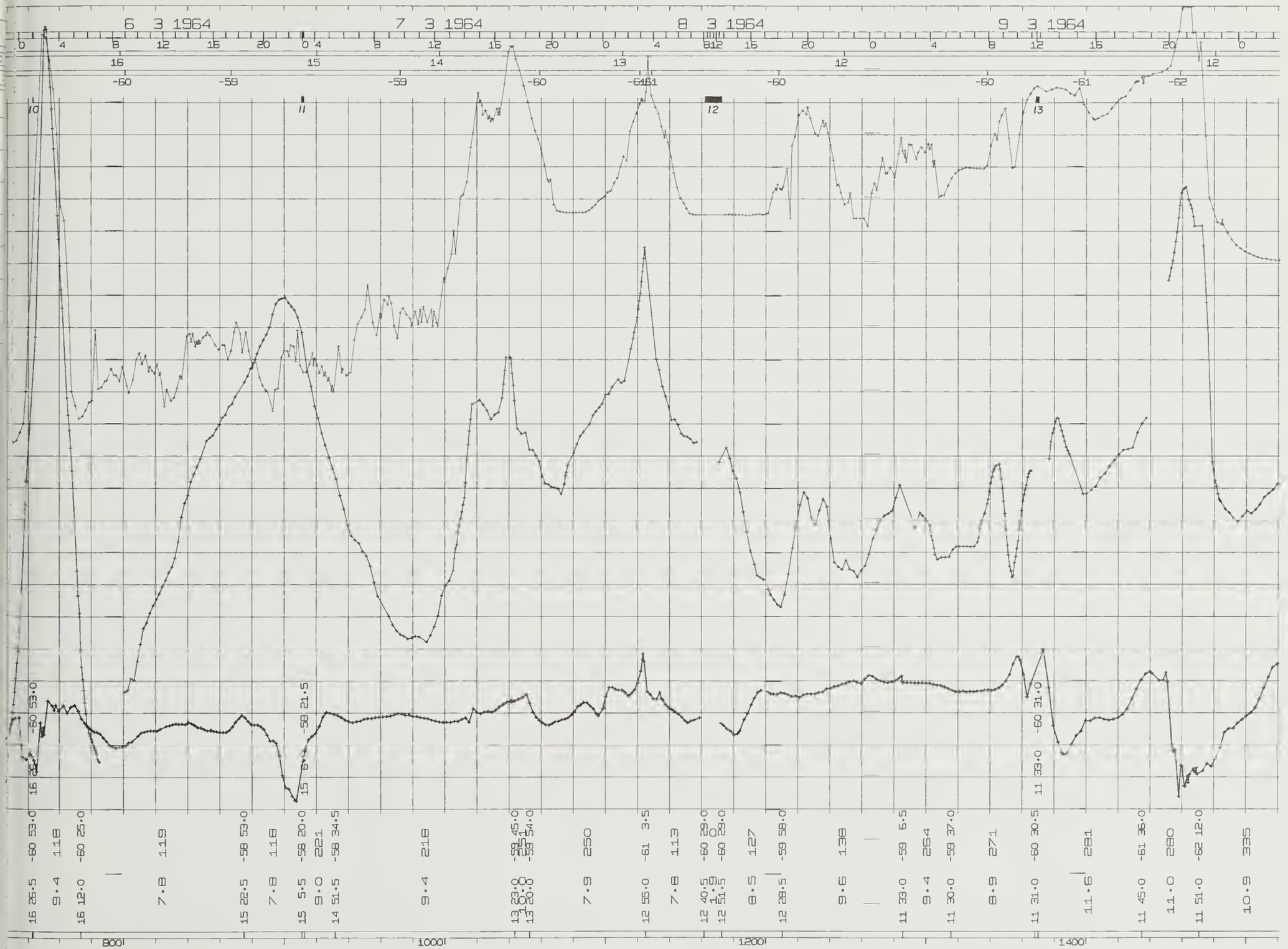

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3200
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M
D
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39 47.0 -73 10.9
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37 19.0 -70 51.5
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36 30.5 -70 43.3
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36 14.0 -70 41.5
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35 27.0 -70 21.5
9.7 157
34 32.5 -69 53.0
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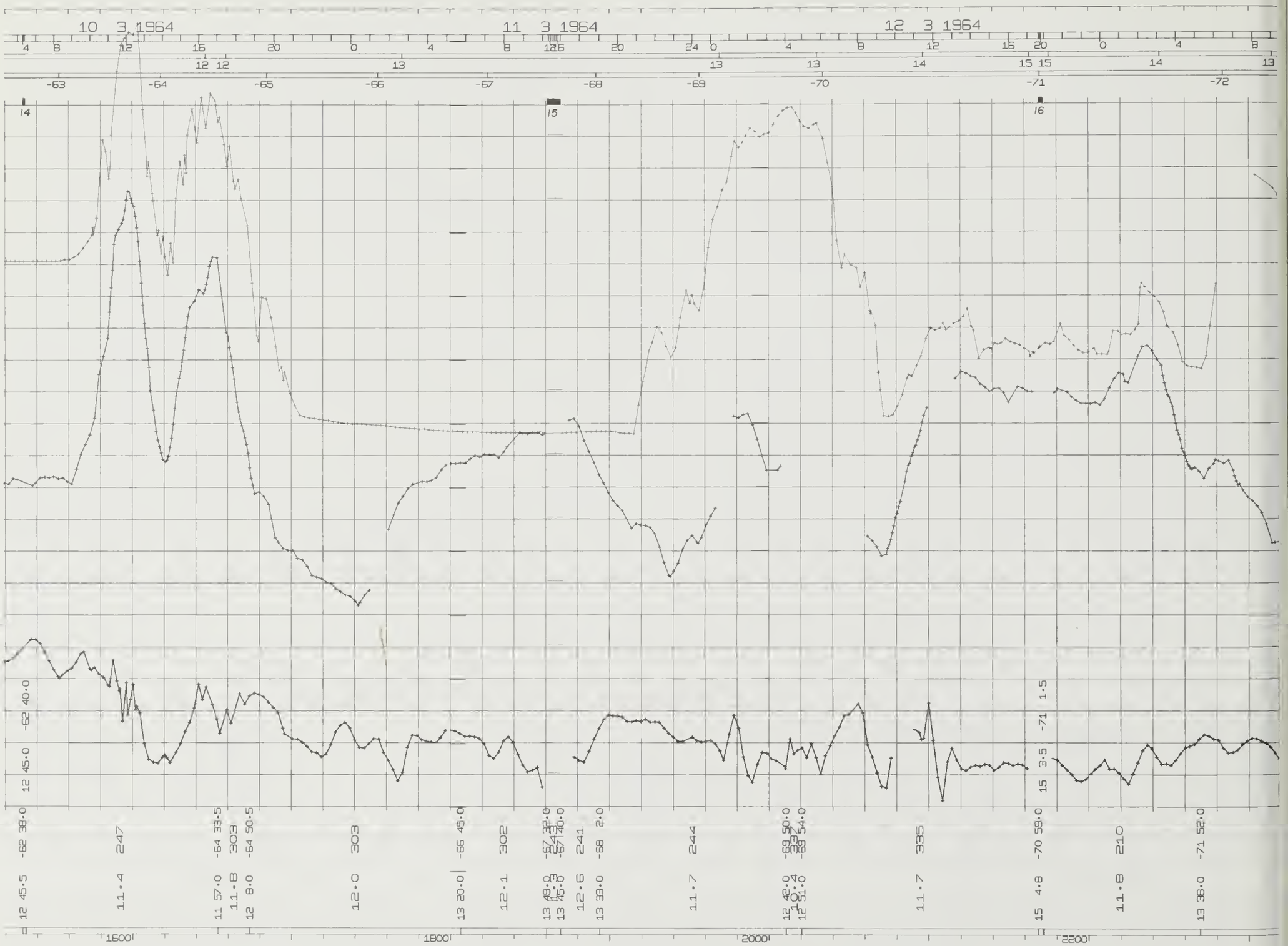

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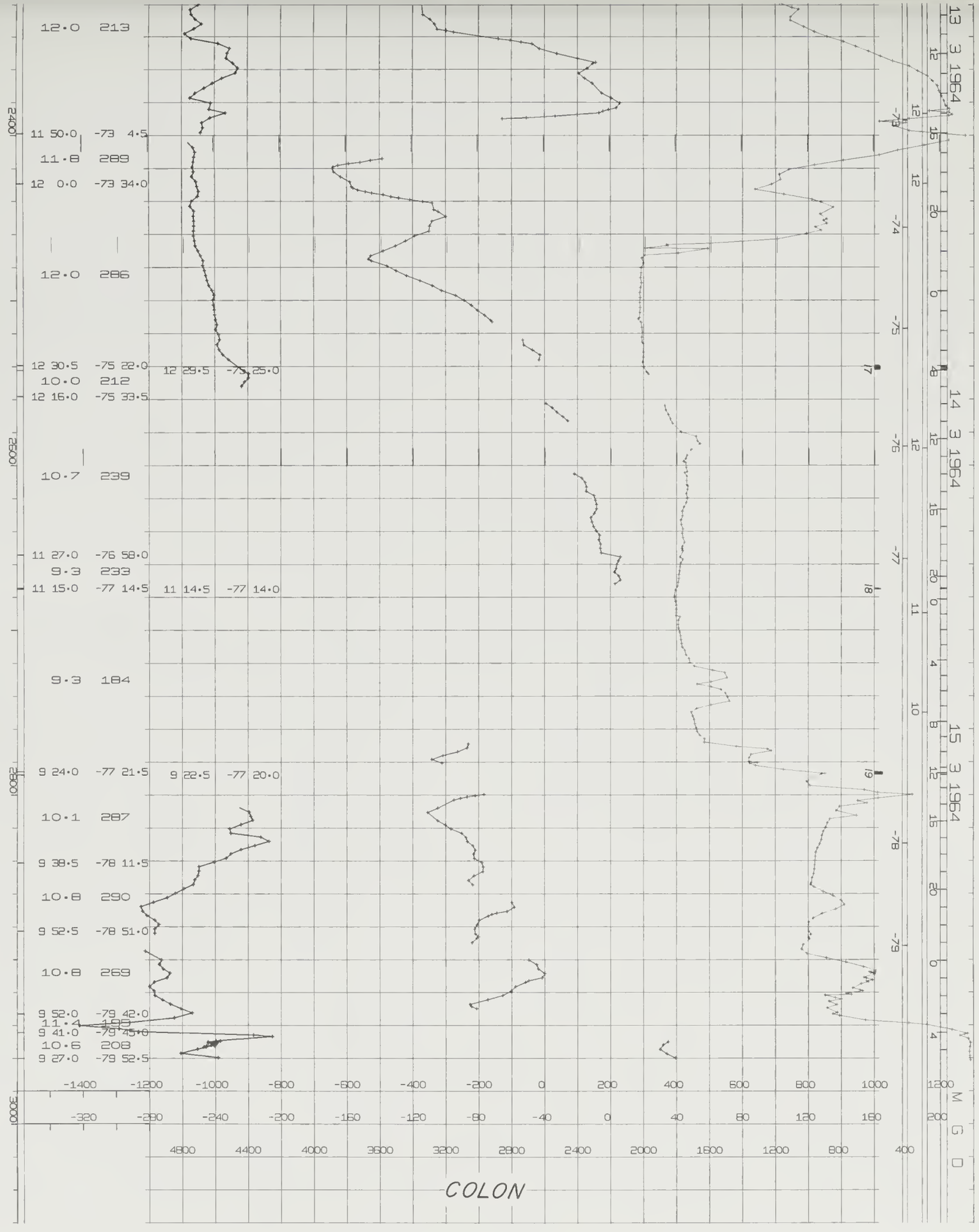

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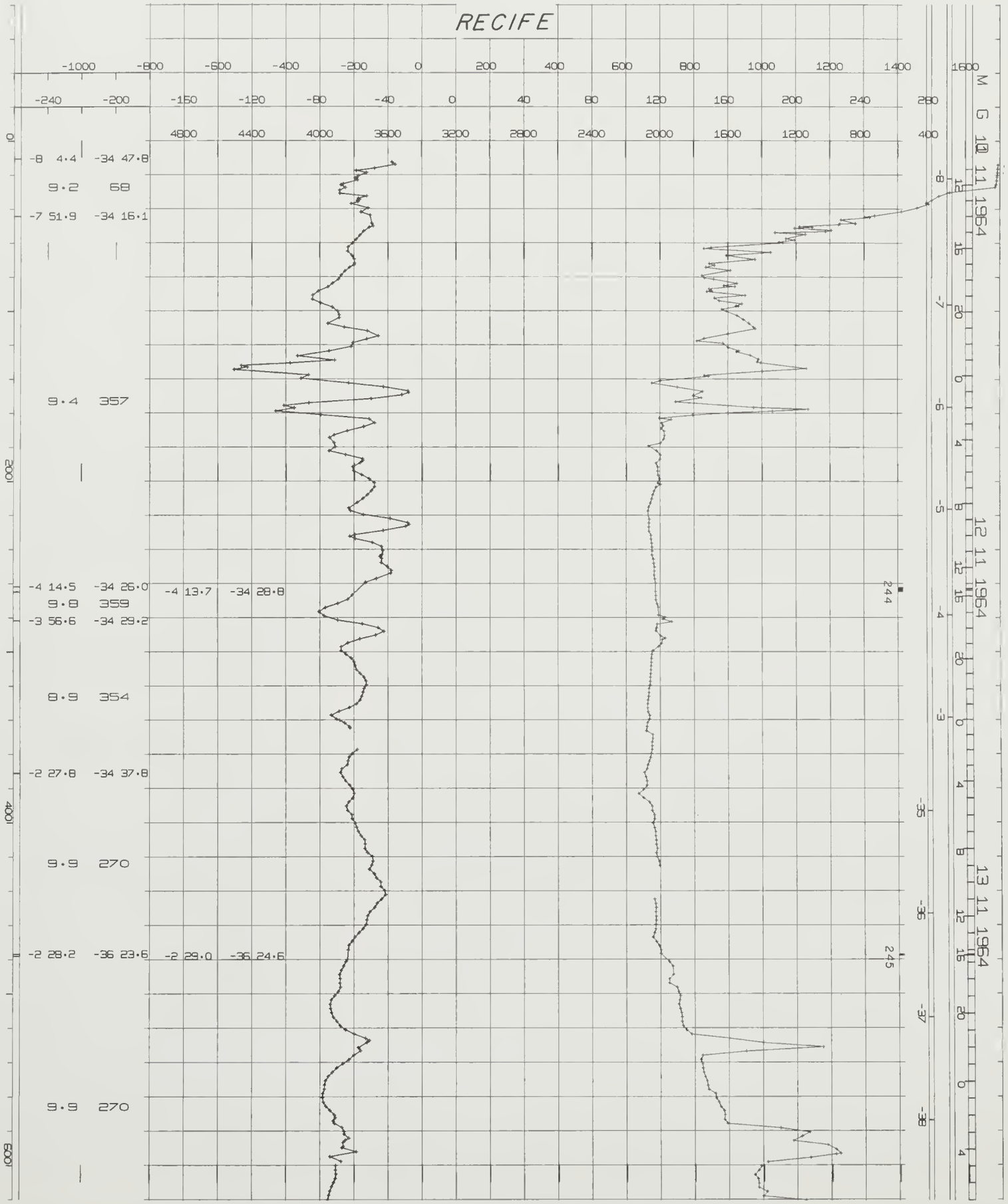

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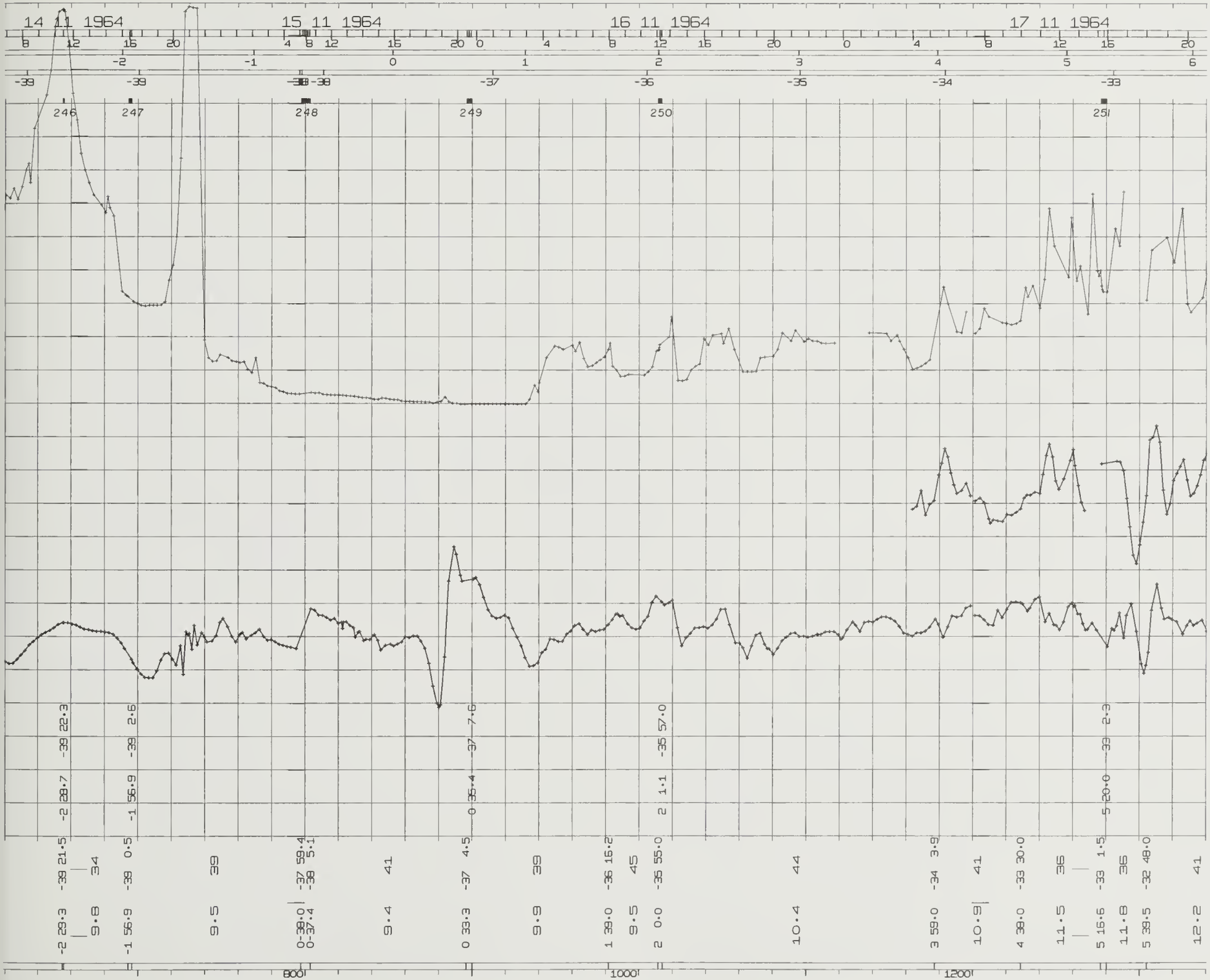

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18 37.0 -66 6.5
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18 55.0 -66 2.0
18 55.0 -66 5.0
11.0 188
18 30.5 -66 8.5
18 33.0 -66 0.5
11.0 69
18 45.0 -65 28.0
8.4 73
19 9.0 -64 5.5
9.8 73
19 36.0 -62 33.0
11.4 172
19 13.5 -62 29.5
10.7 49
19 25.0 -62 15.5
8.3 40
19 39.0 -62 3.0
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18 23.0 -62 28.0
9.6 74
18 37.0 -61 37.0
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18 17.0 -60 57.0
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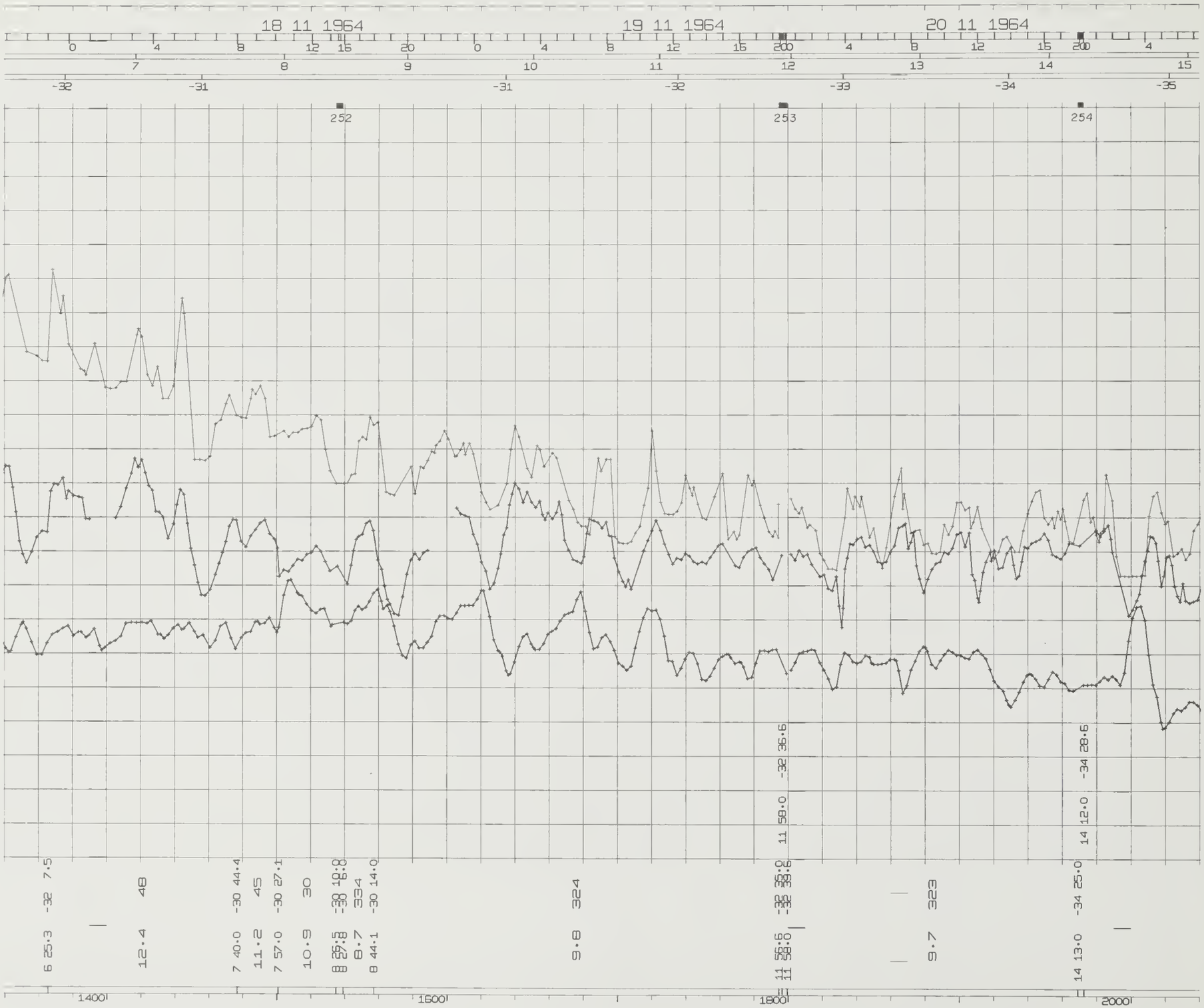

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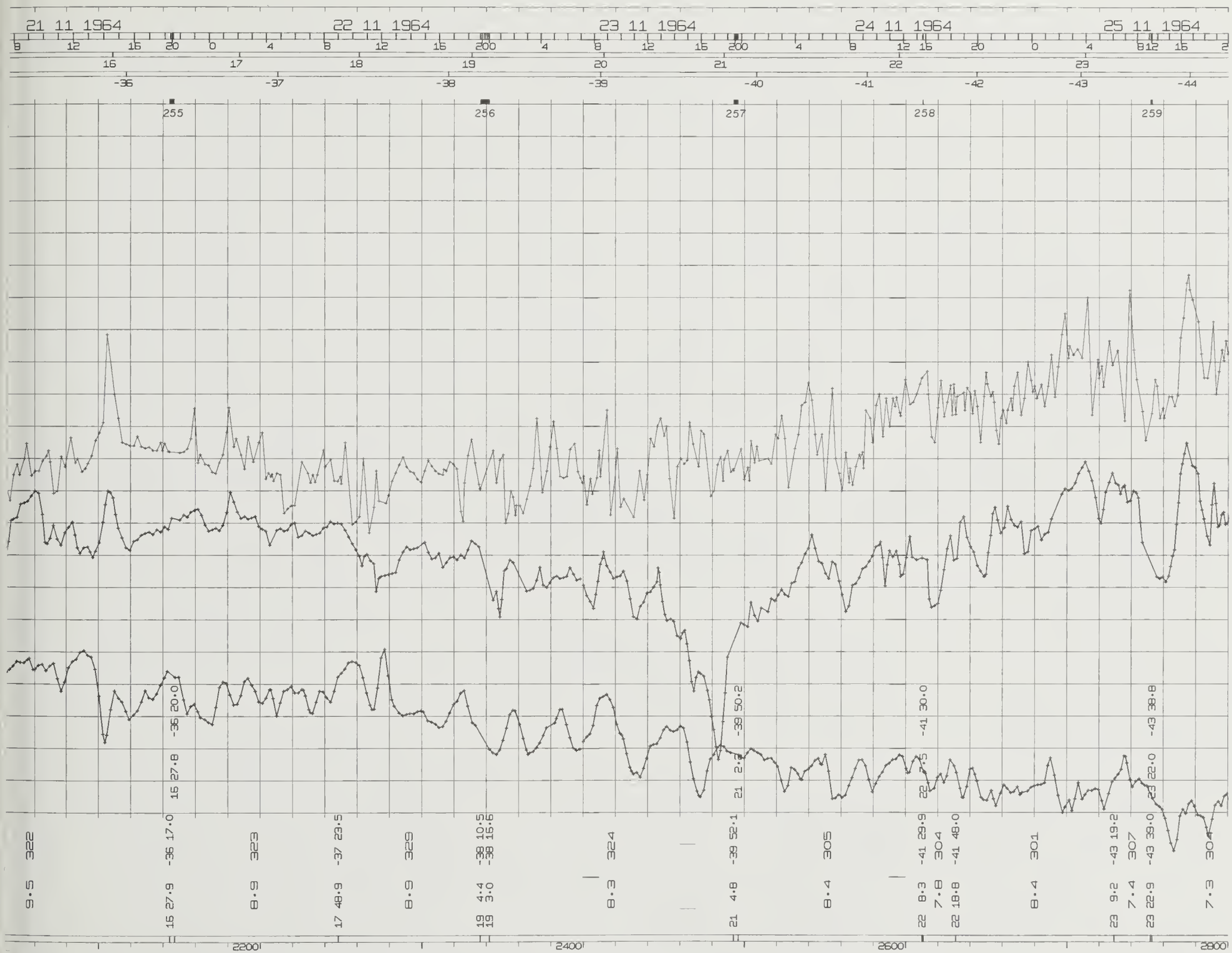

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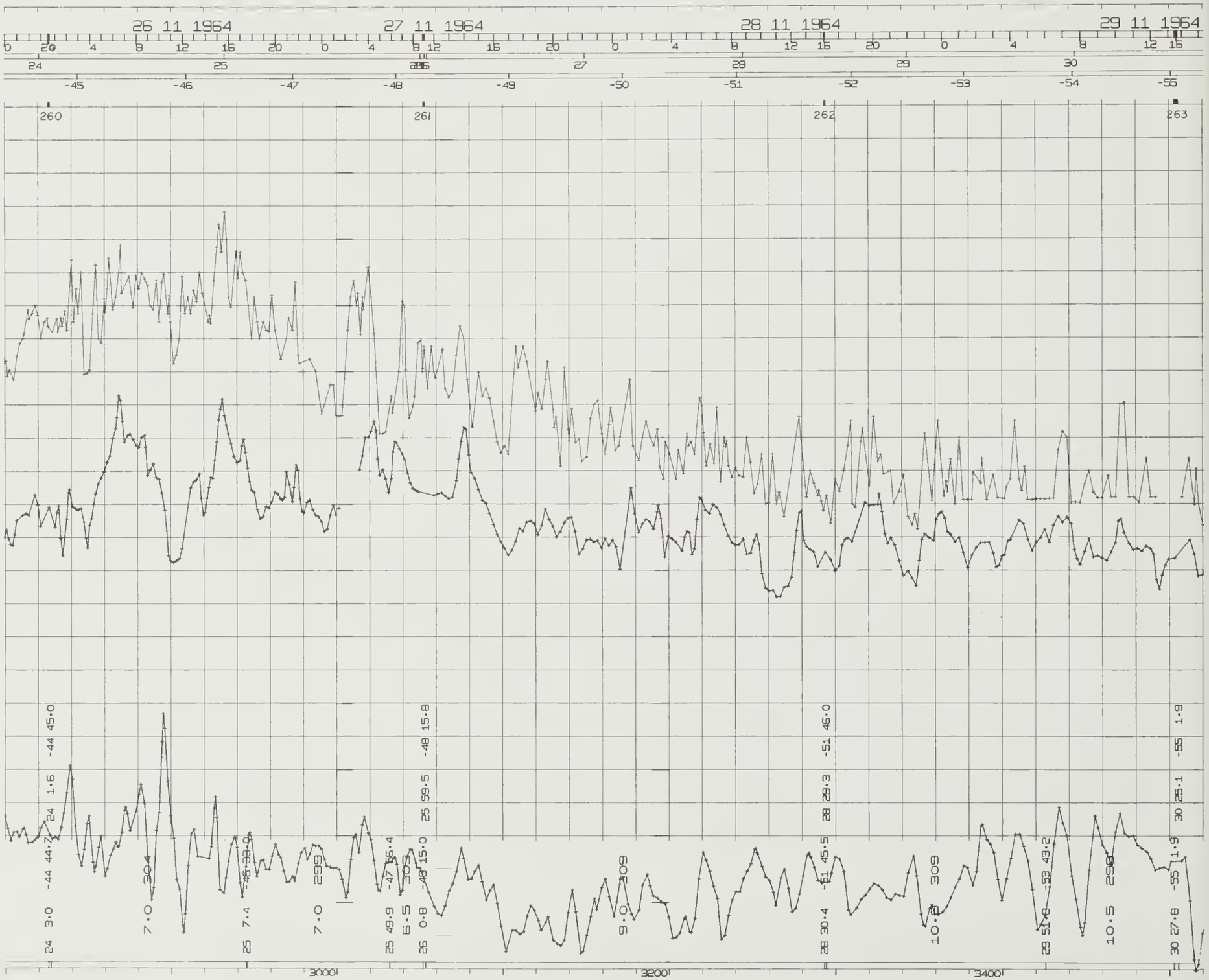

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12 16·0 -75 33·5
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11 27·0 -76 58·0
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11 15·0 -77 14·5
11 14·5 -77 14·0
9·3 184
9 24·0 -77 21·5
9 22·5 -77 20·0
10·1 287
9 38·5 -78 11·5
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9 52·0 -79 42·0
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9 41·0 -79 45·0
10·6 208
9 27·0 -79 52·5
2400
2600
2800
3000
13 3 1964
14 3 1964
15 3 1964
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M G D
COLON

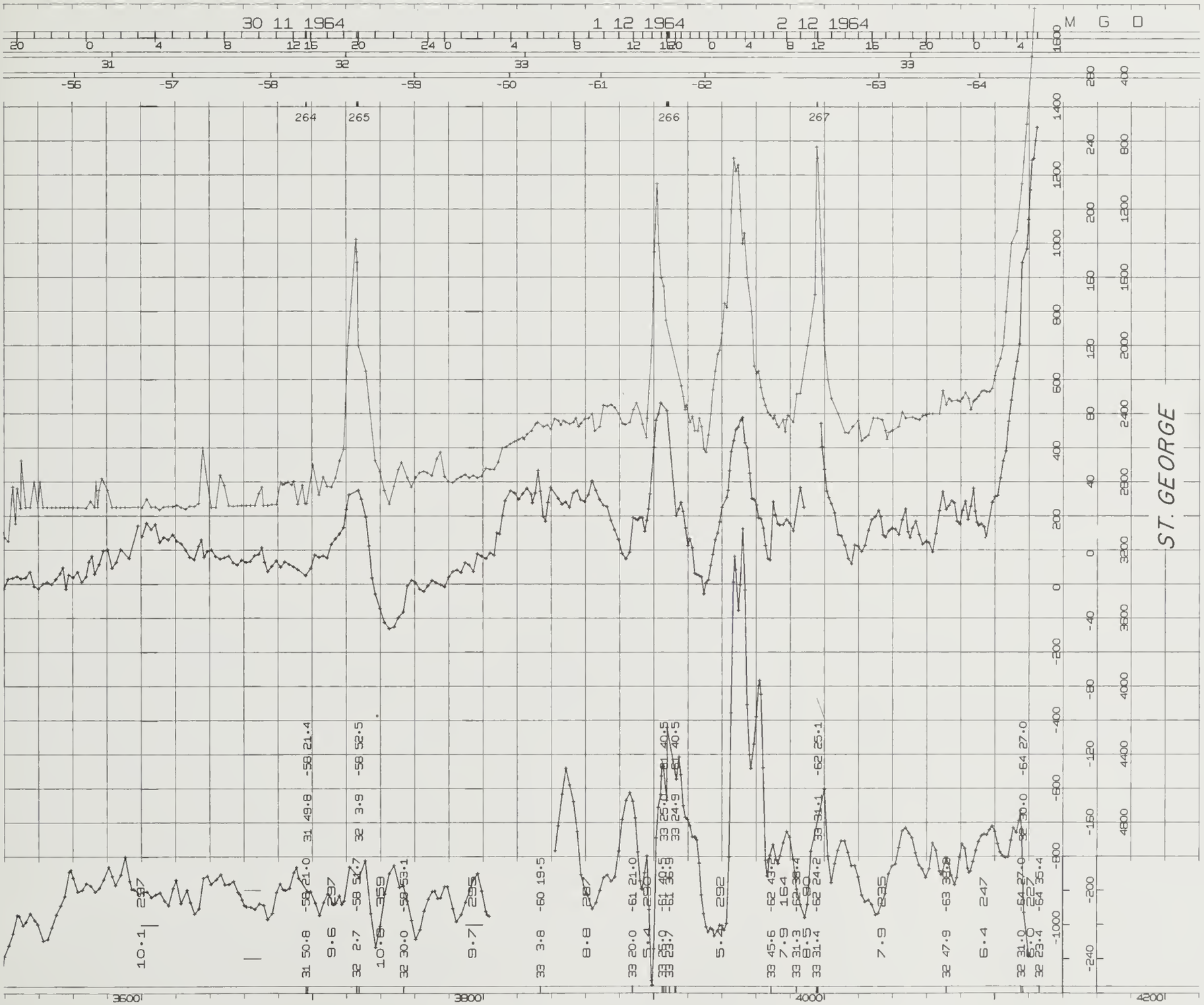

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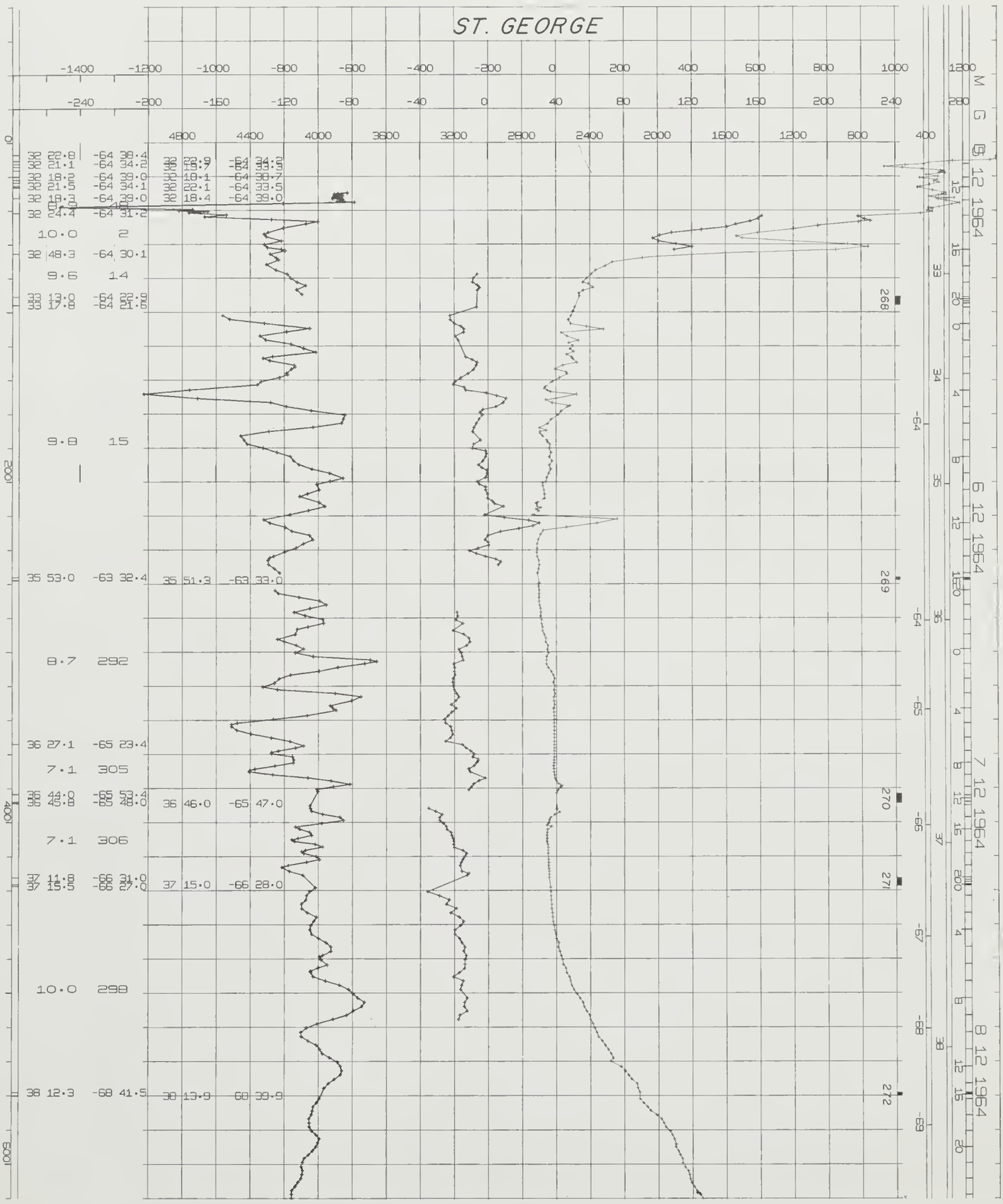

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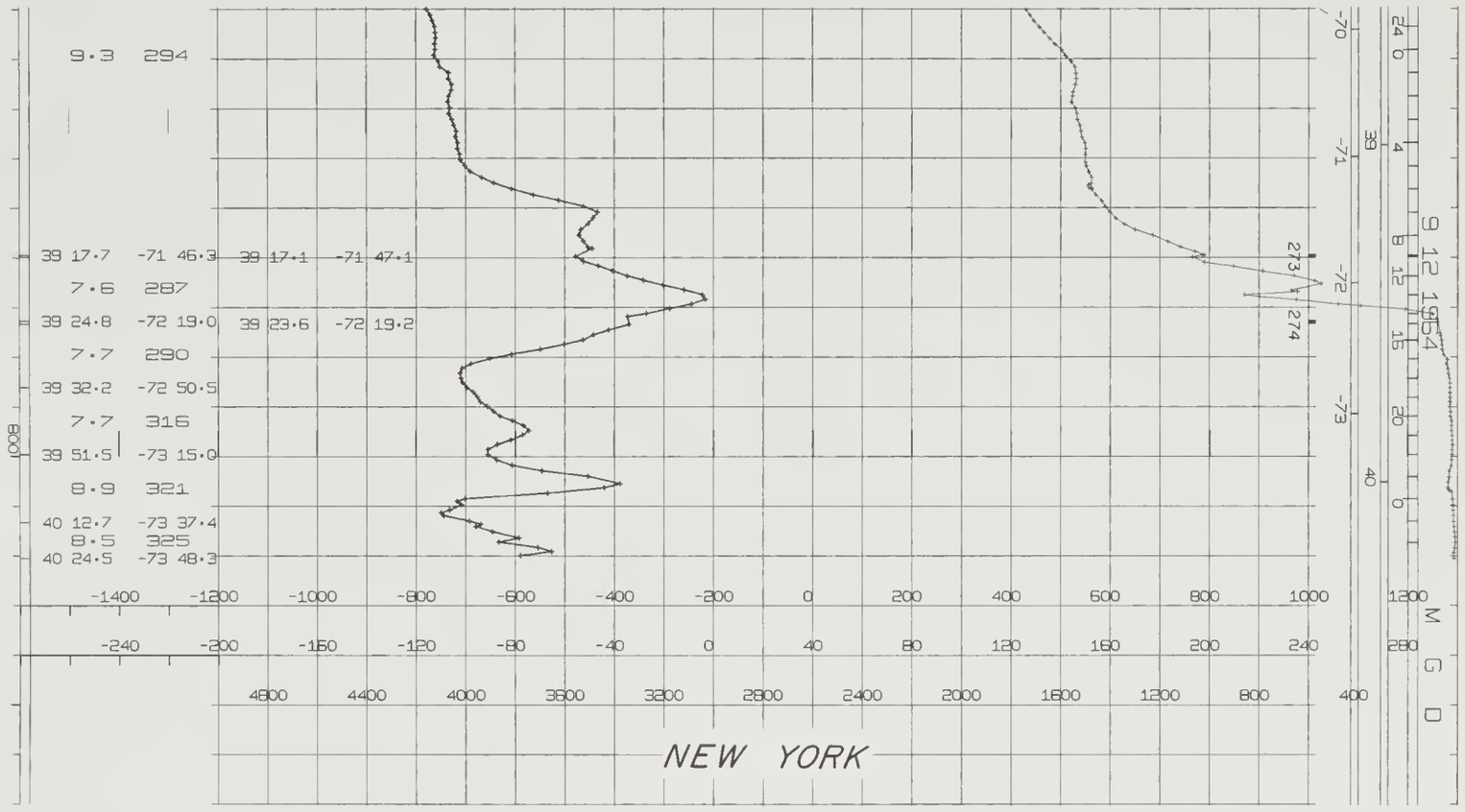

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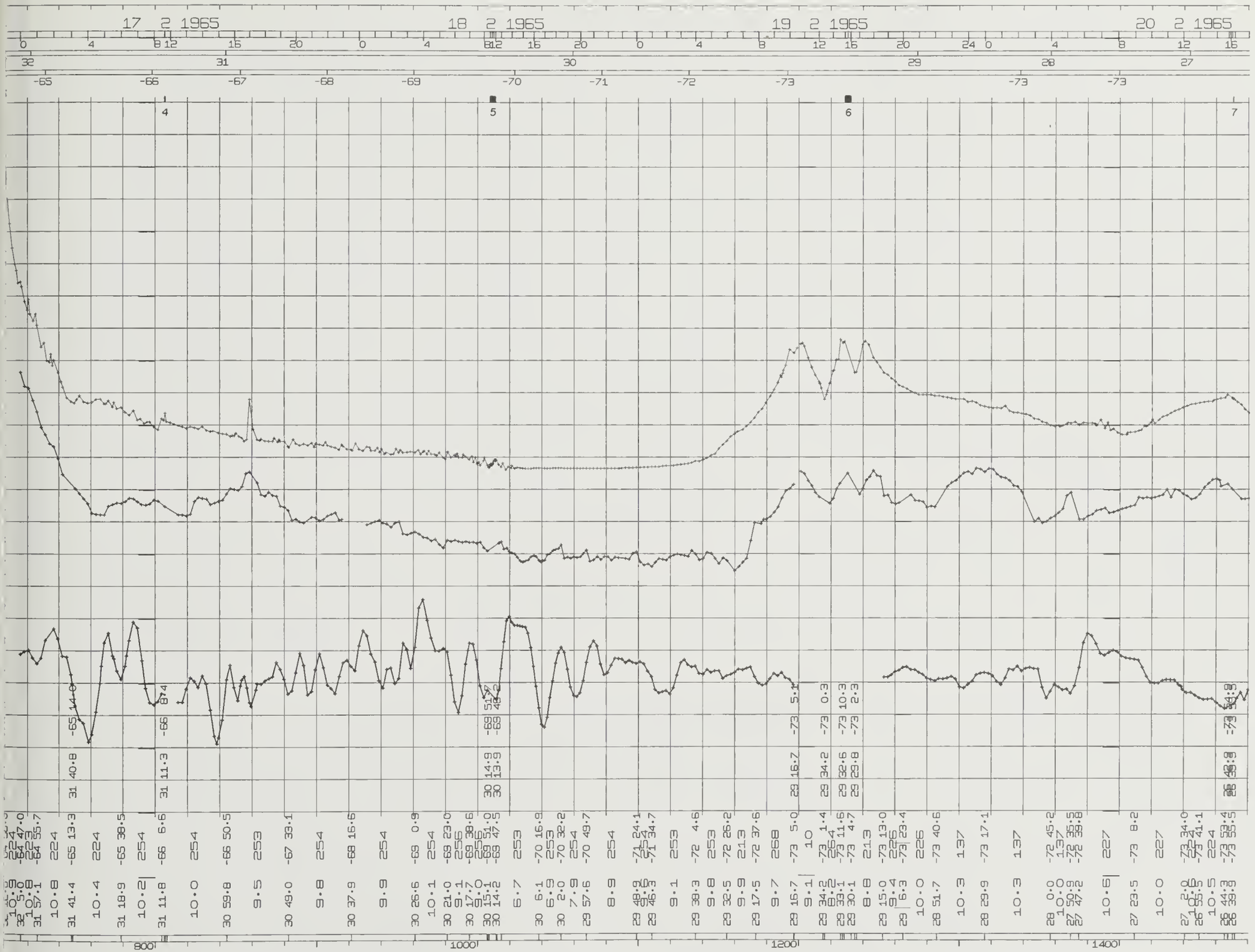

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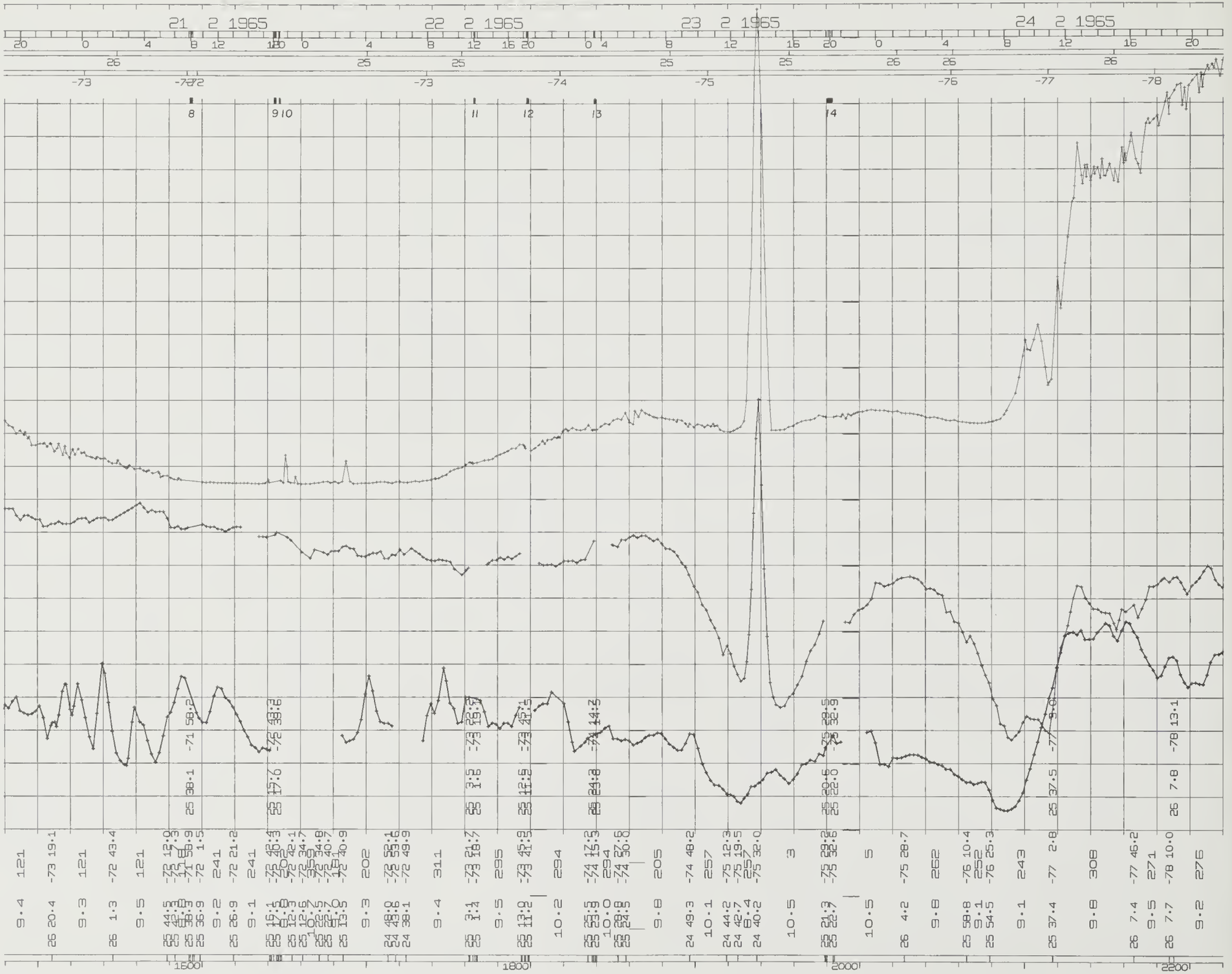

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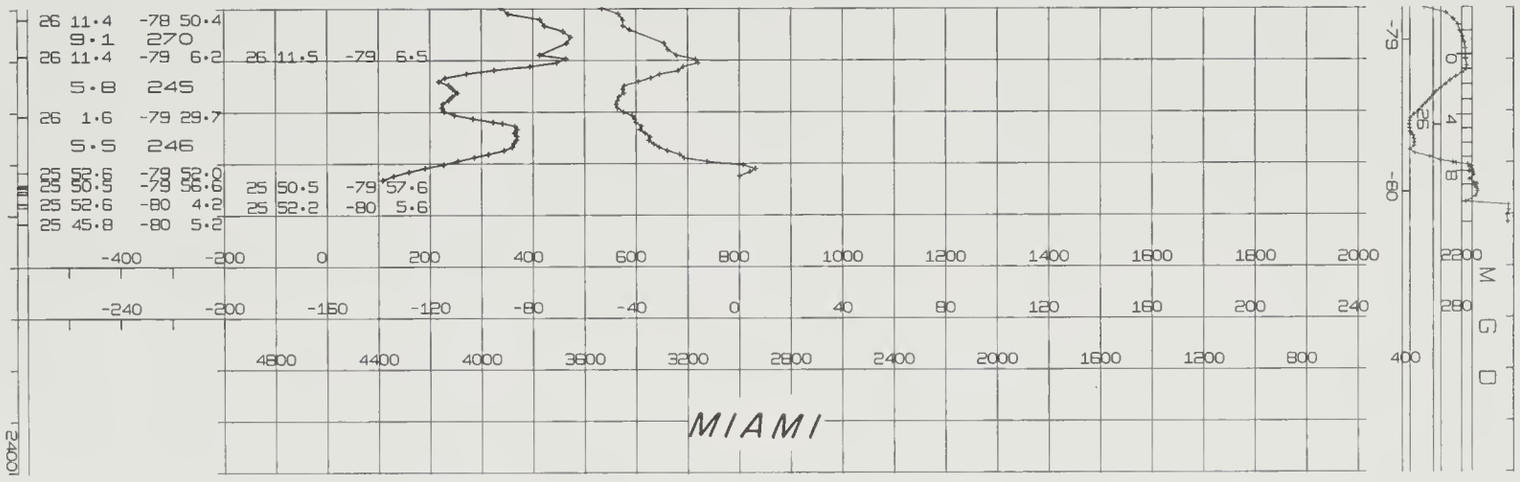

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32 22.1 -64 33.5
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9.3 294
39 17.7 -71 46.3
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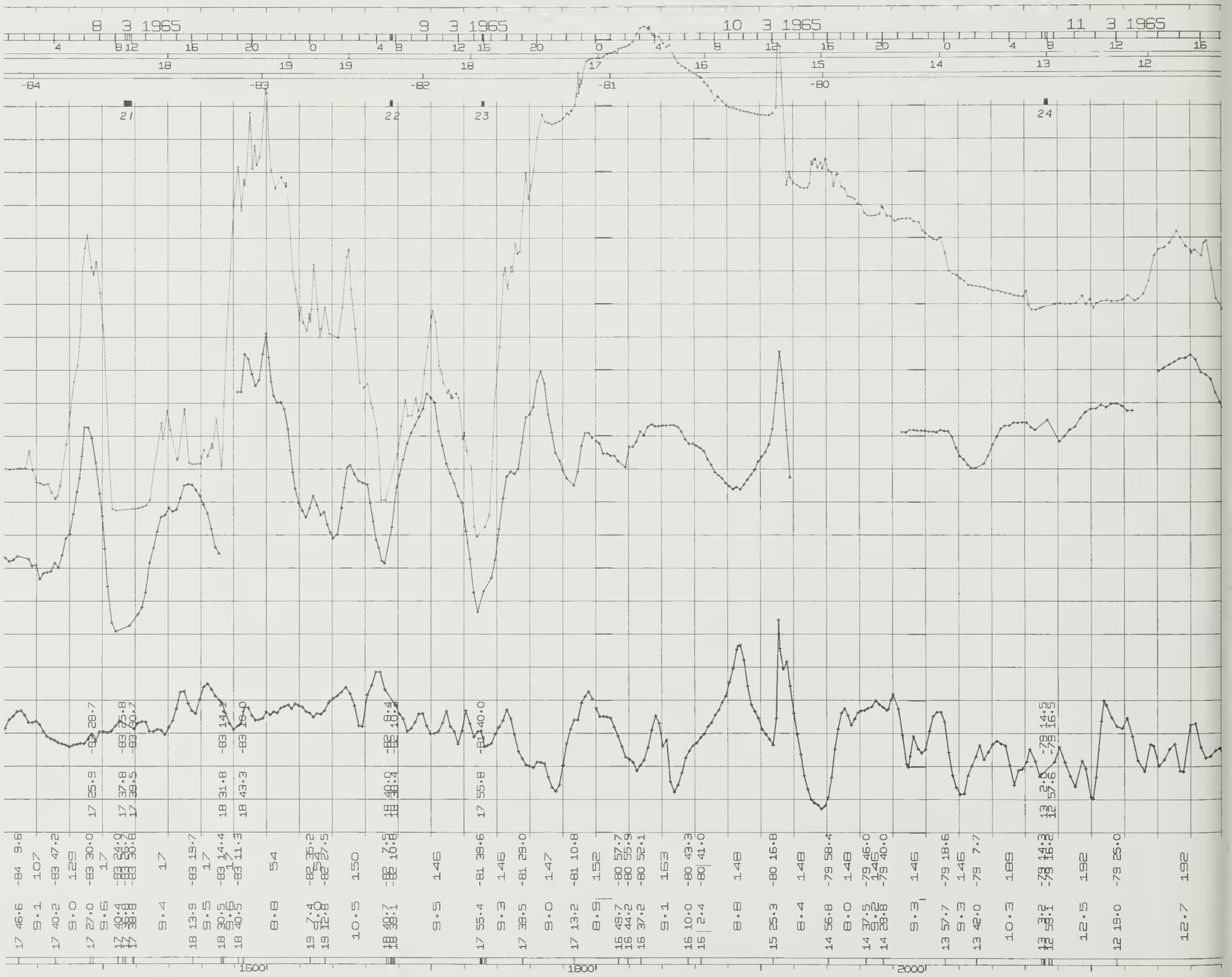

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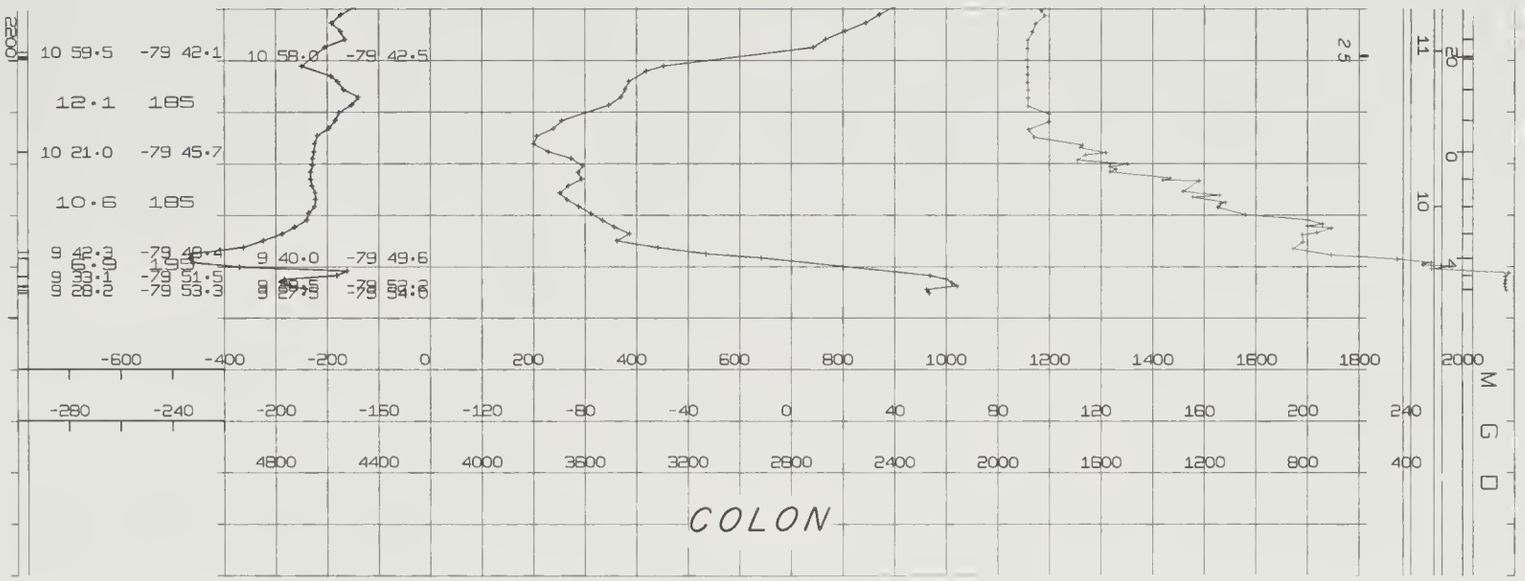

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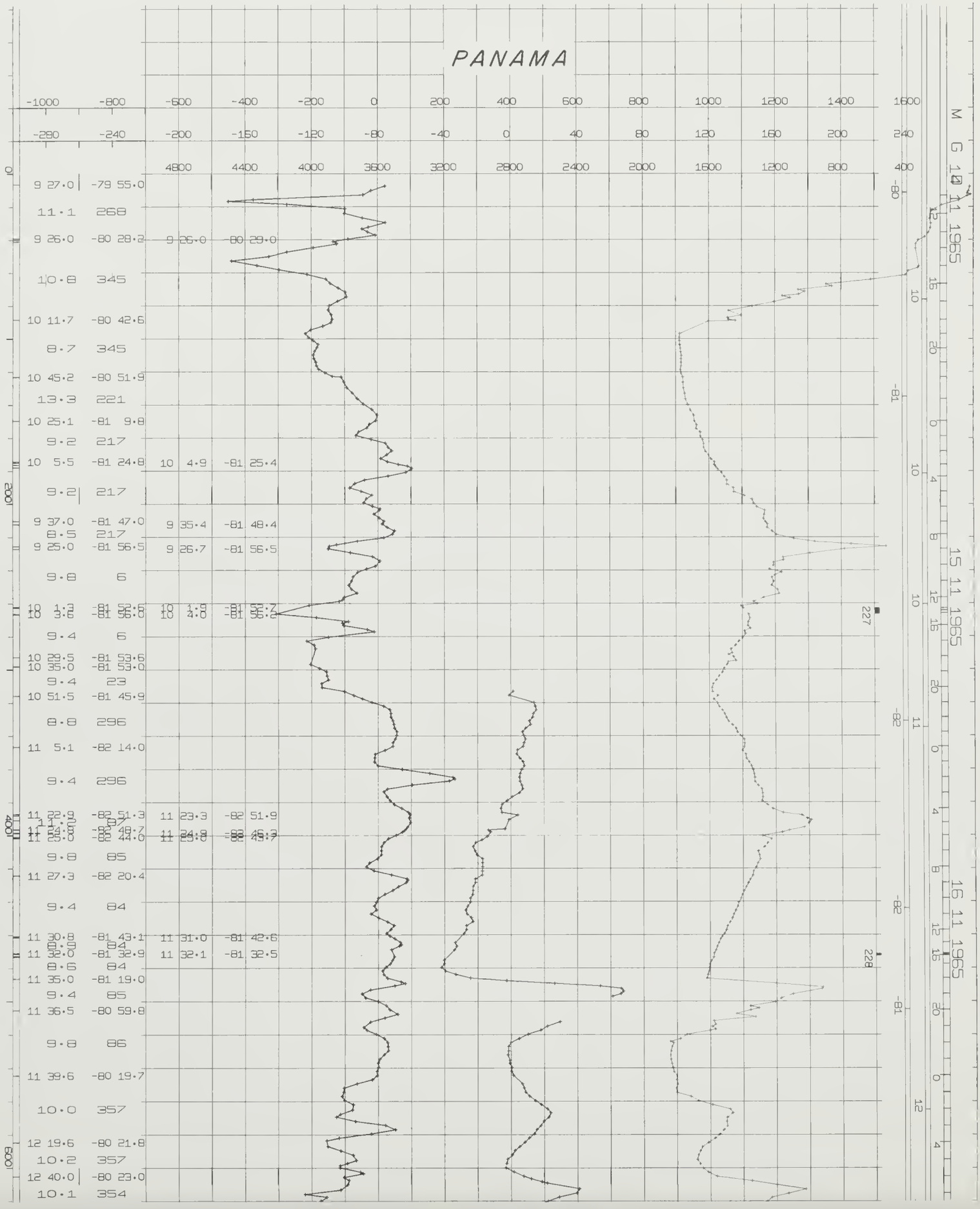

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25 52.6 -80 4.2
25 52.2 -80 5.6
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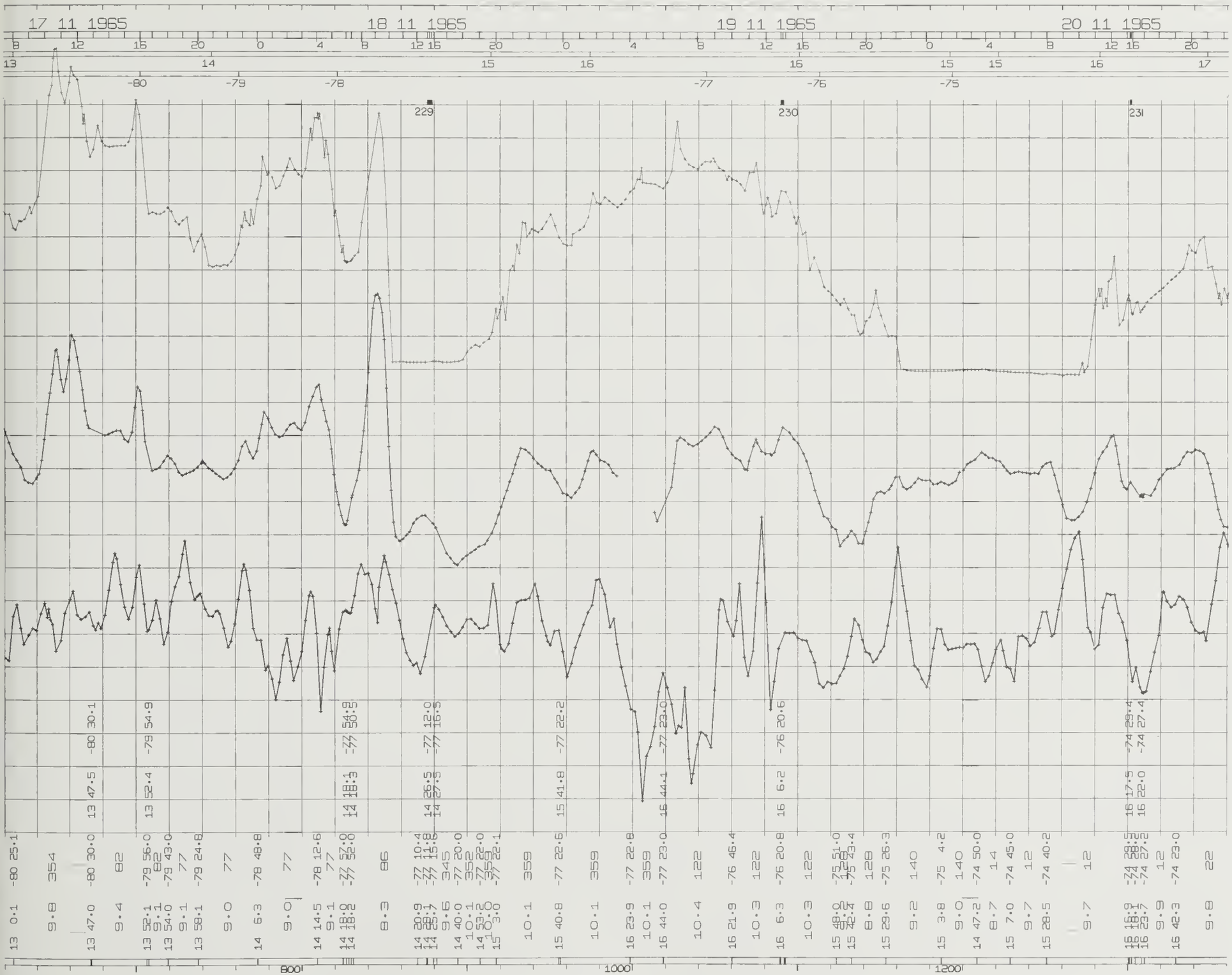
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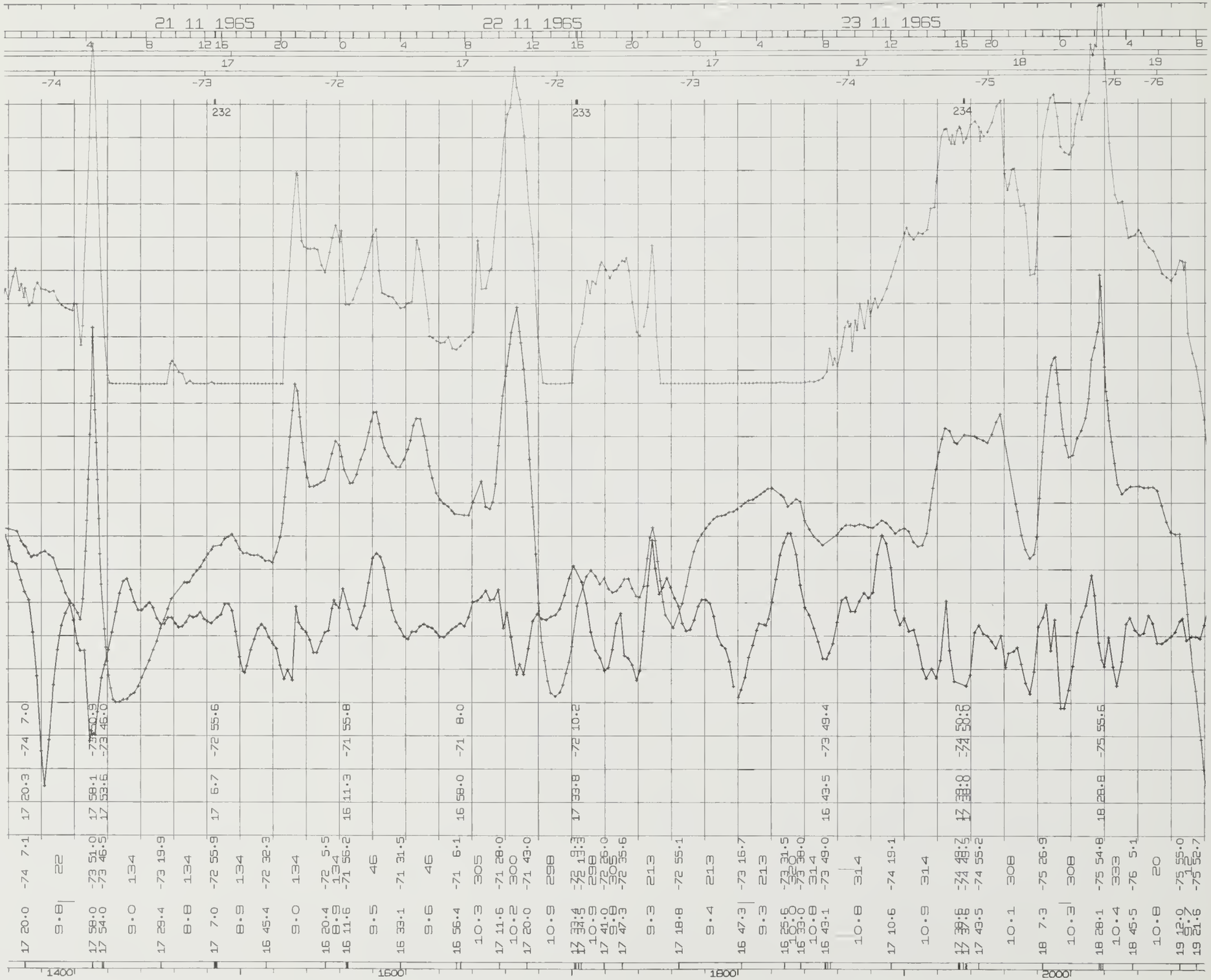
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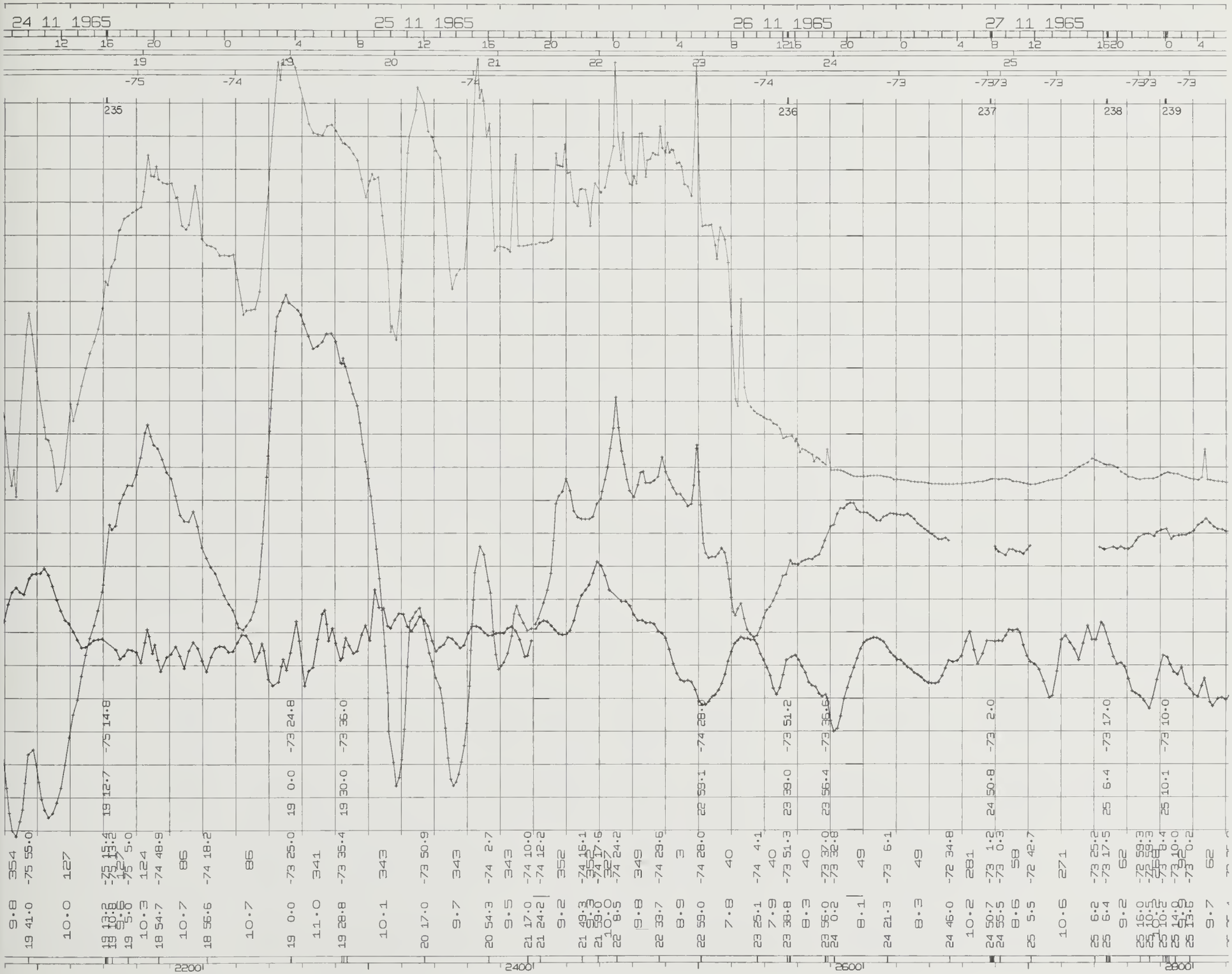

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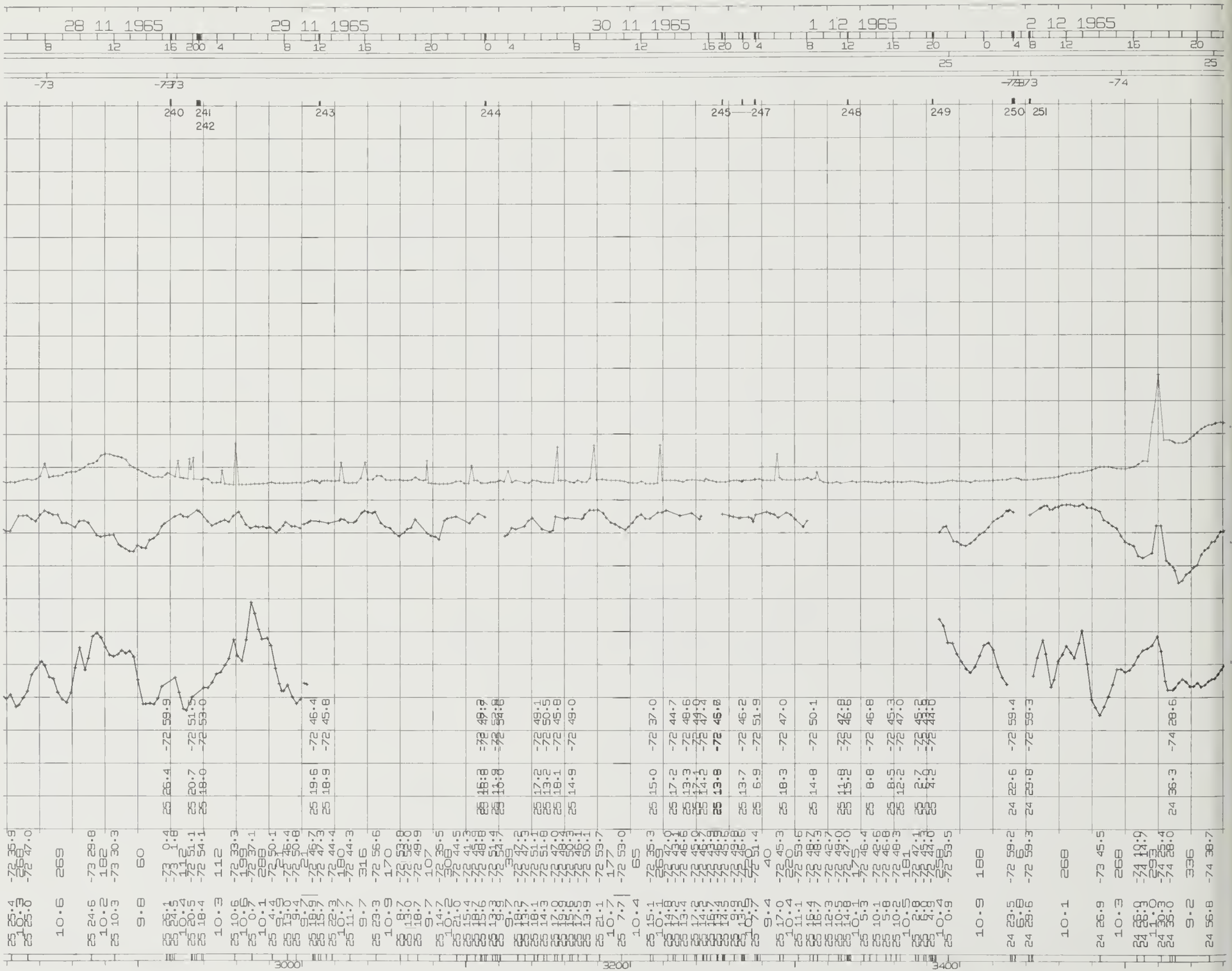

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COLON
MGD


PANAMA
M G 10 11 1965
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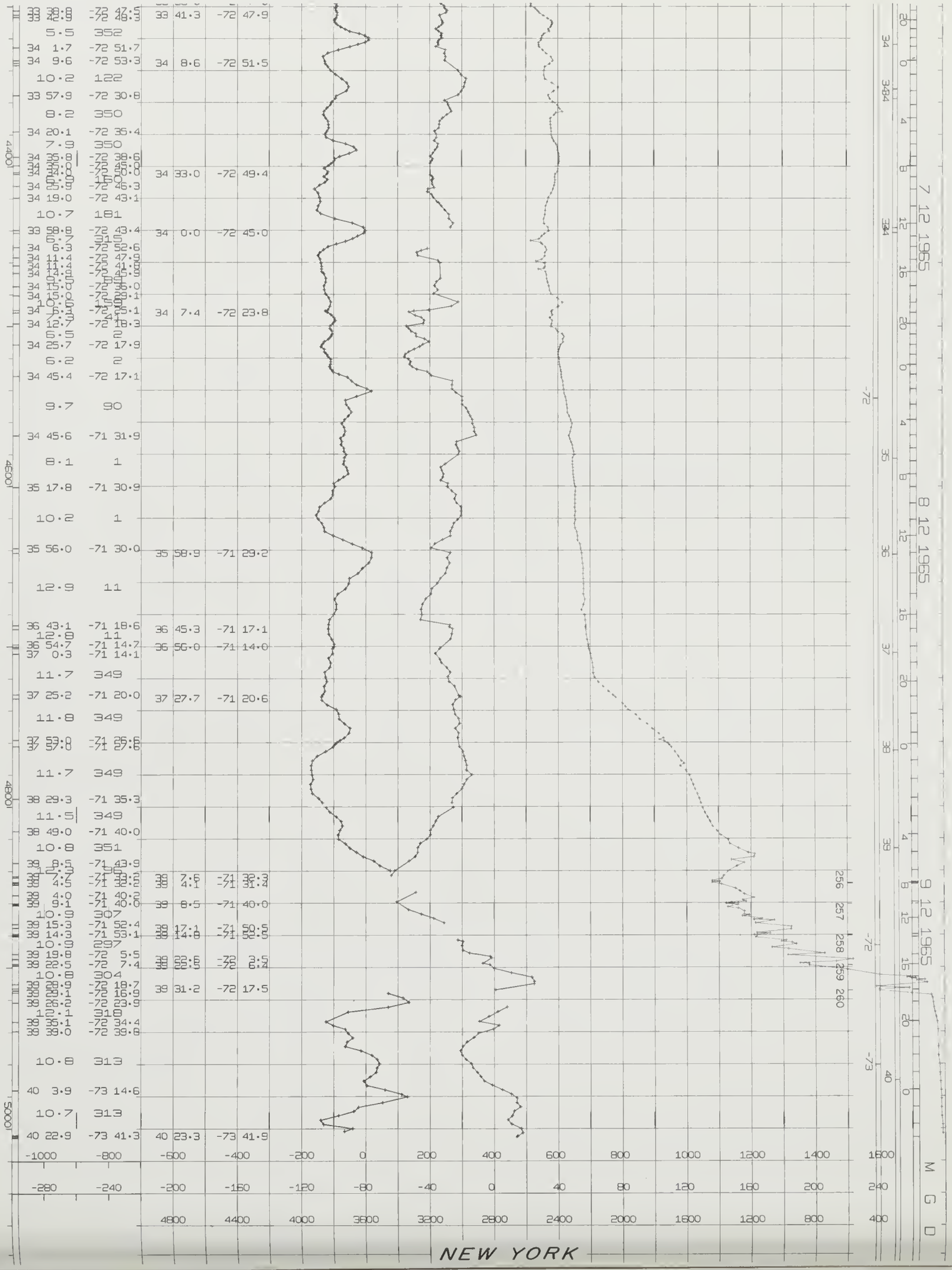

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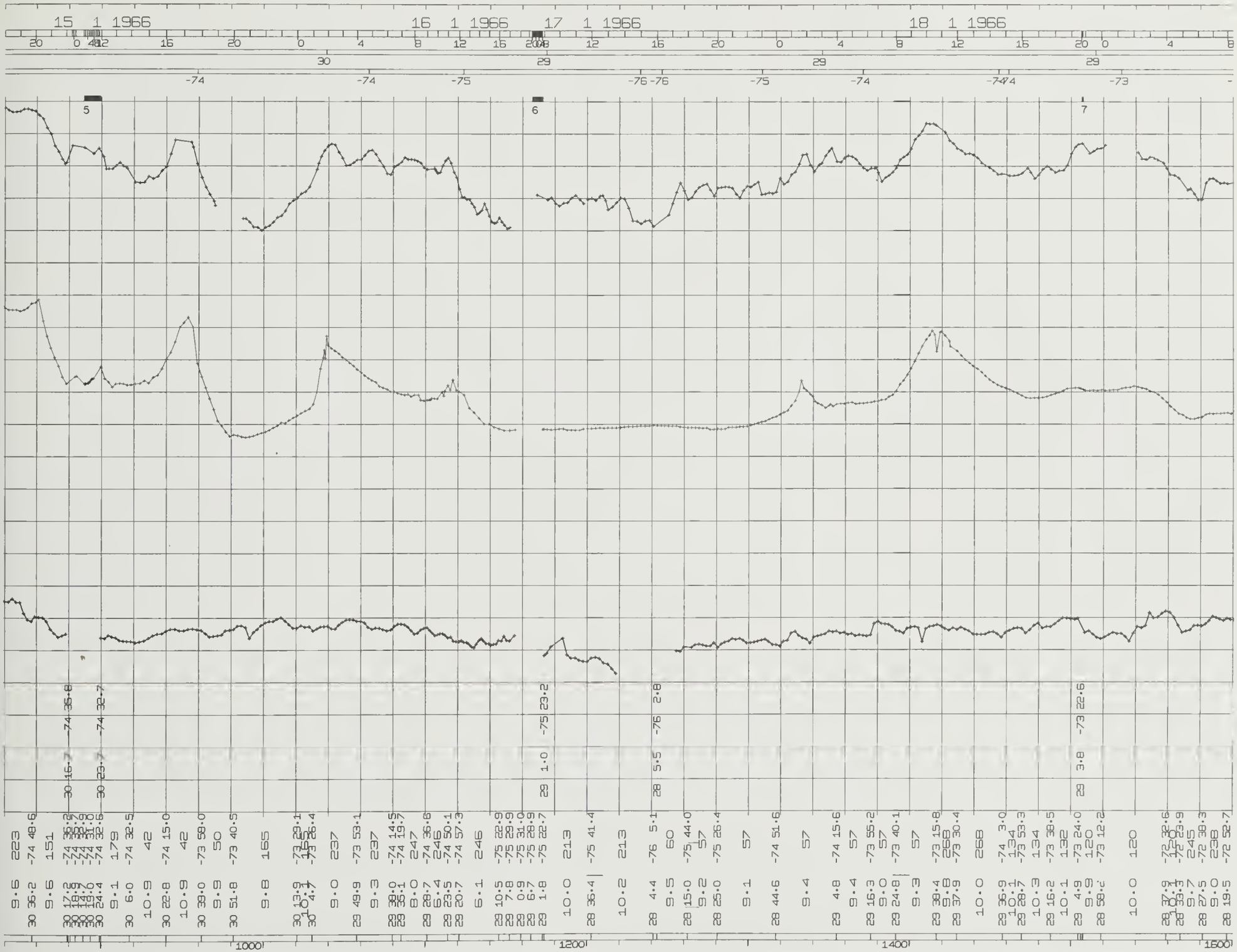

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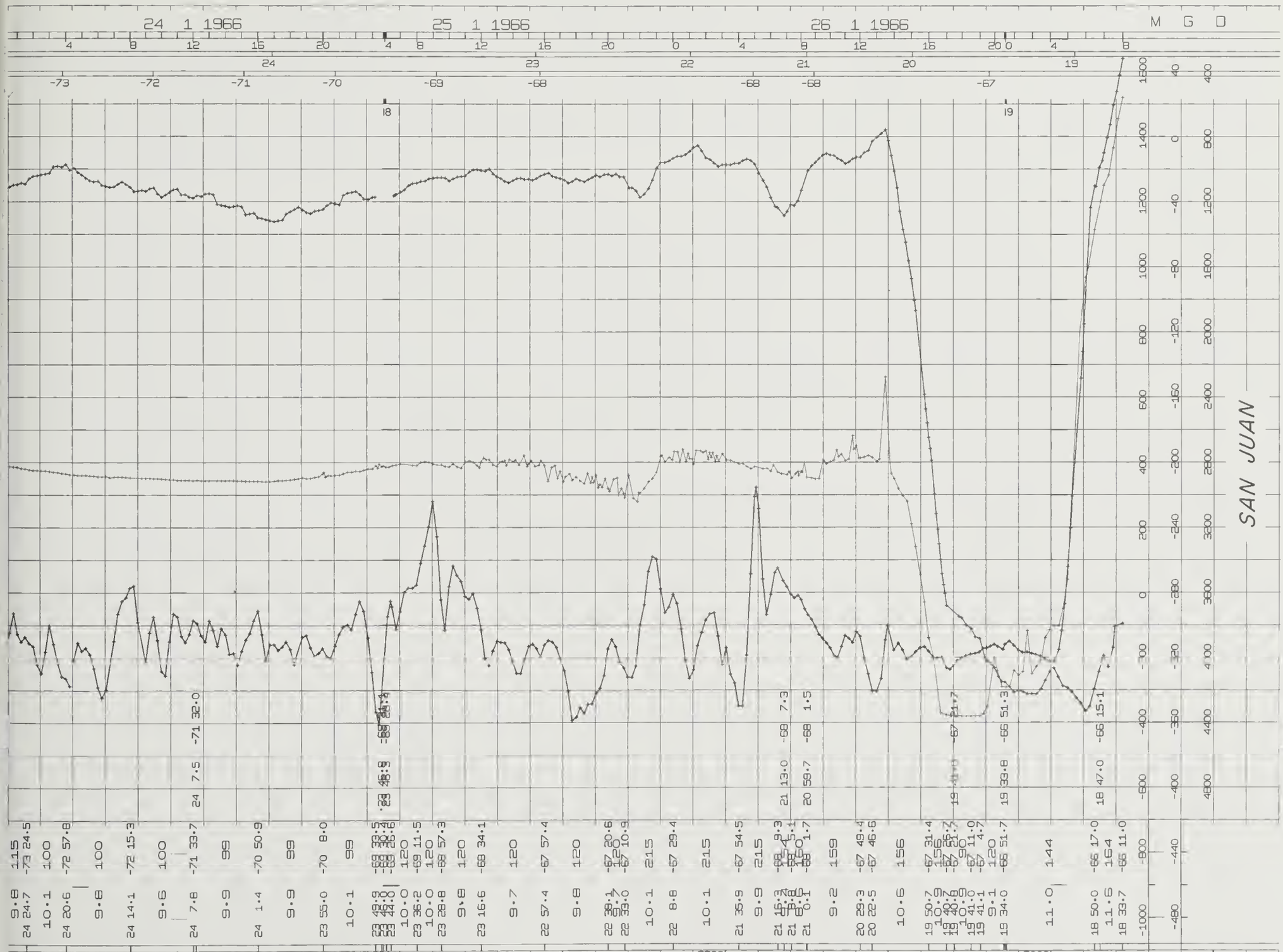

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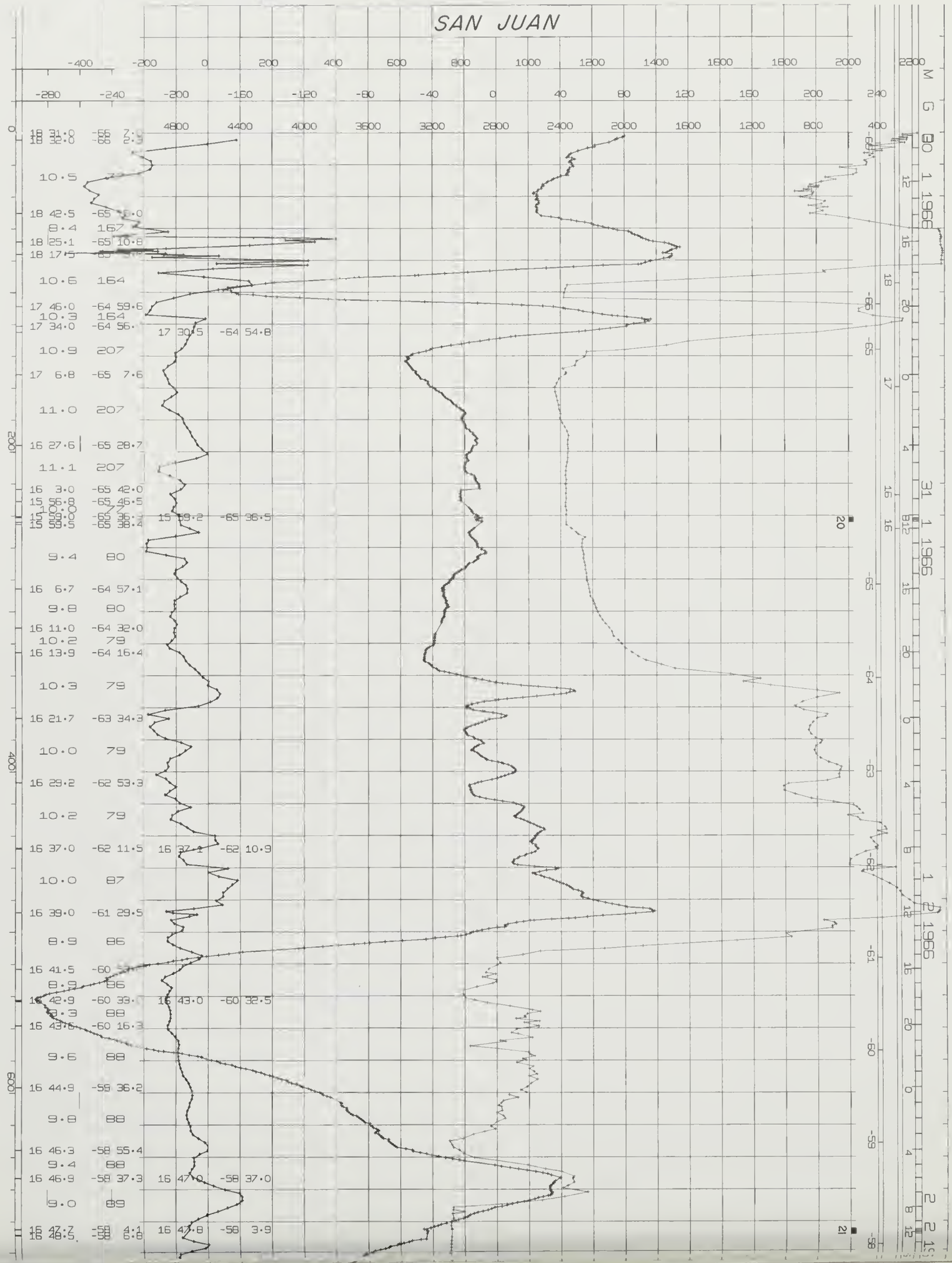

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40 27.0 -73 50.6
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40 27.9 -72 51.8
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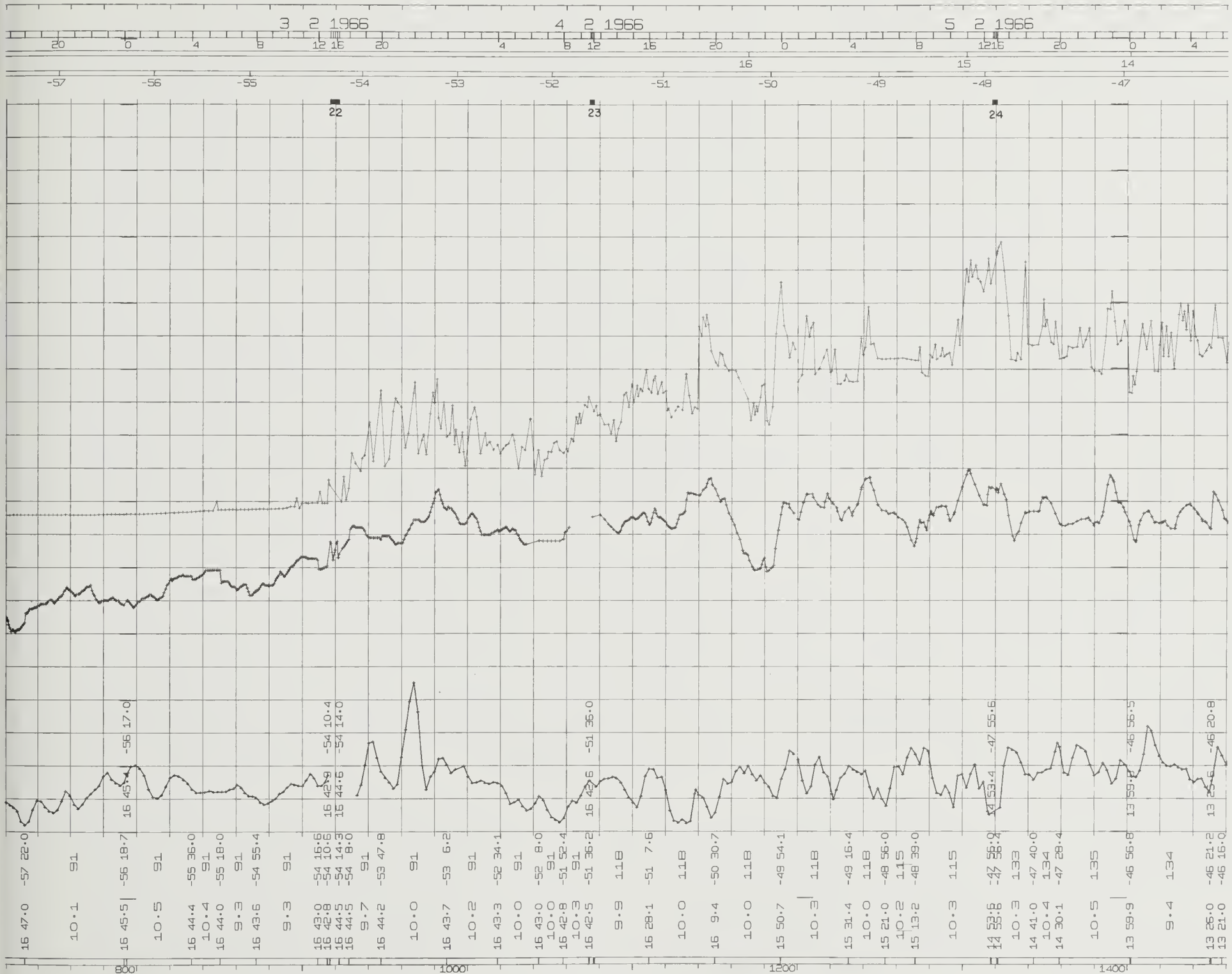
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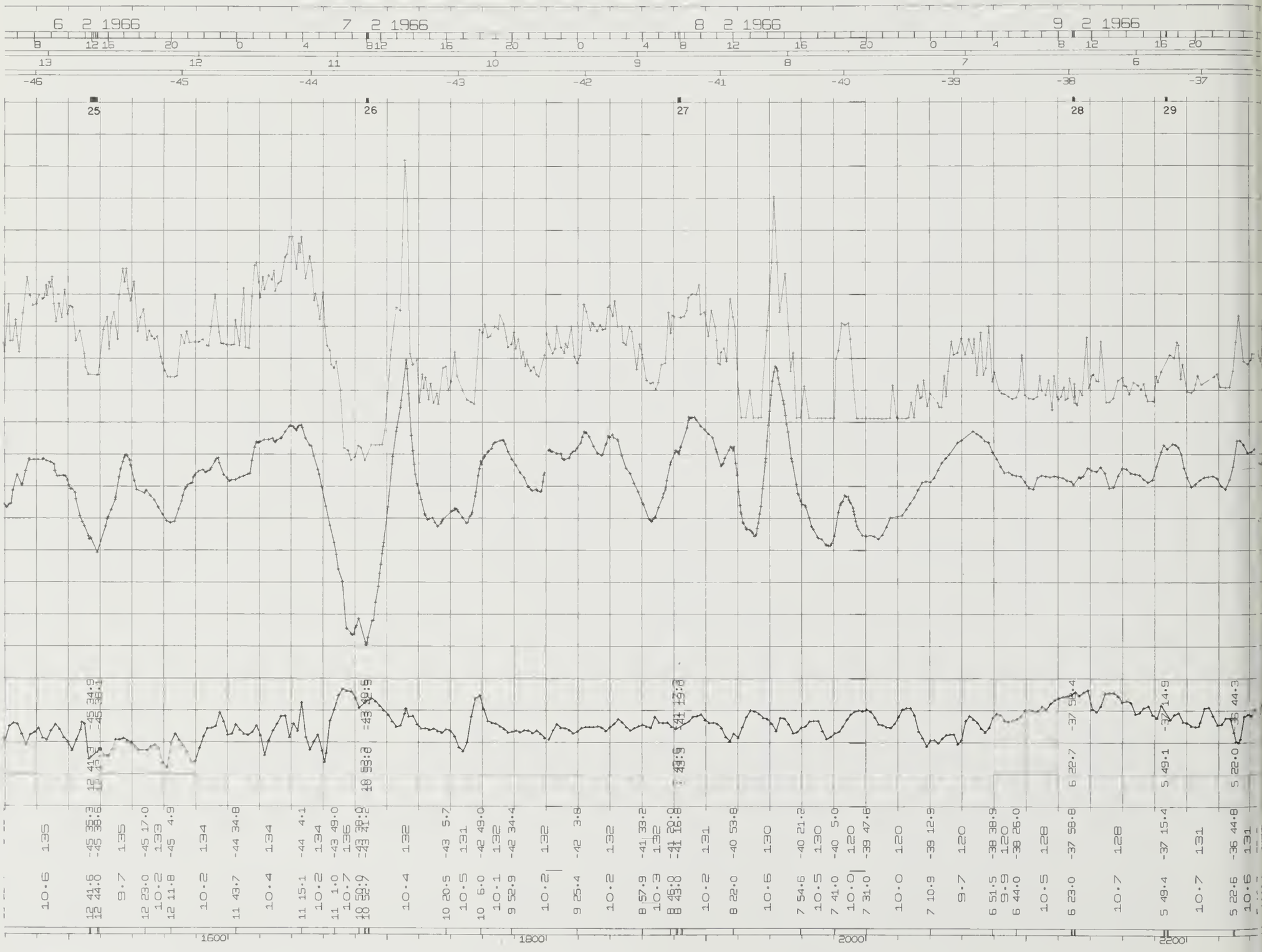

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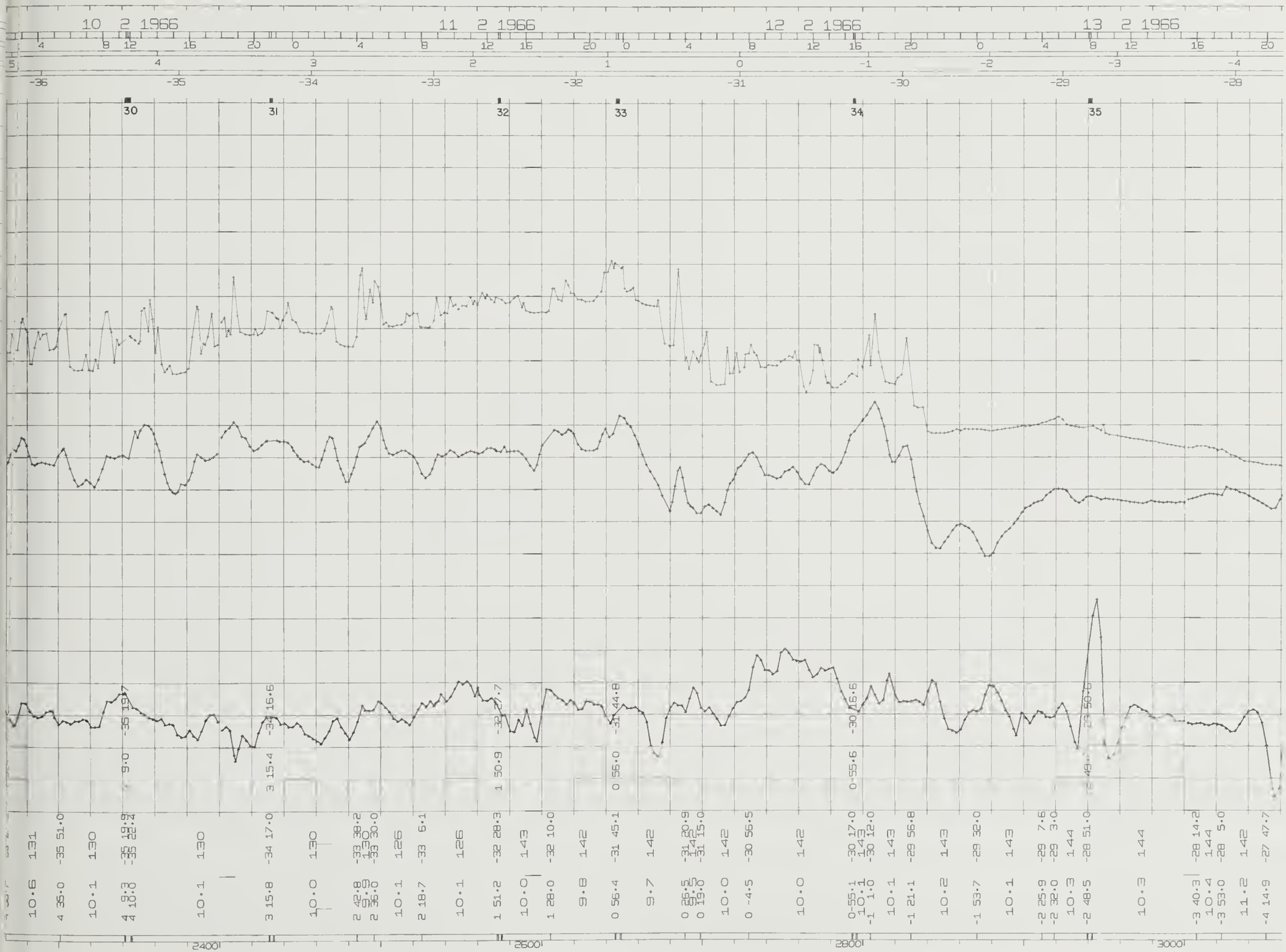
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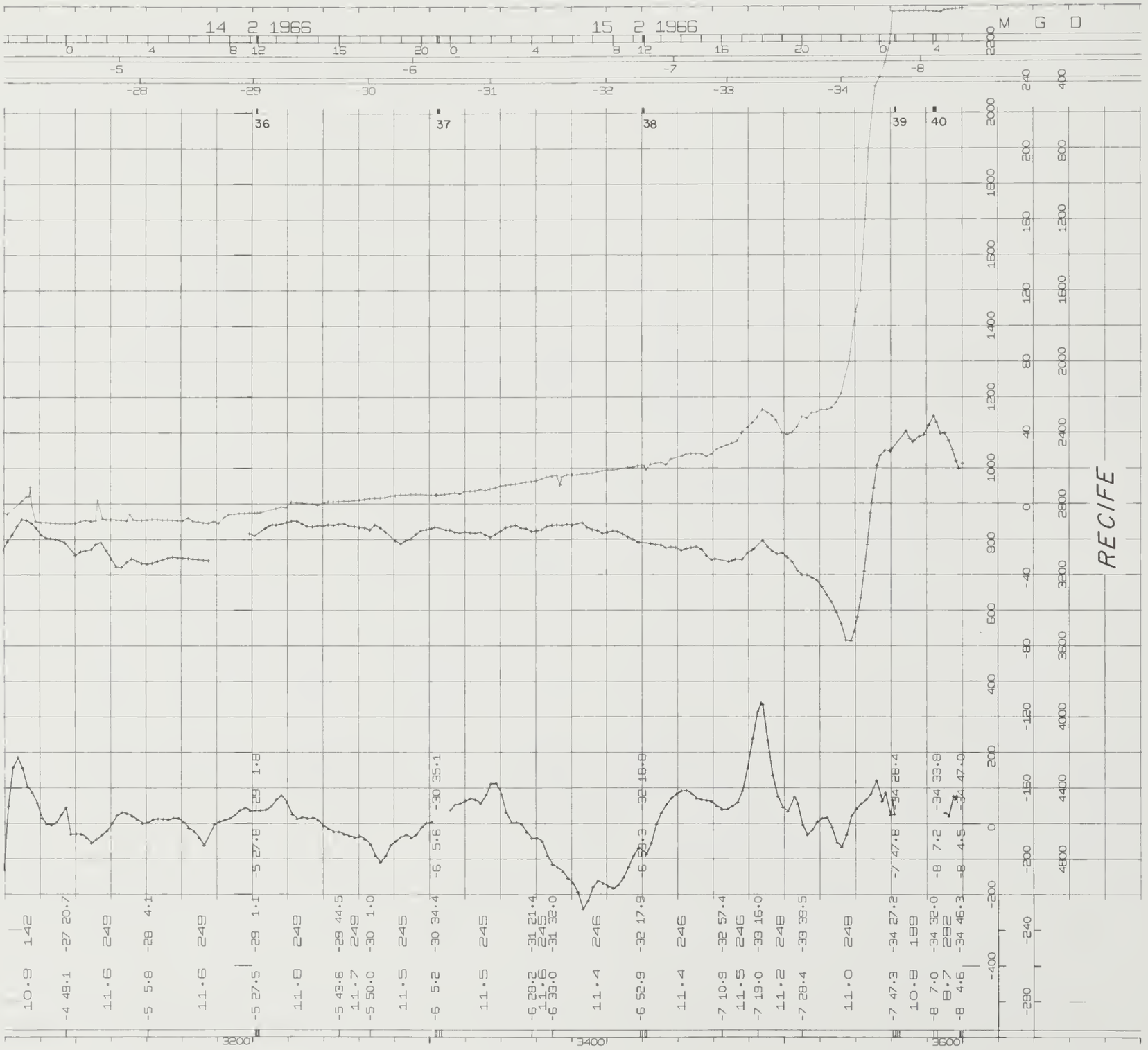

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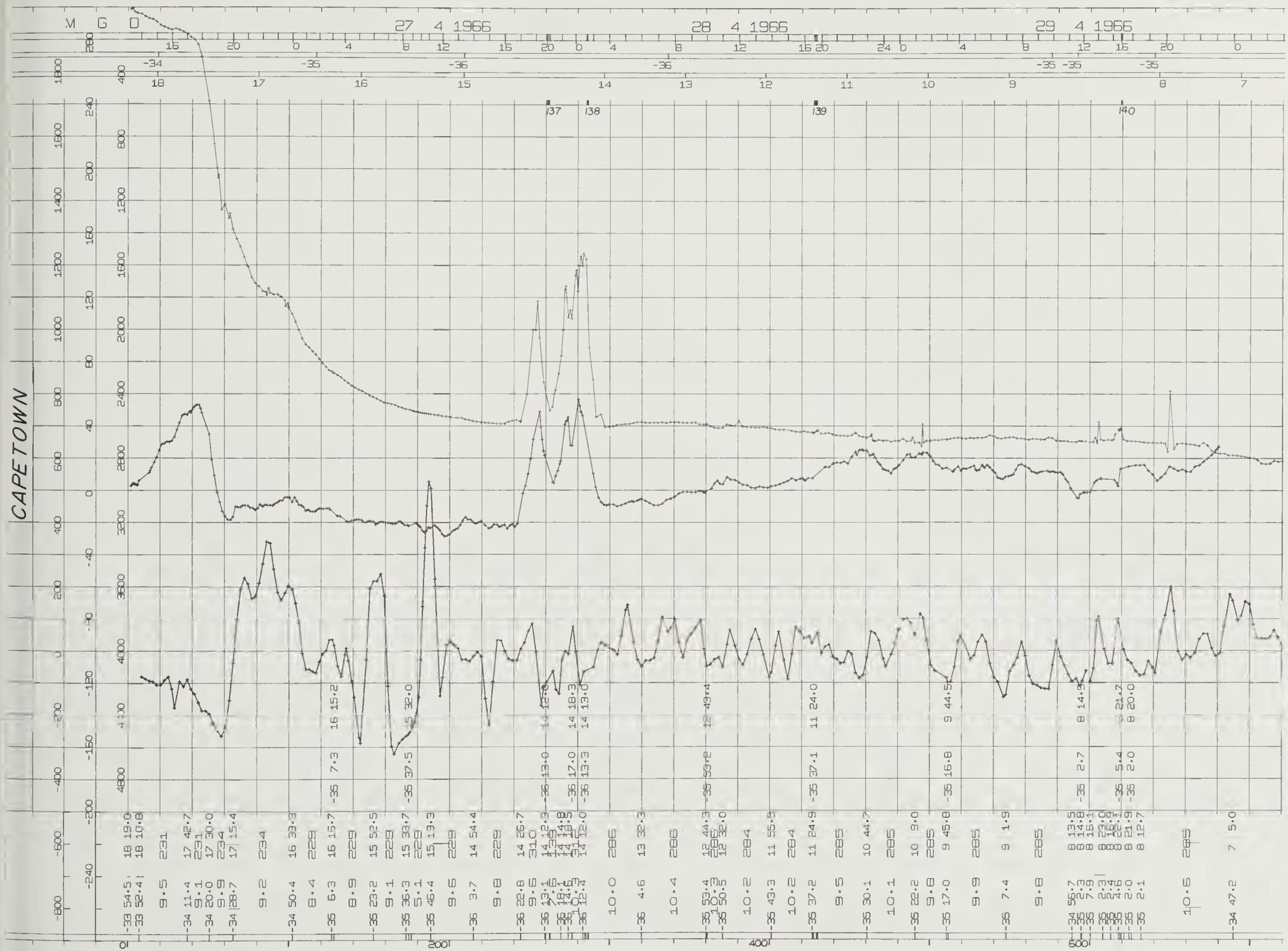

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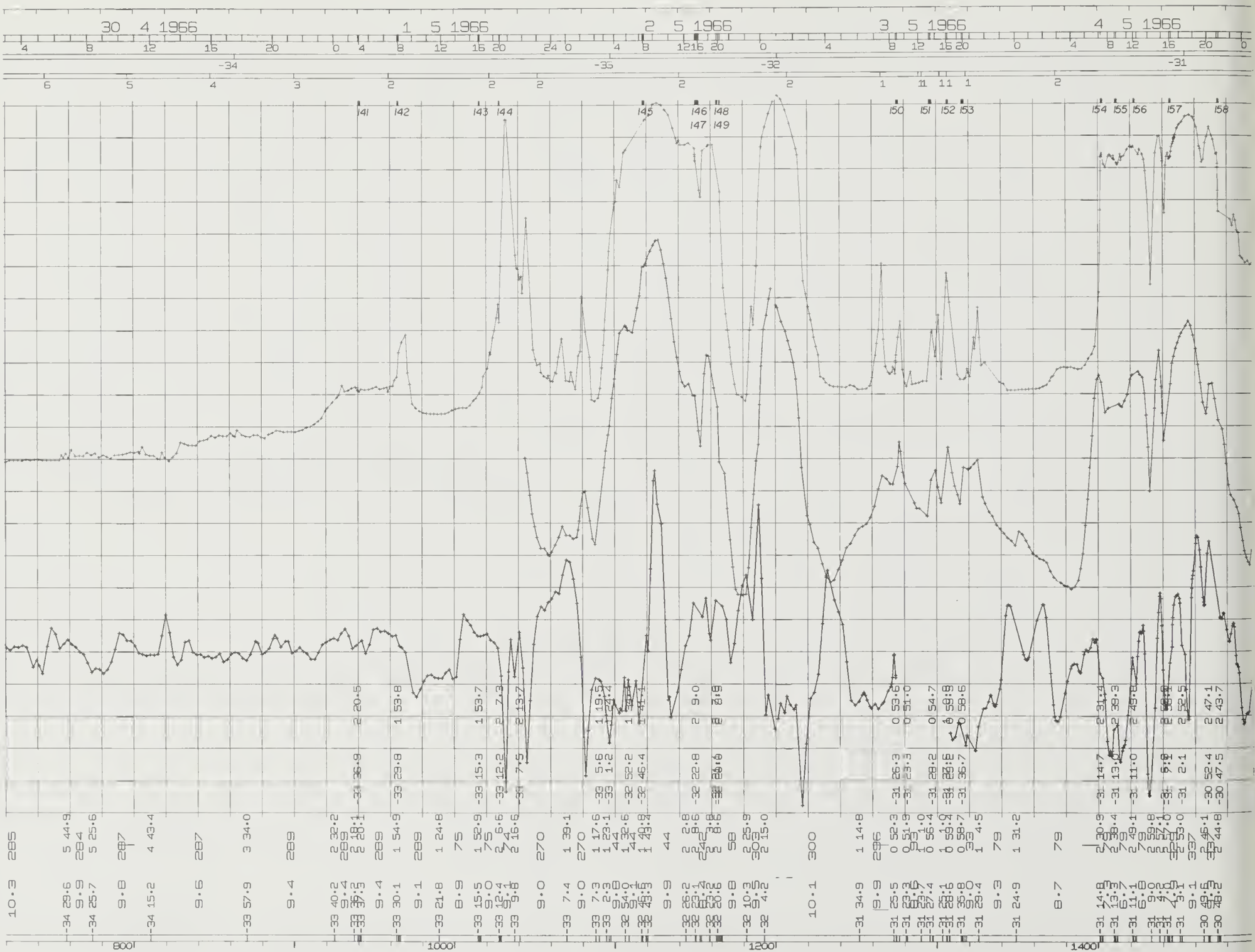

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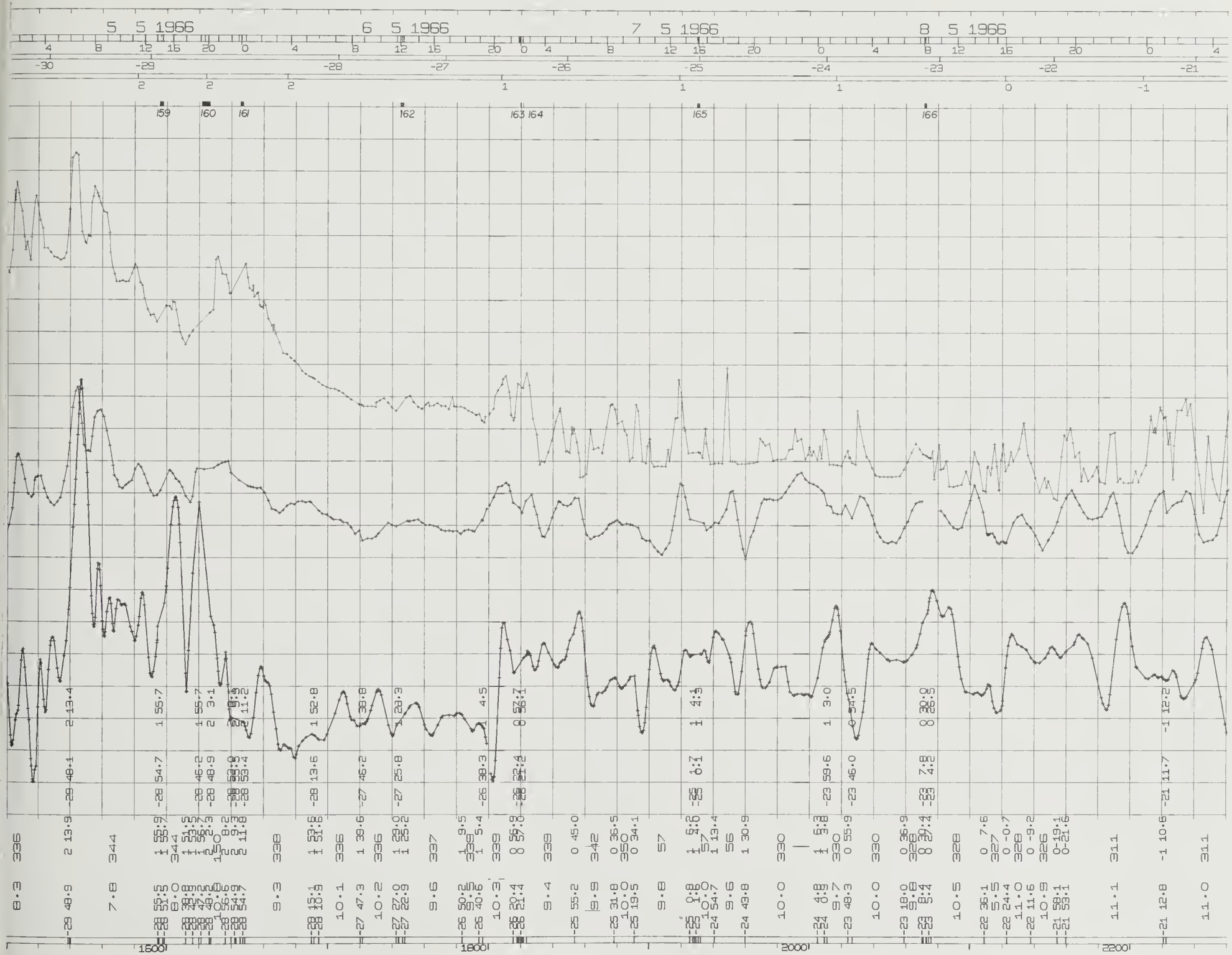

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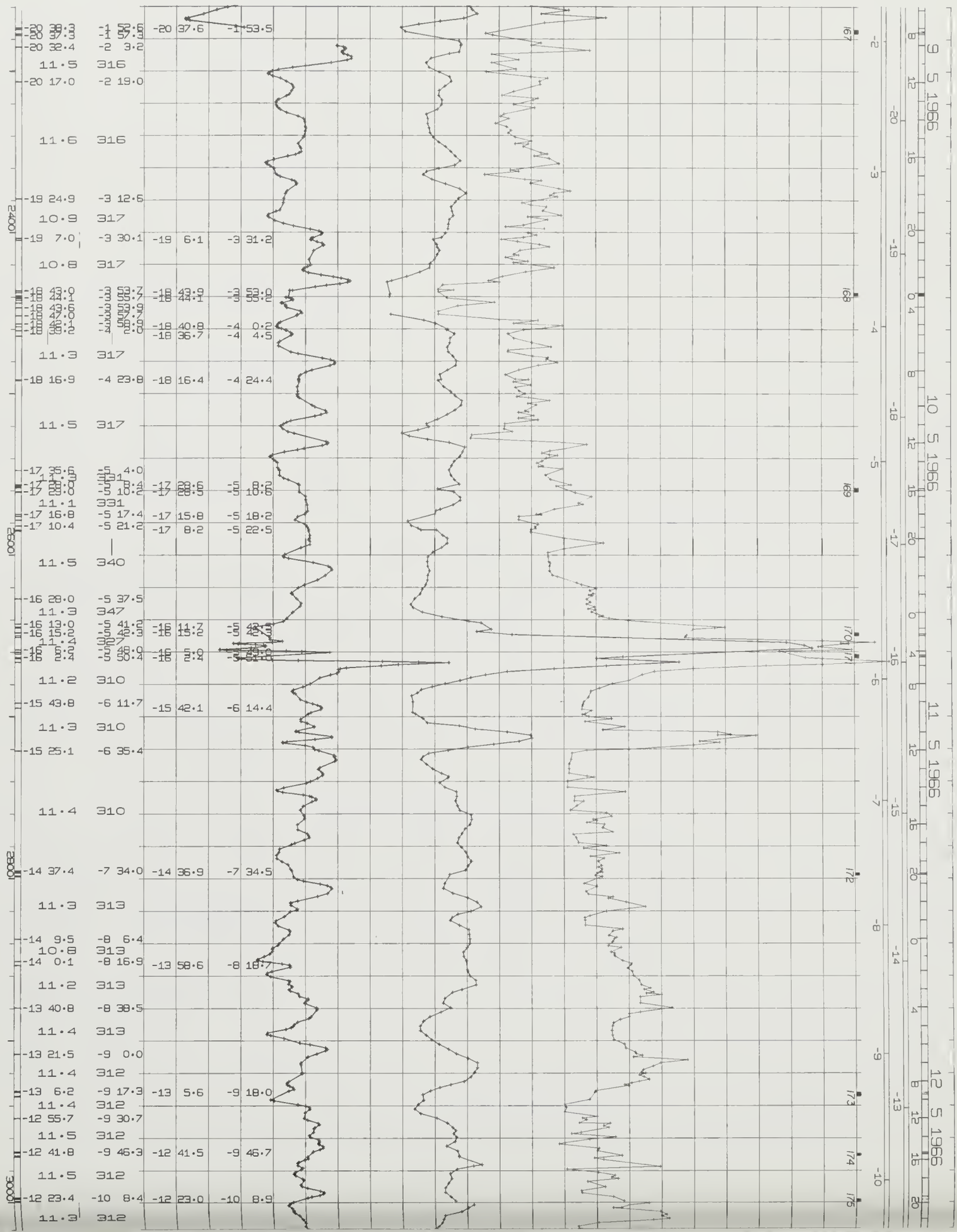

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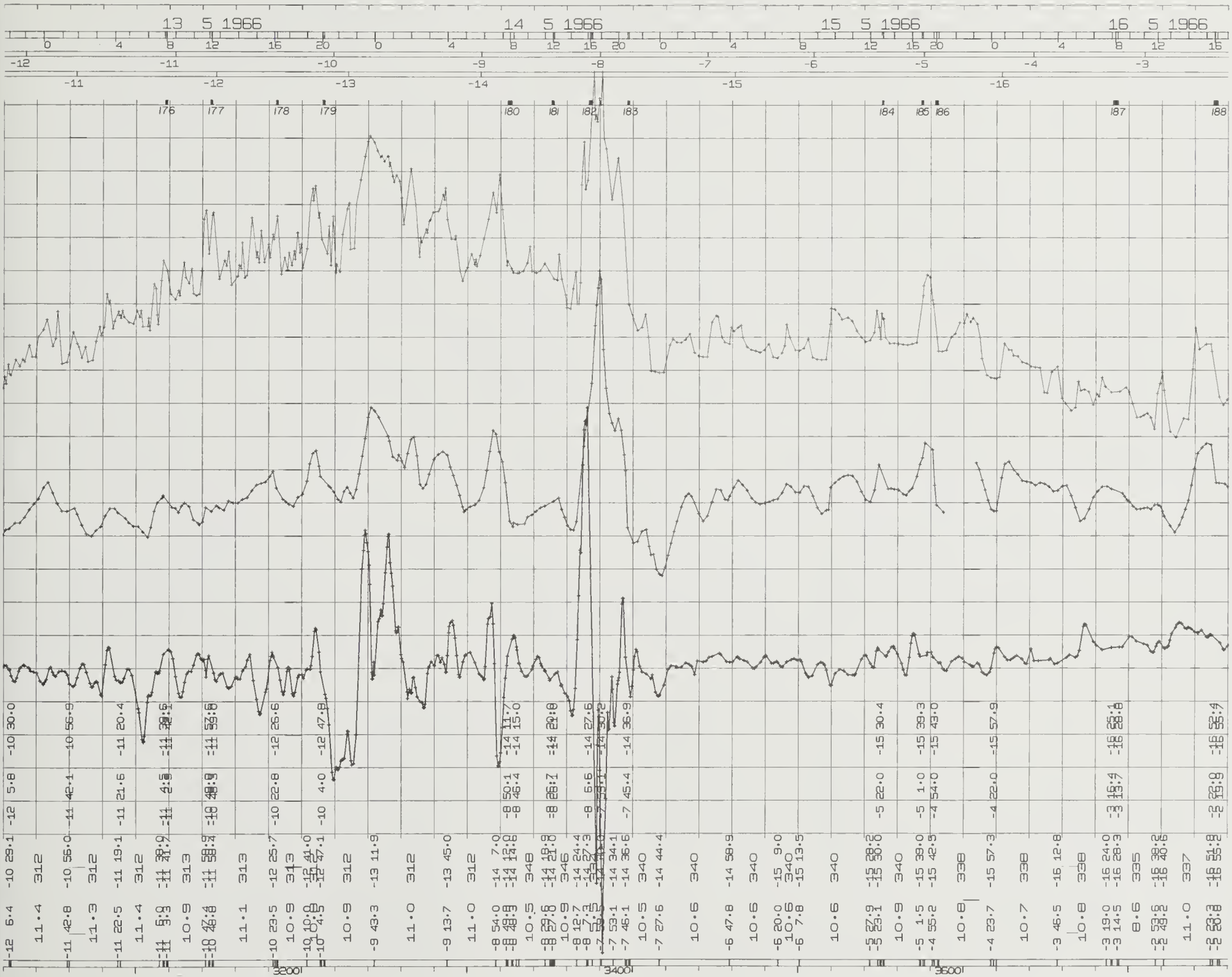

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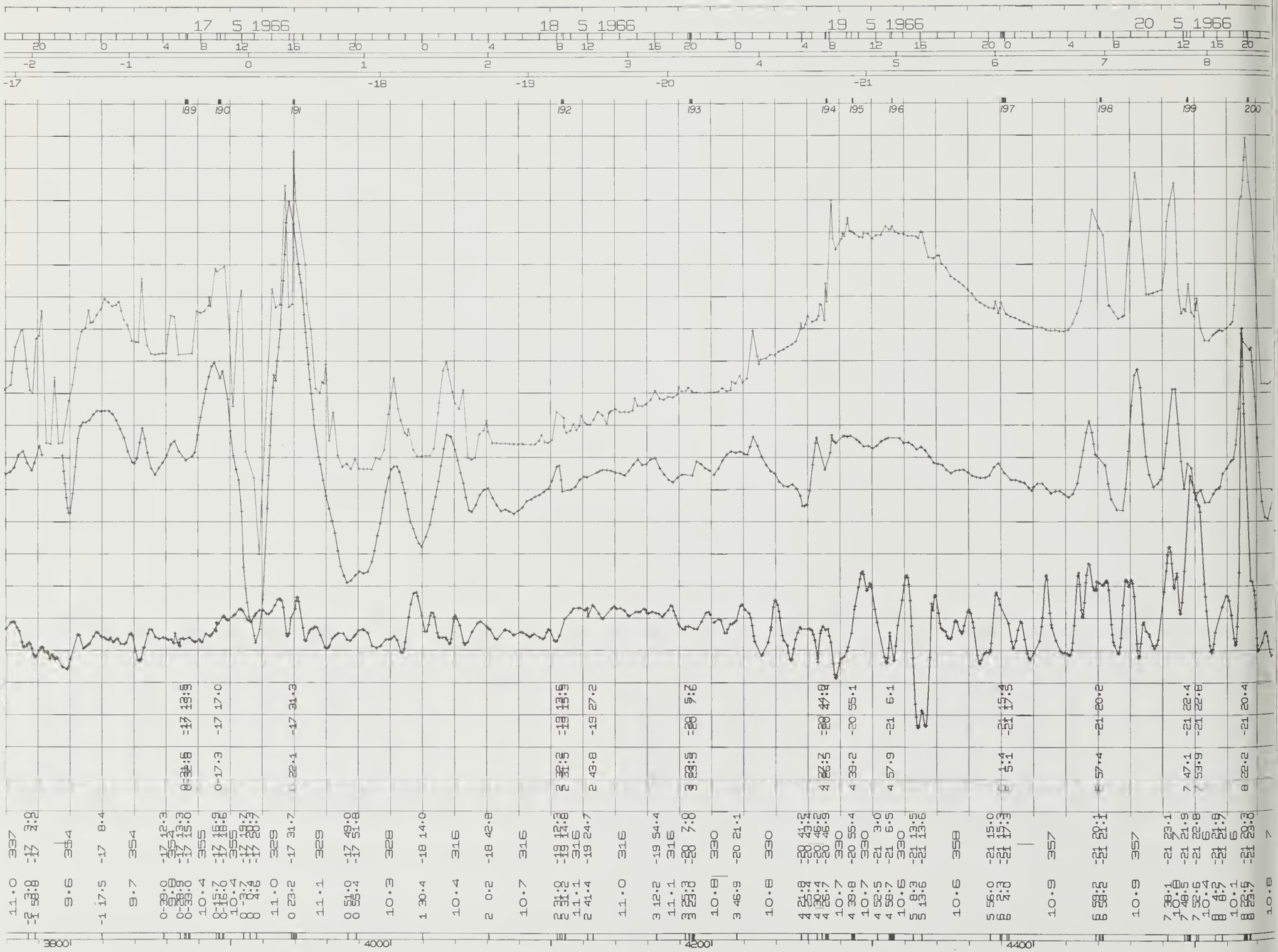

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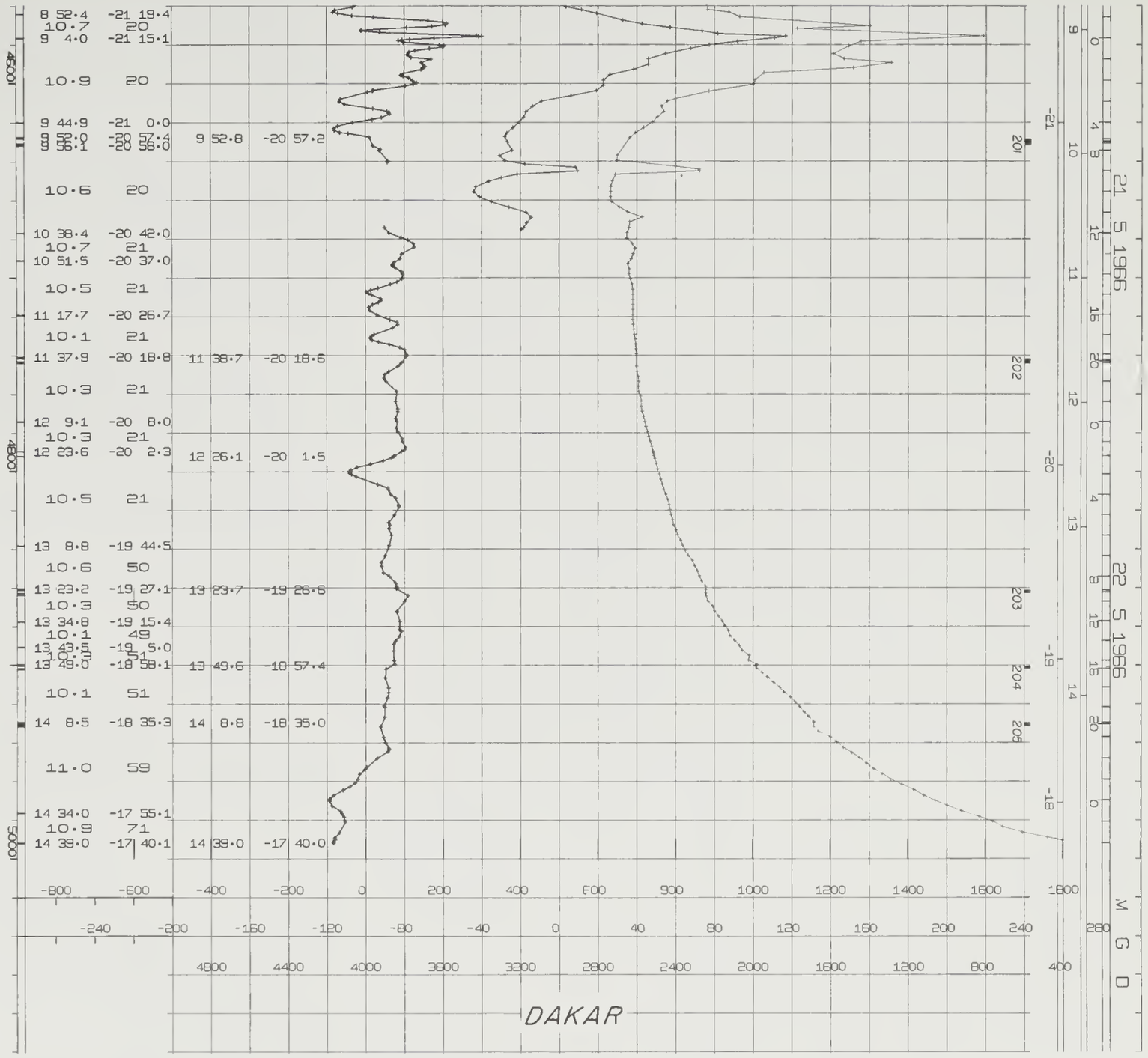

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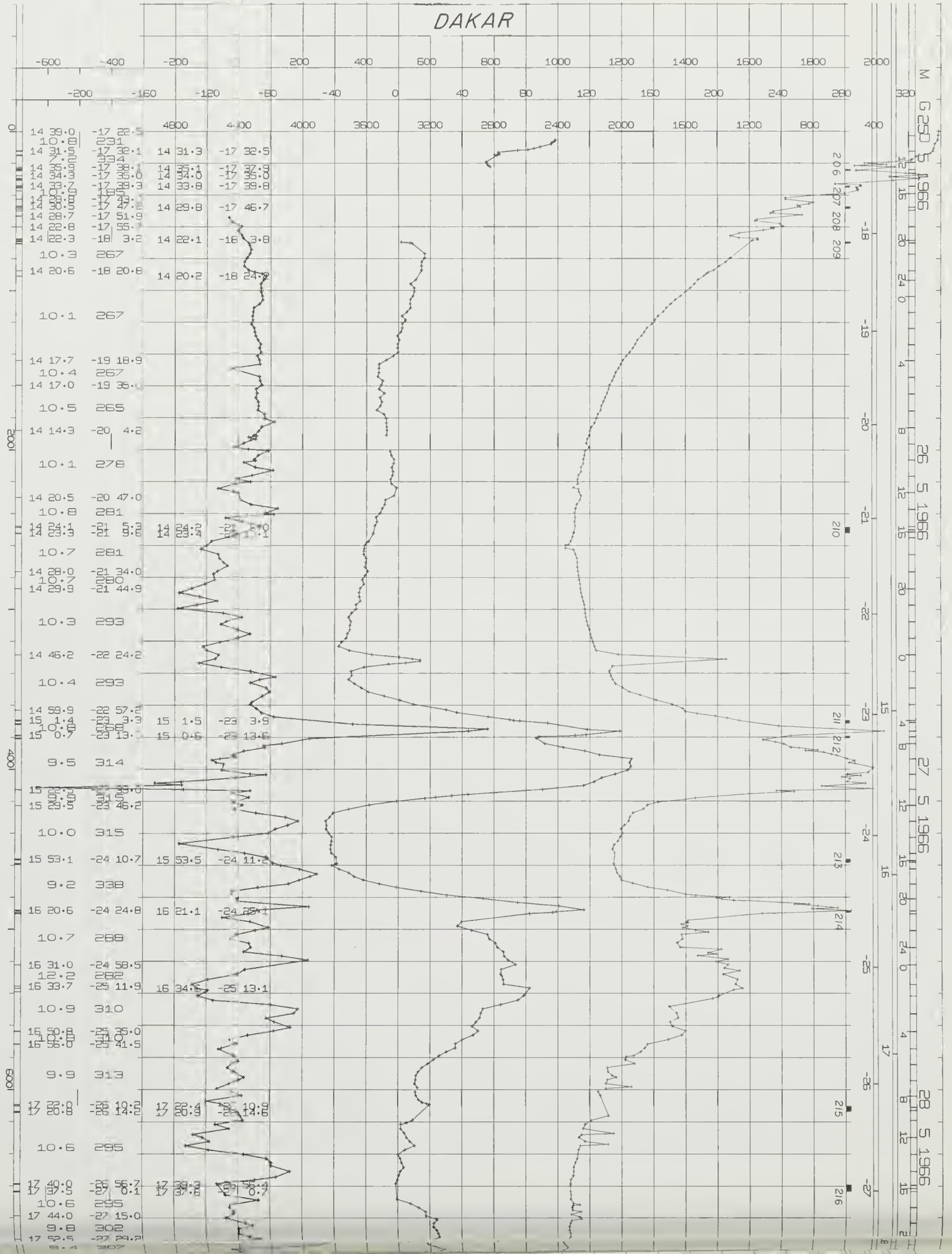

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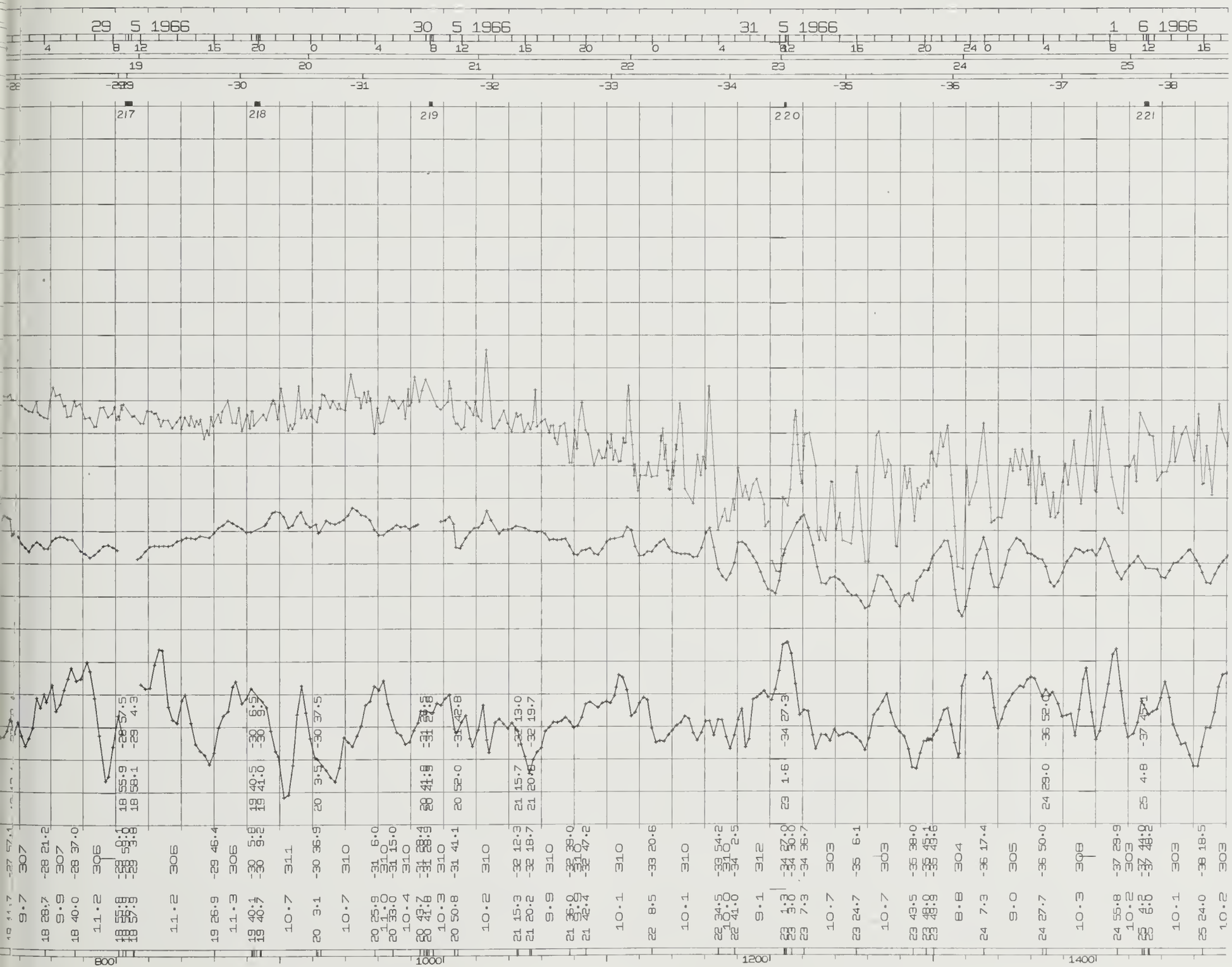

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-16 5.2 -5 48.0
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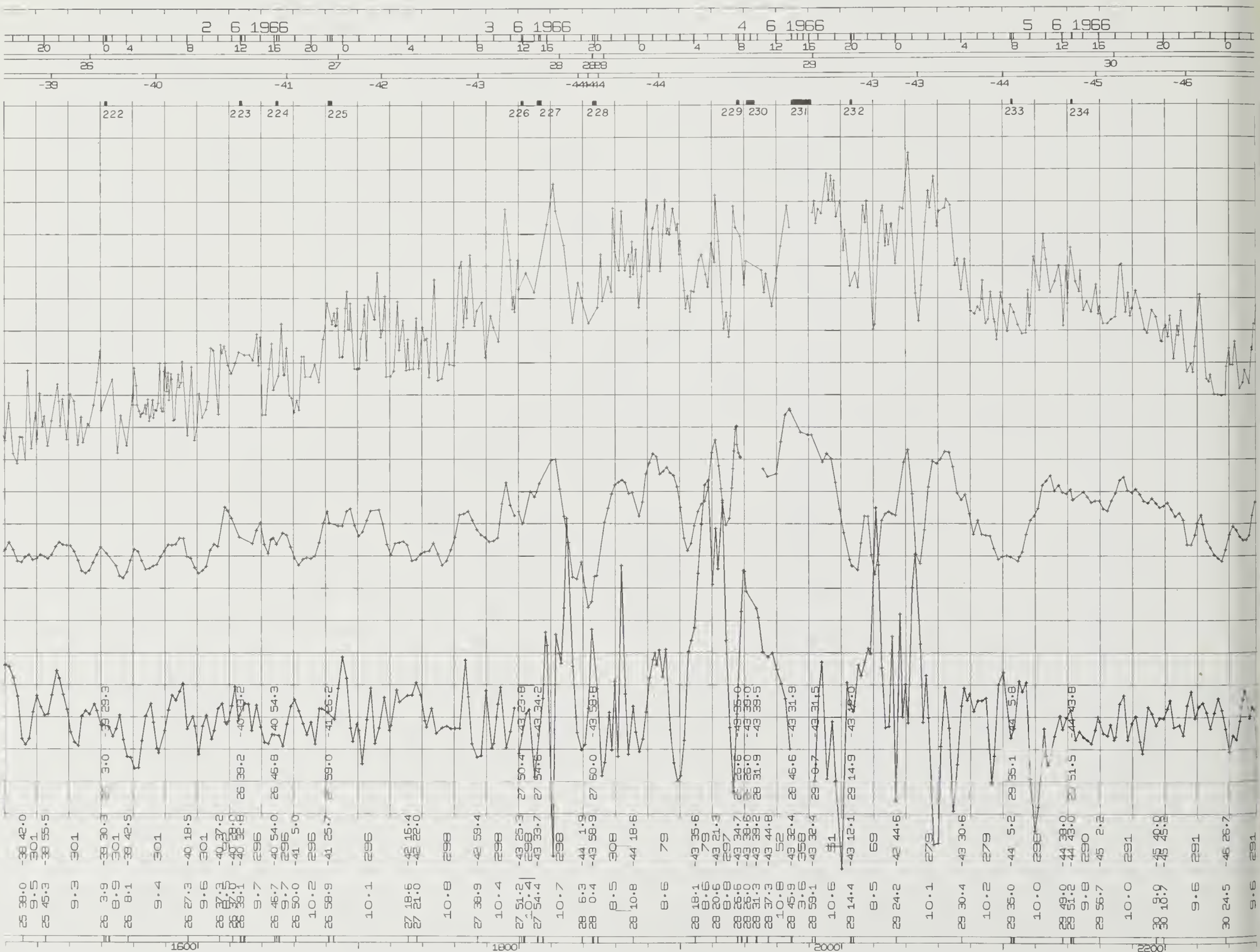

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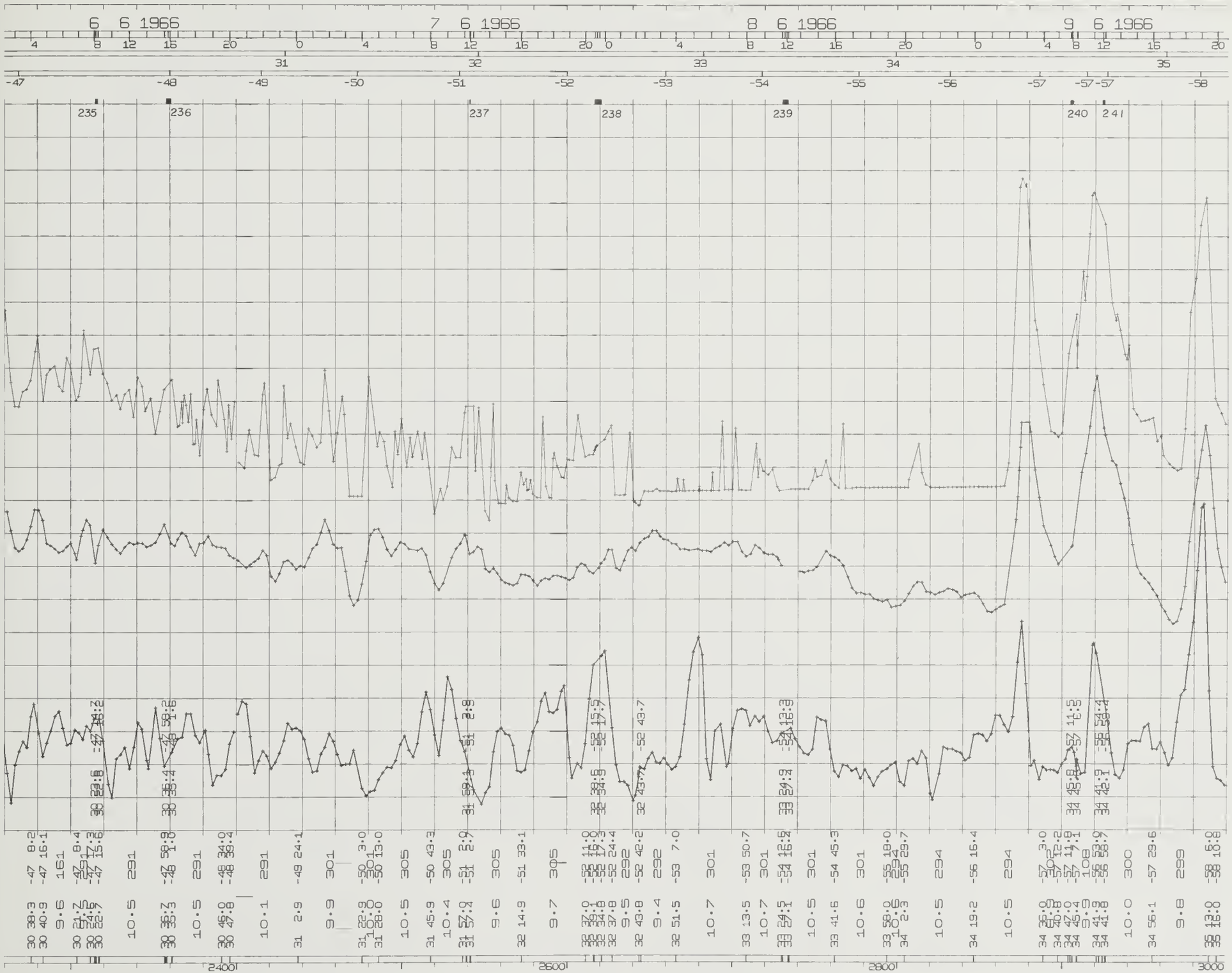

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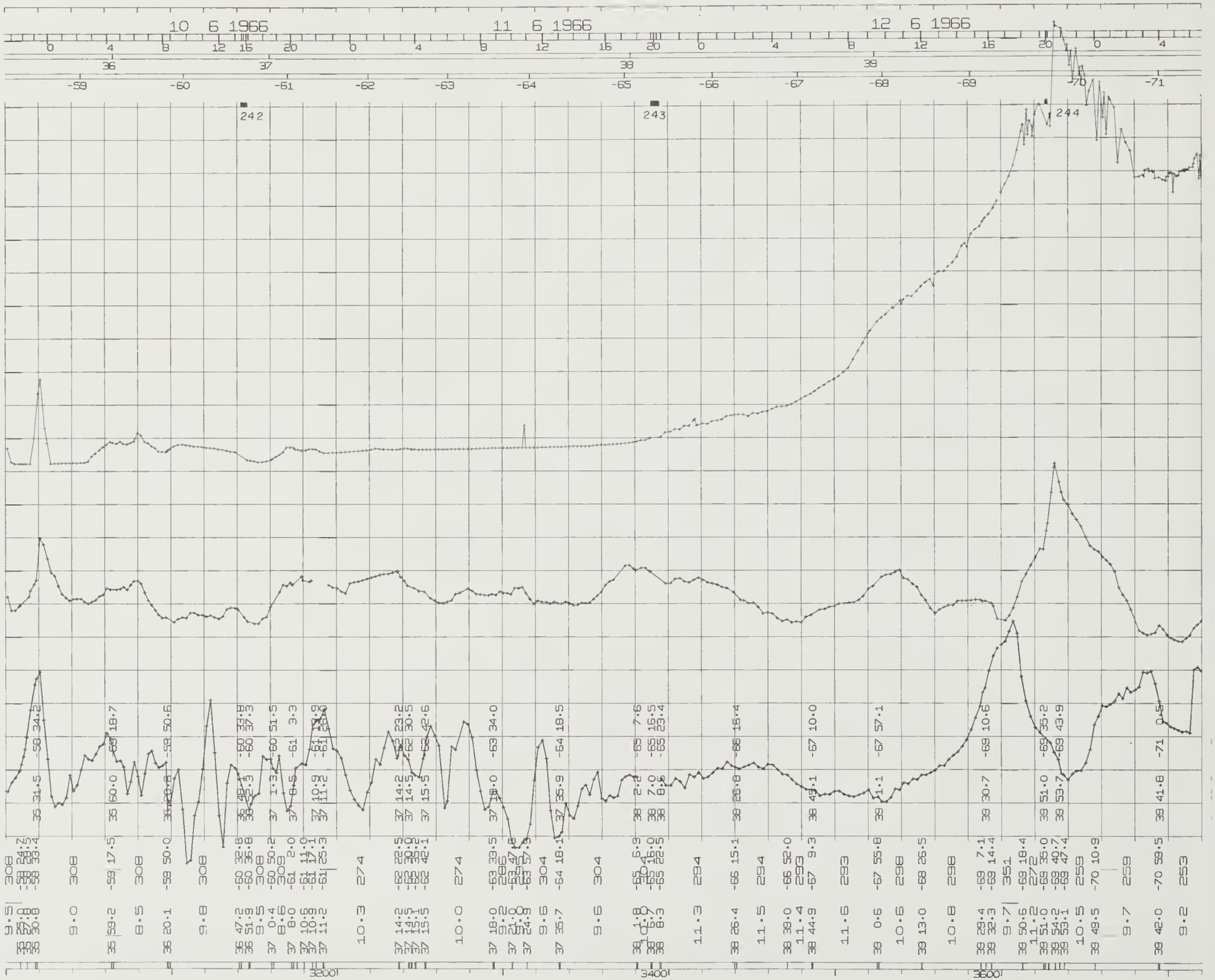

DAKAR
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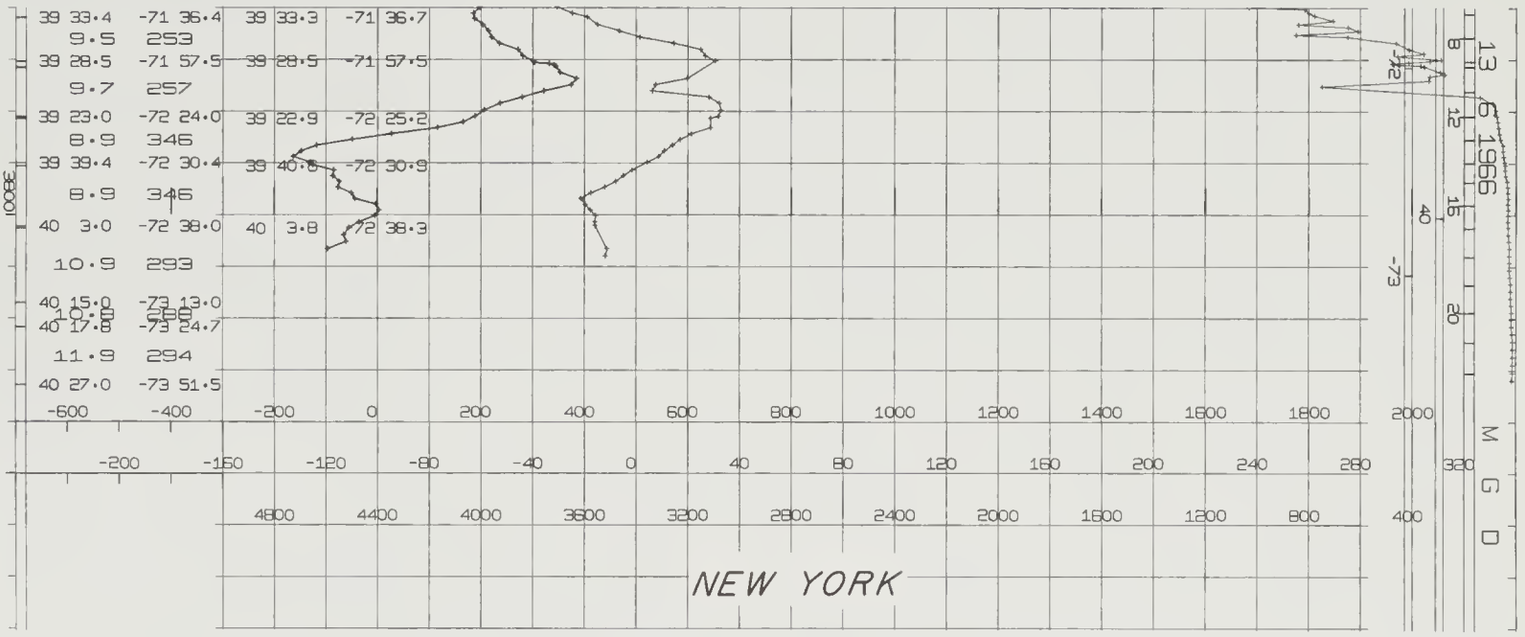

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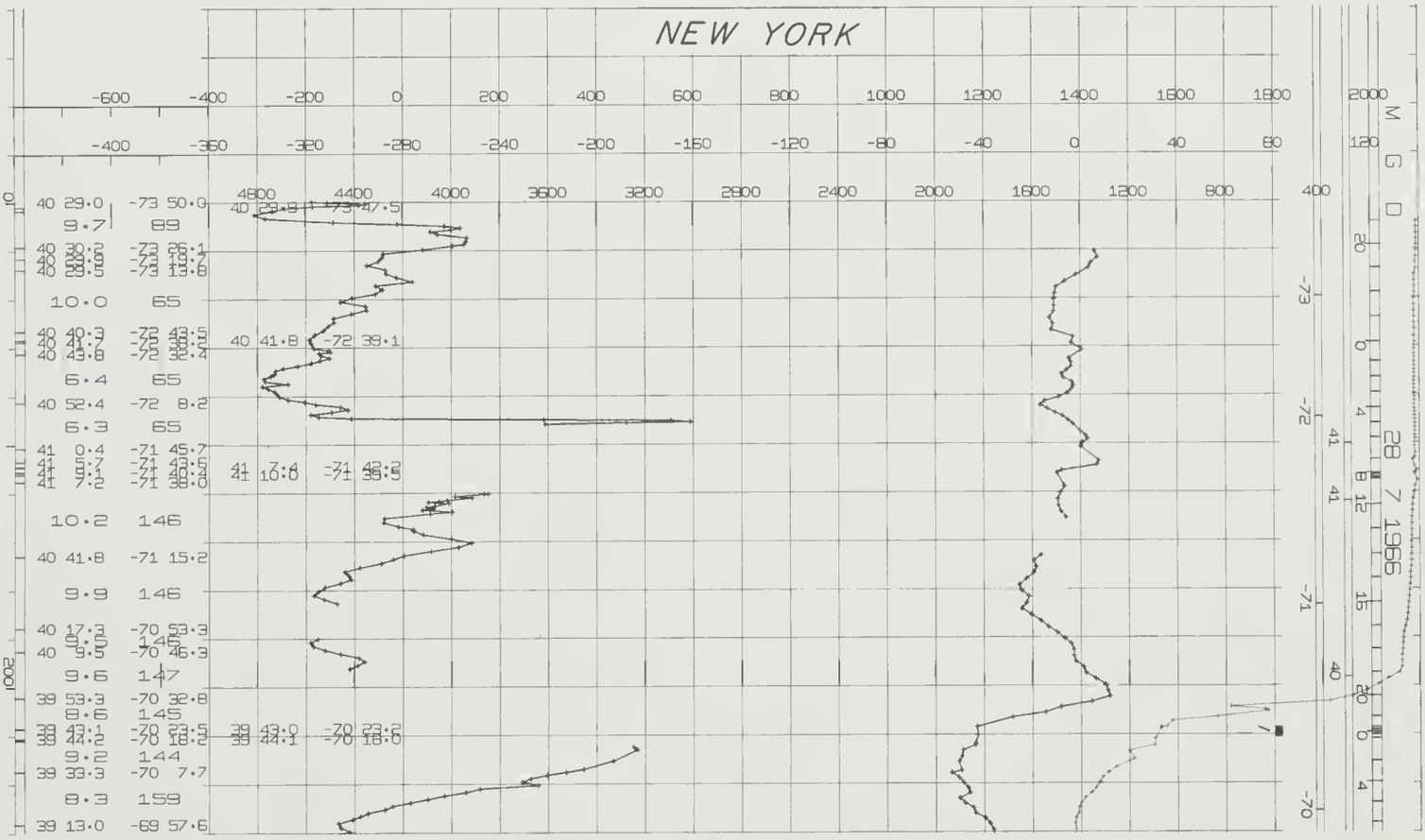

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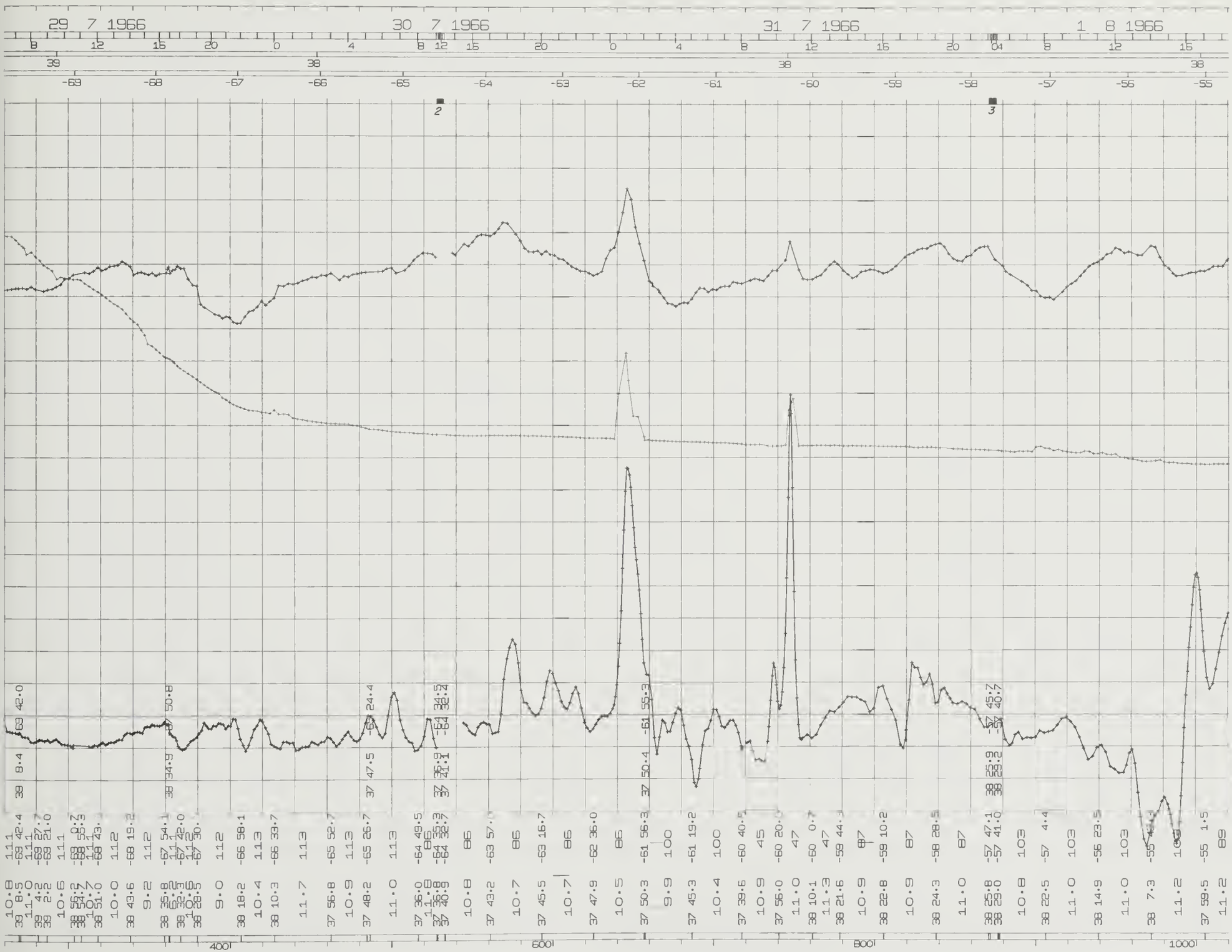

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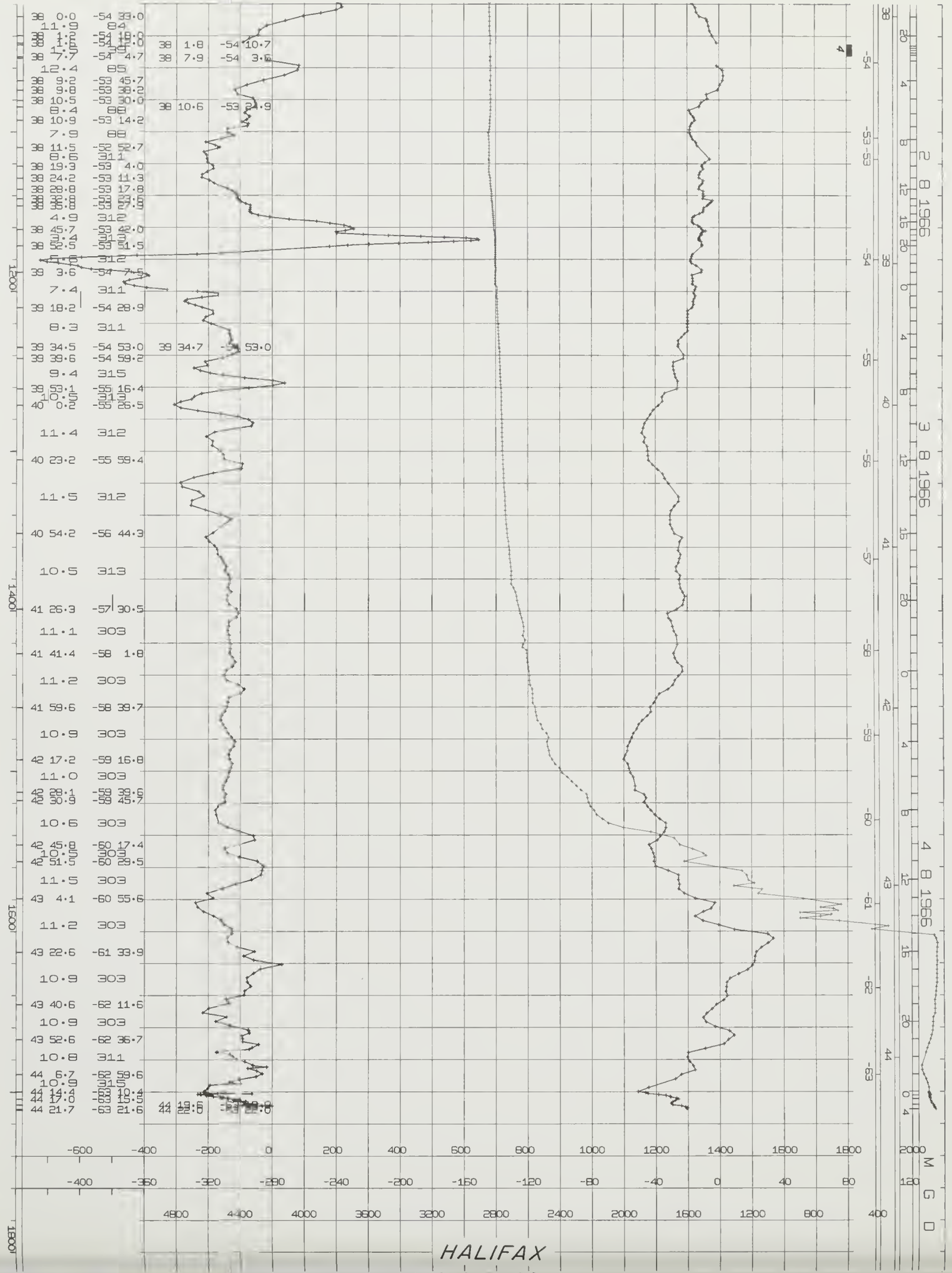

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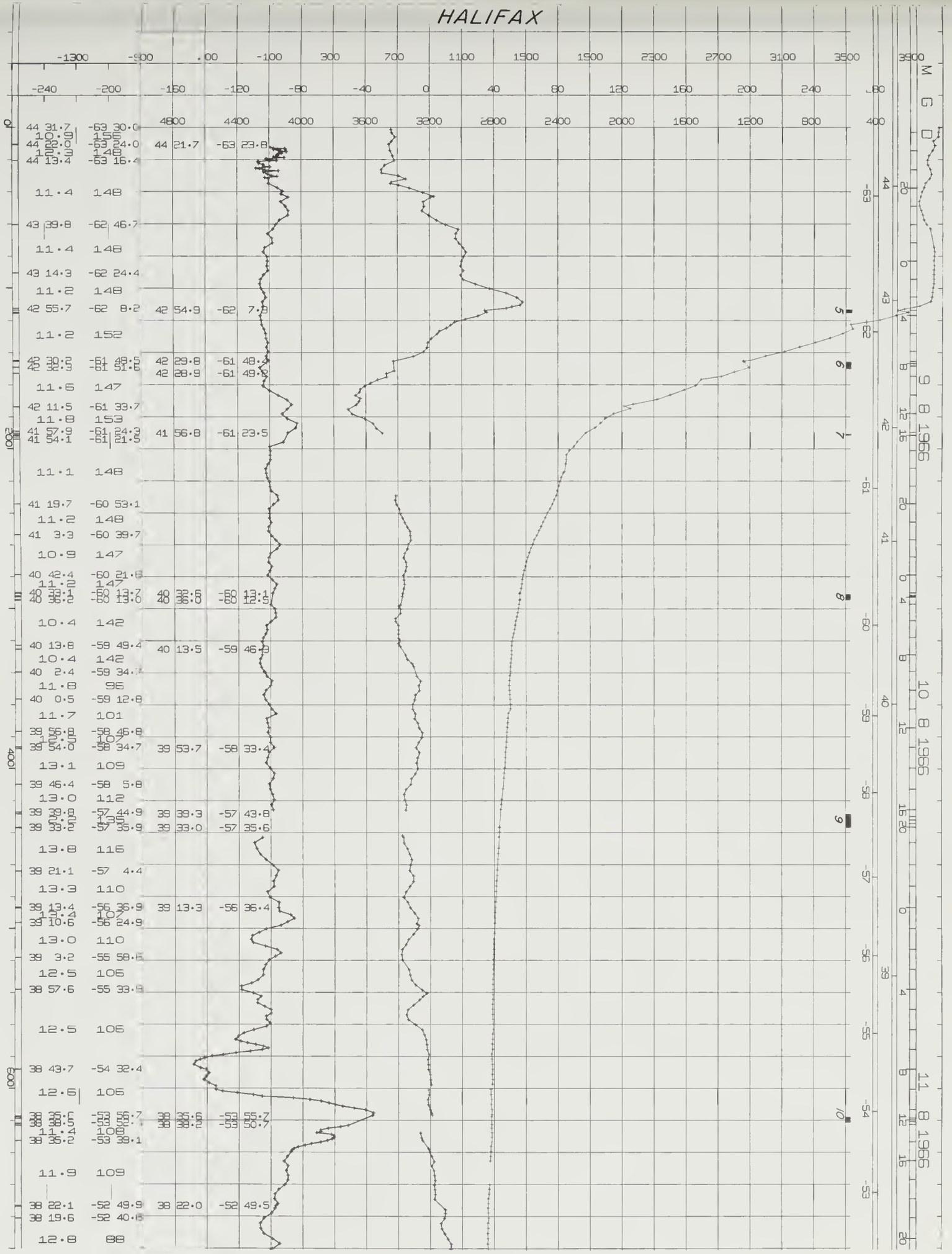

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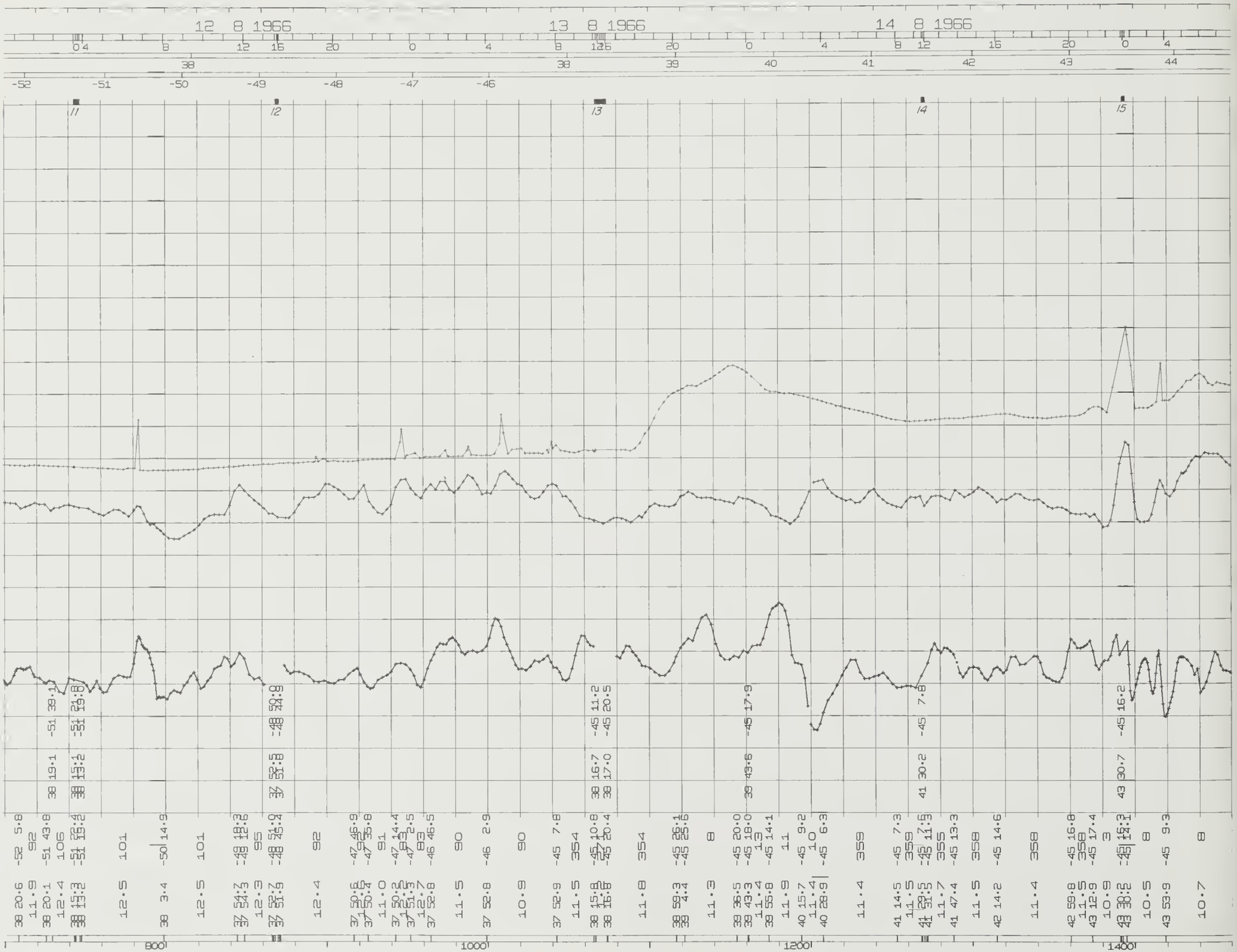

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NEW YORK
6 1966
M G D

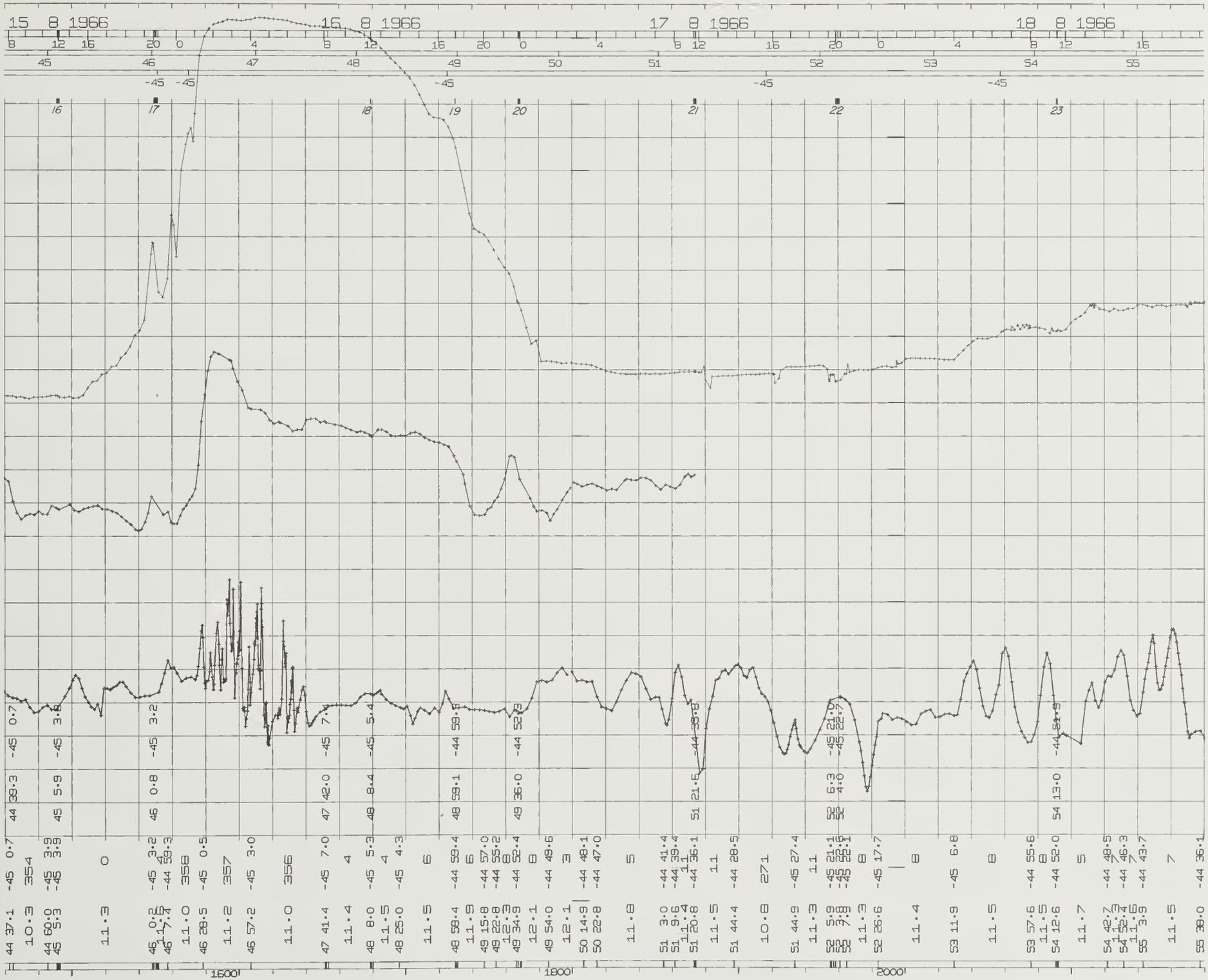

NEW YORK
28 7 1965
M G D

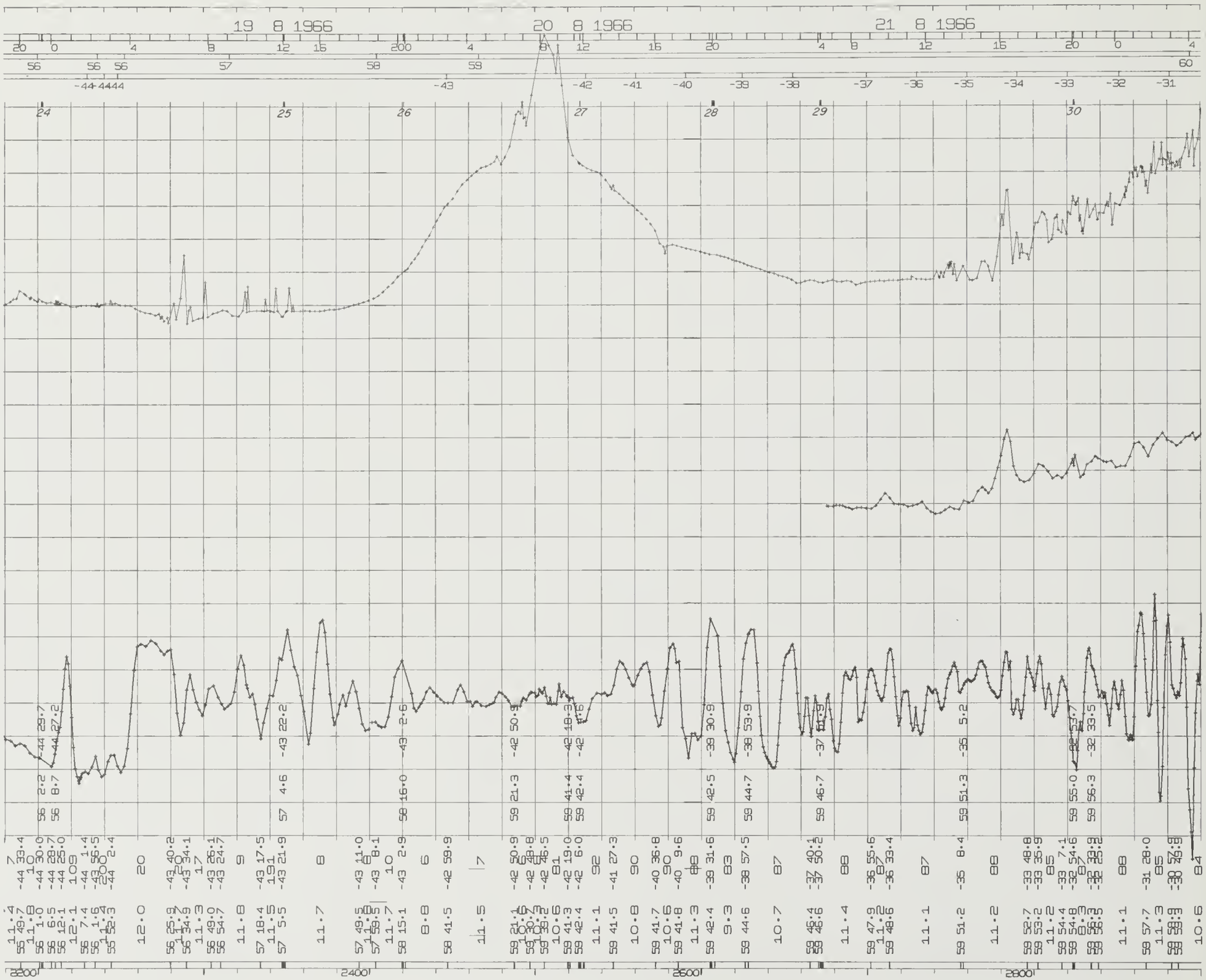

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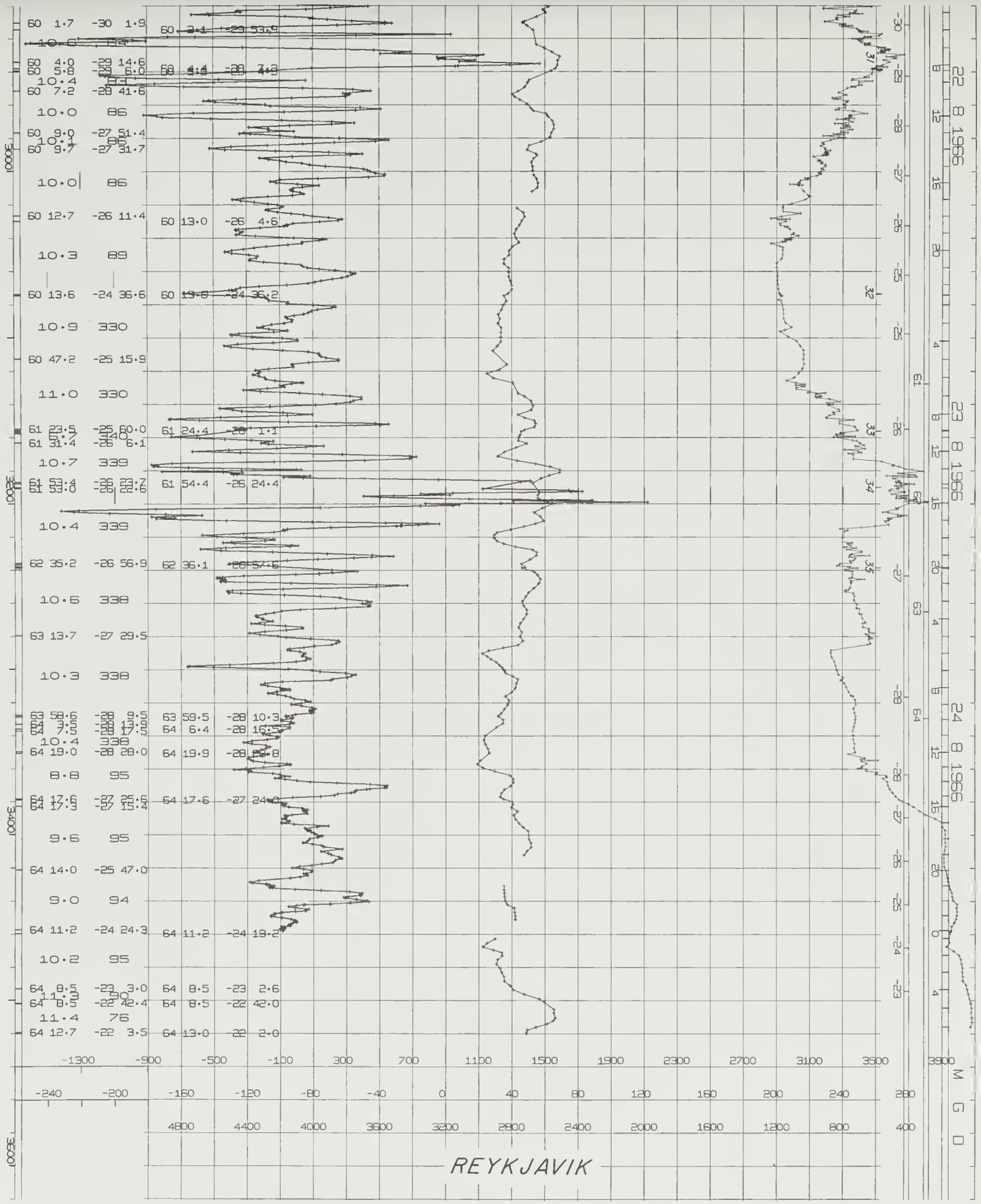

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HALIFAX


HALIFAX
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38 22.1 -52 49.9
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42 54.9 -62 7.8
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39 39.3 -57 43.8
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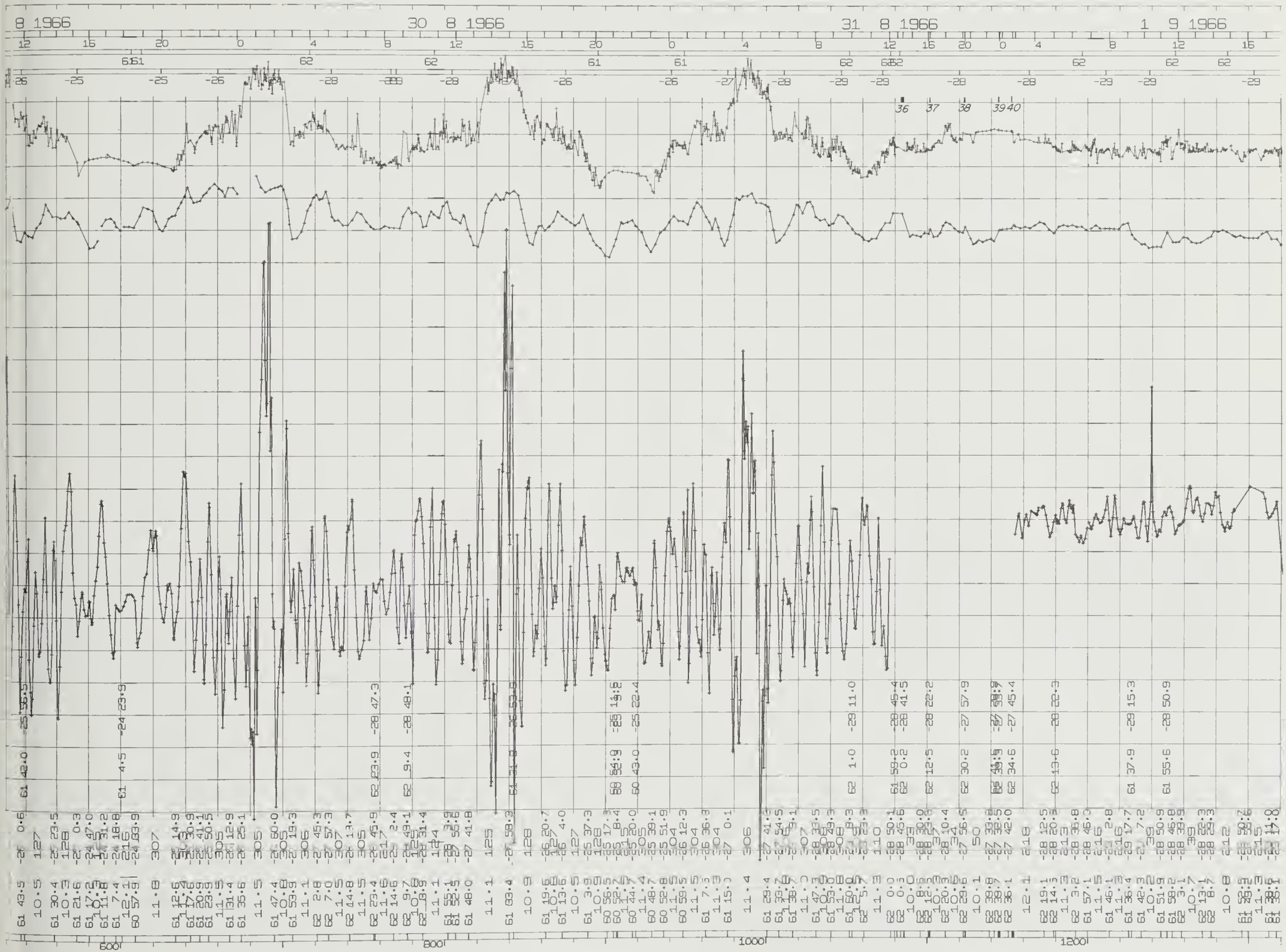

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19 8 1966
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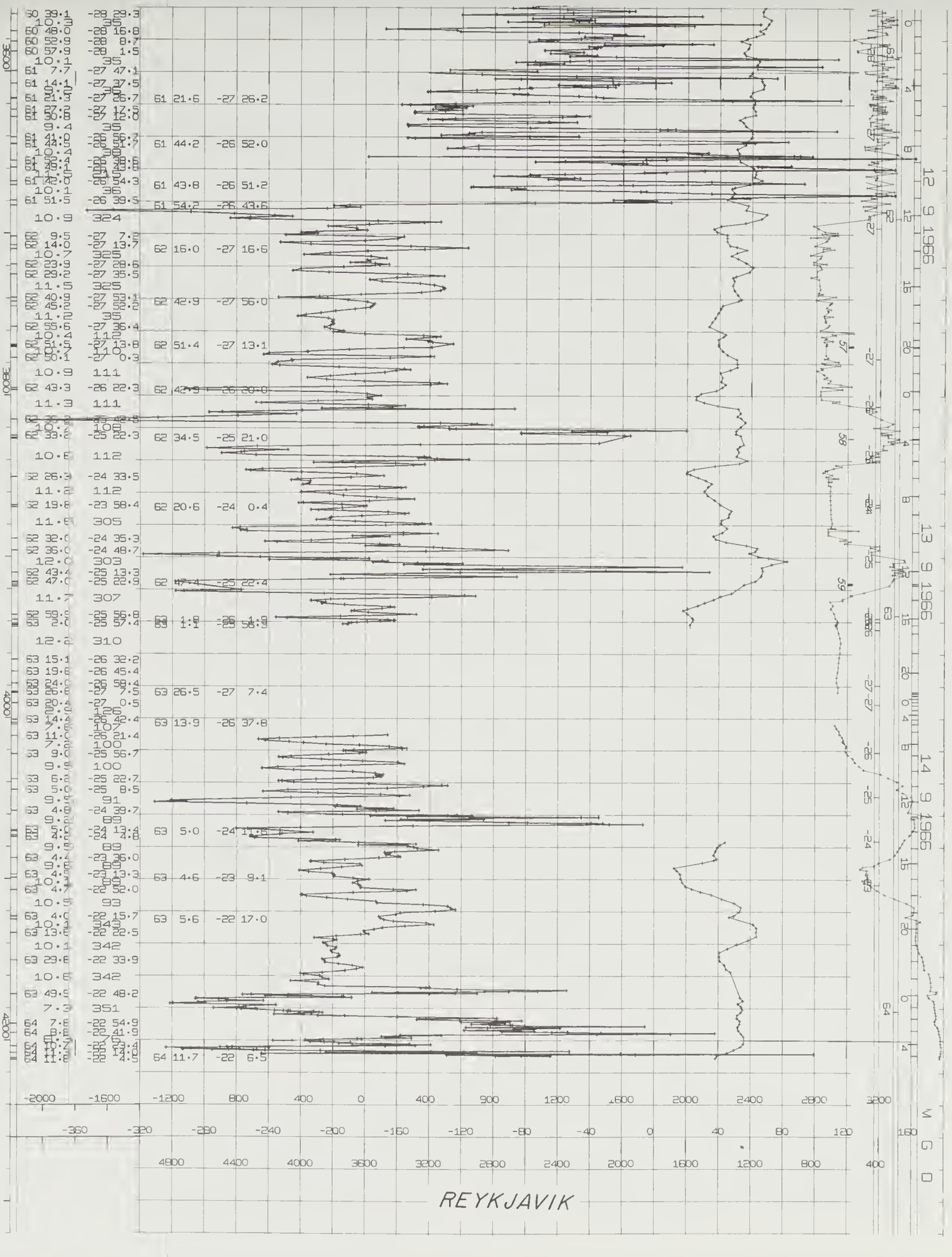
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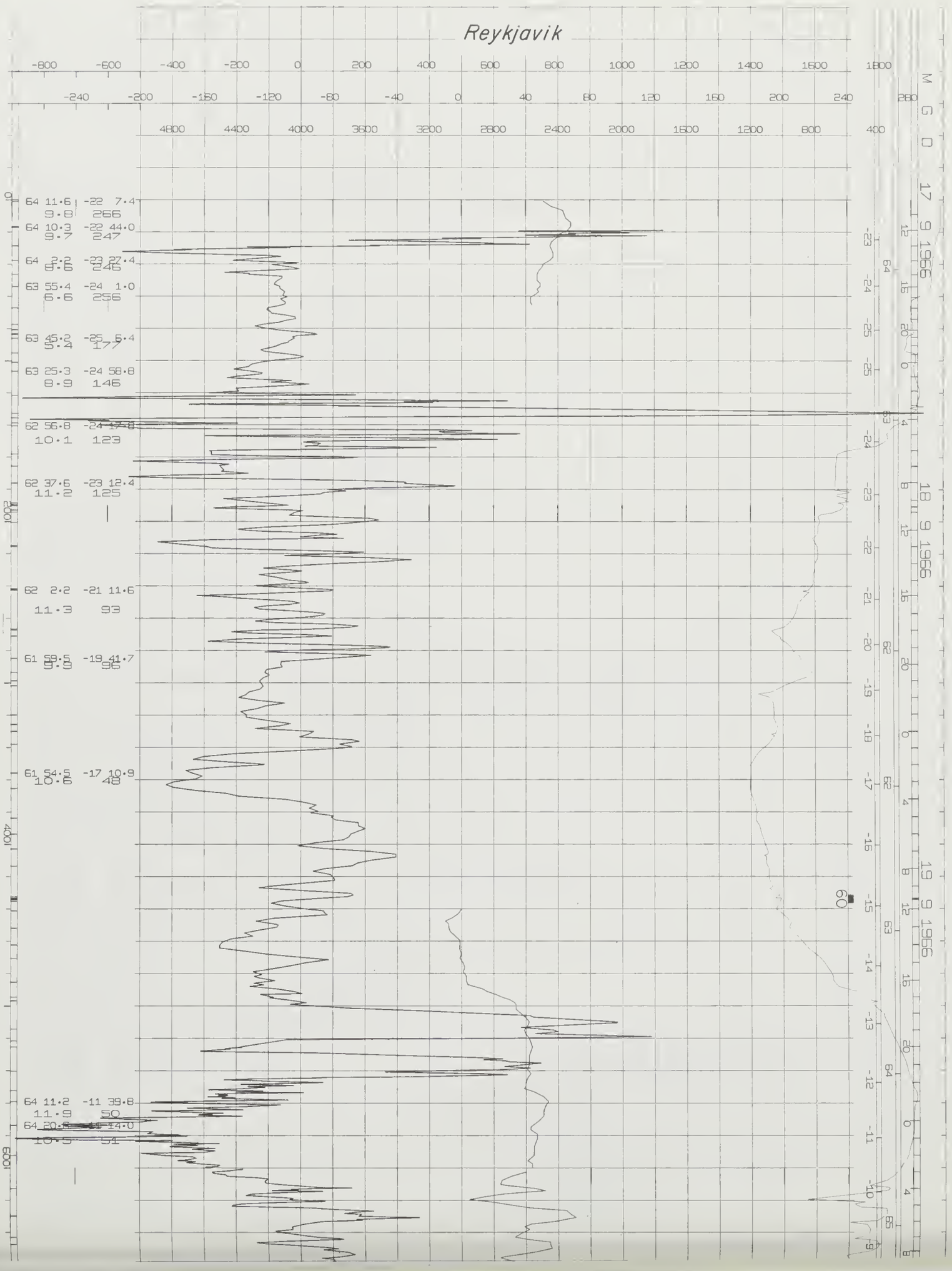

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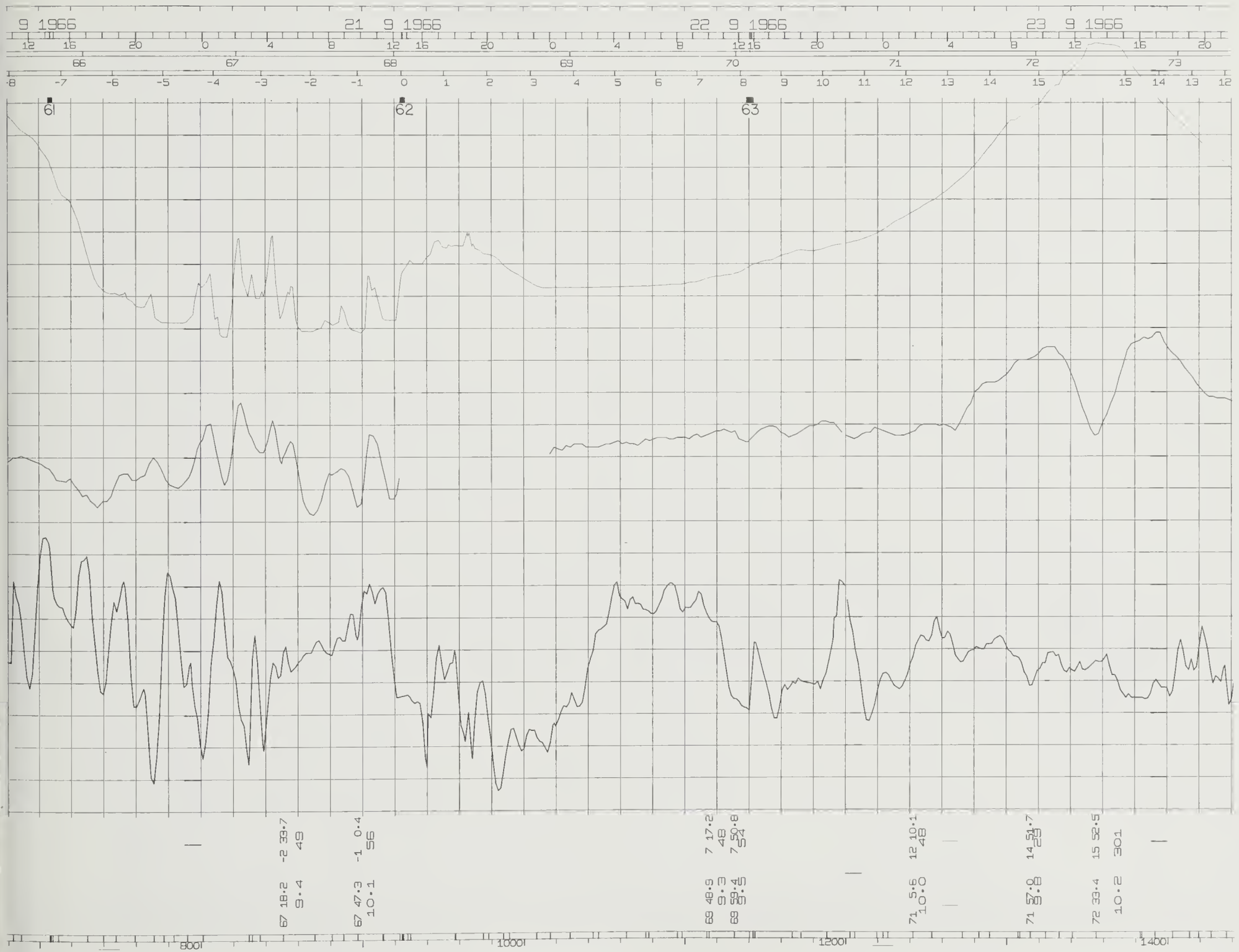
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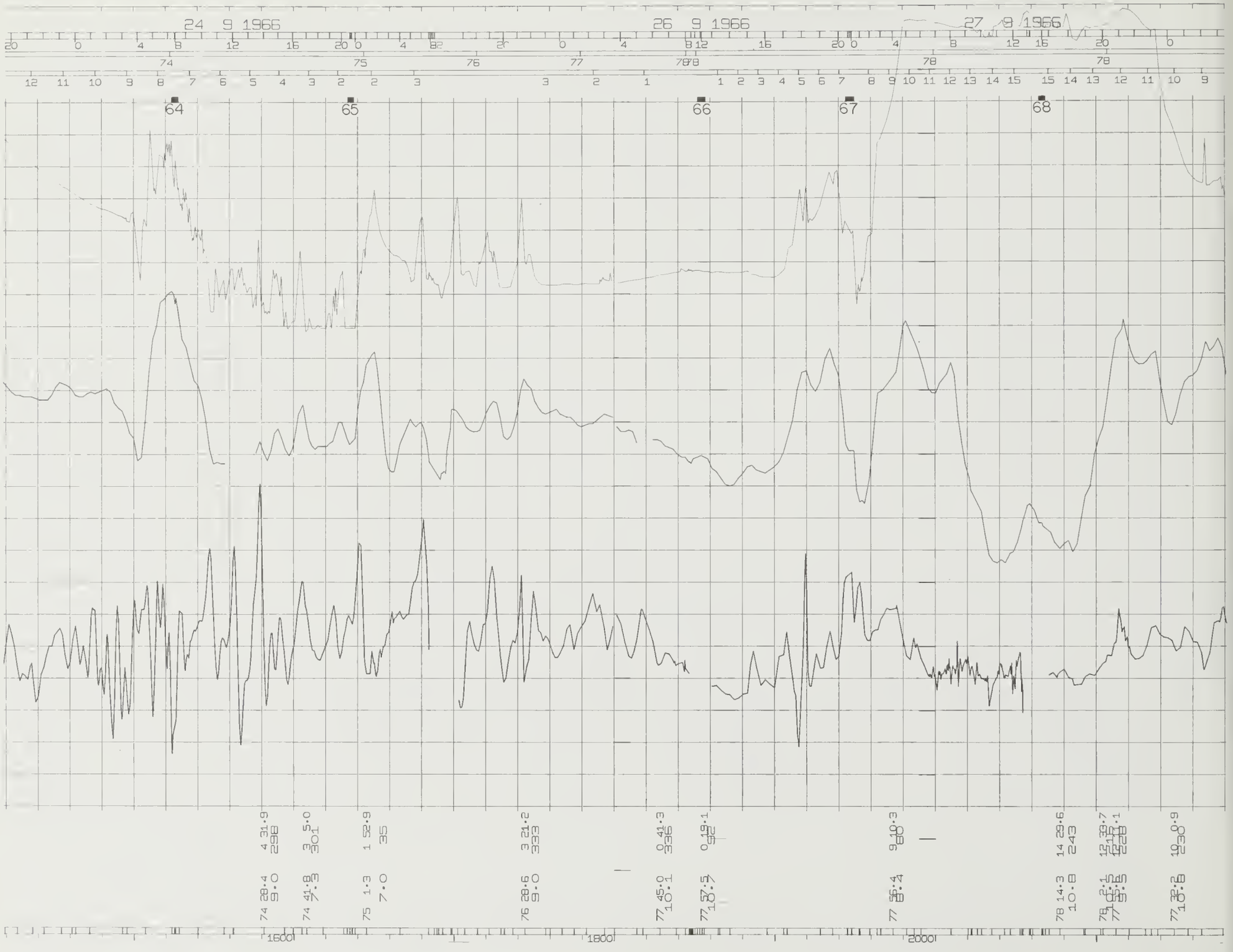
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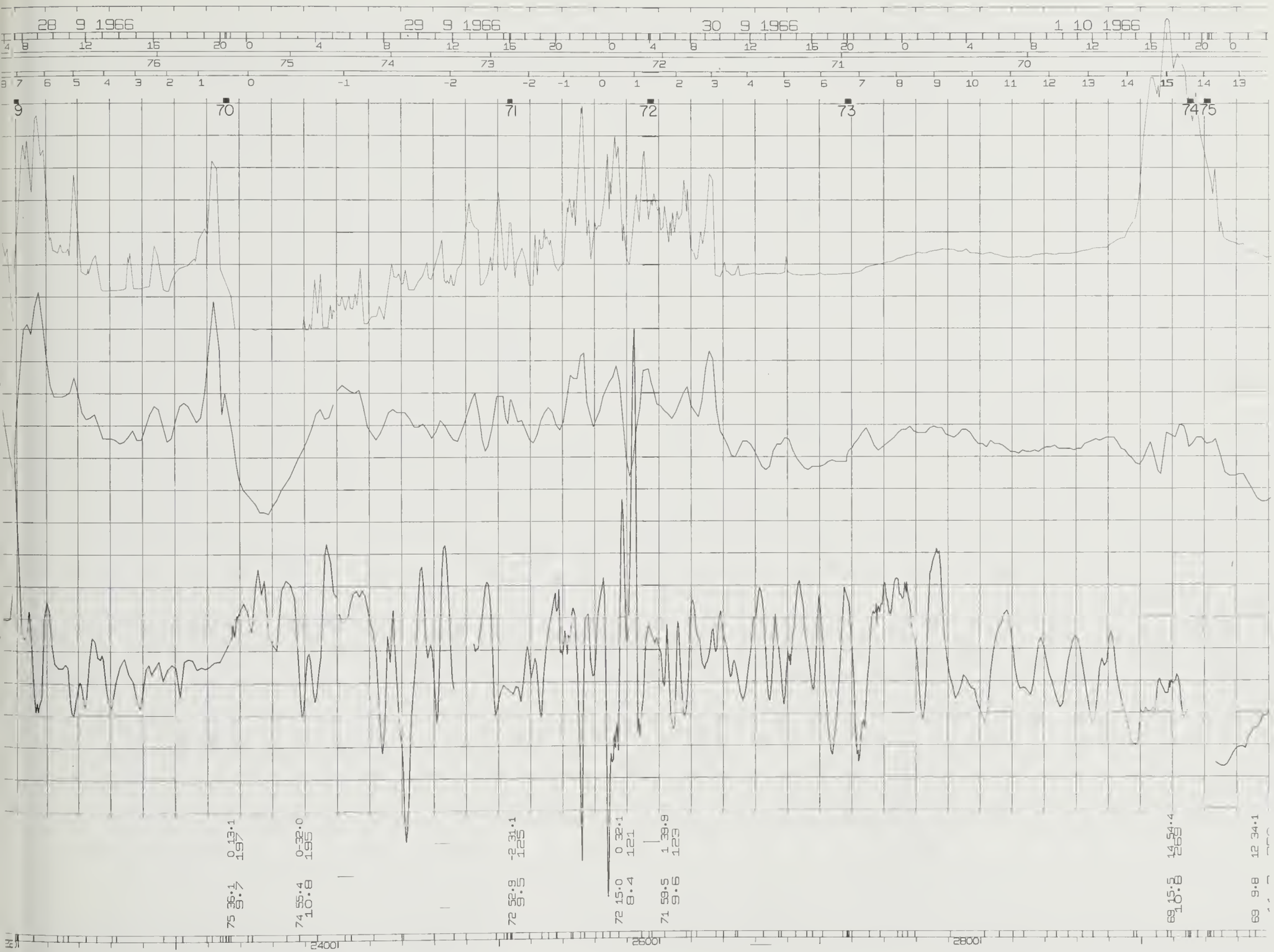
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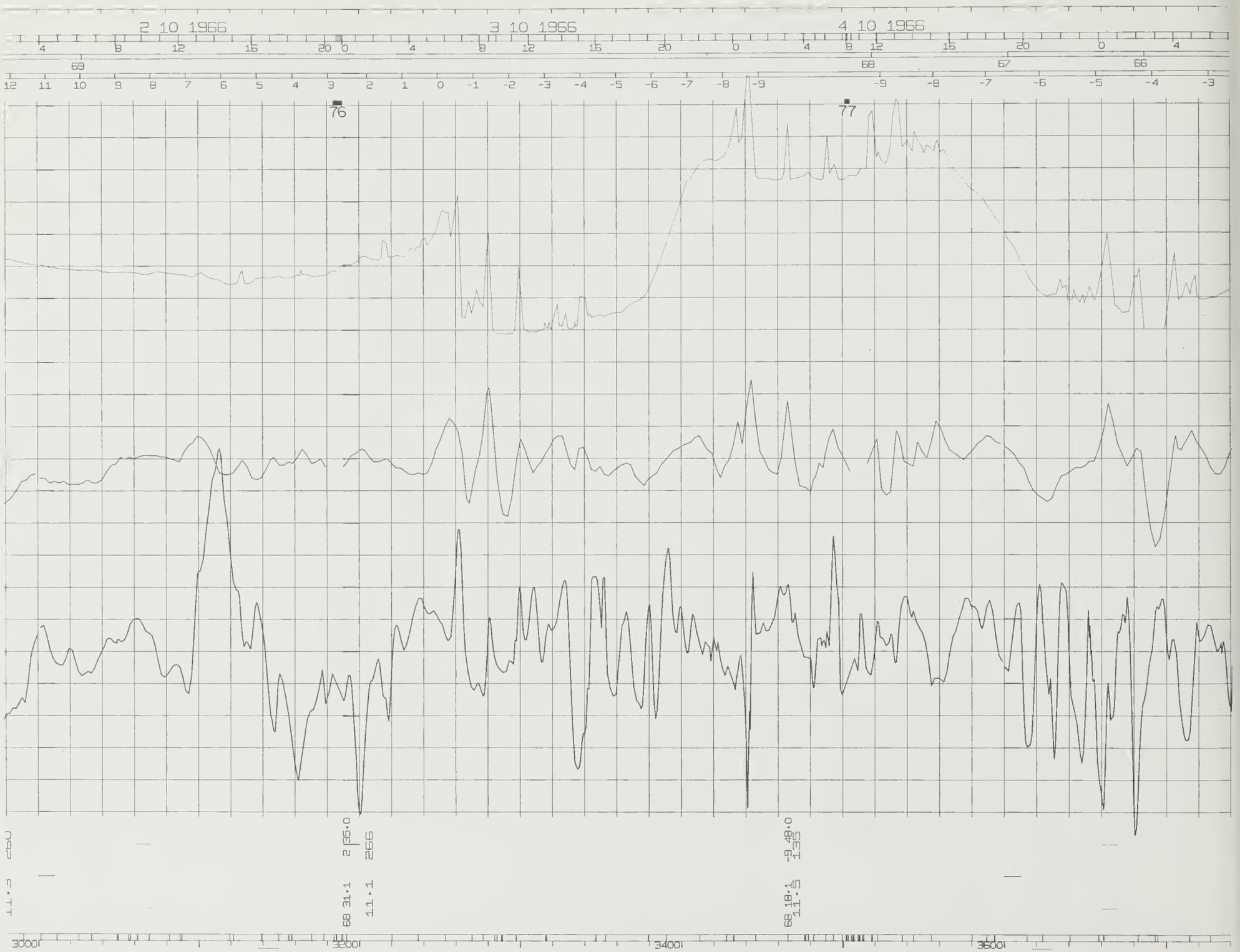

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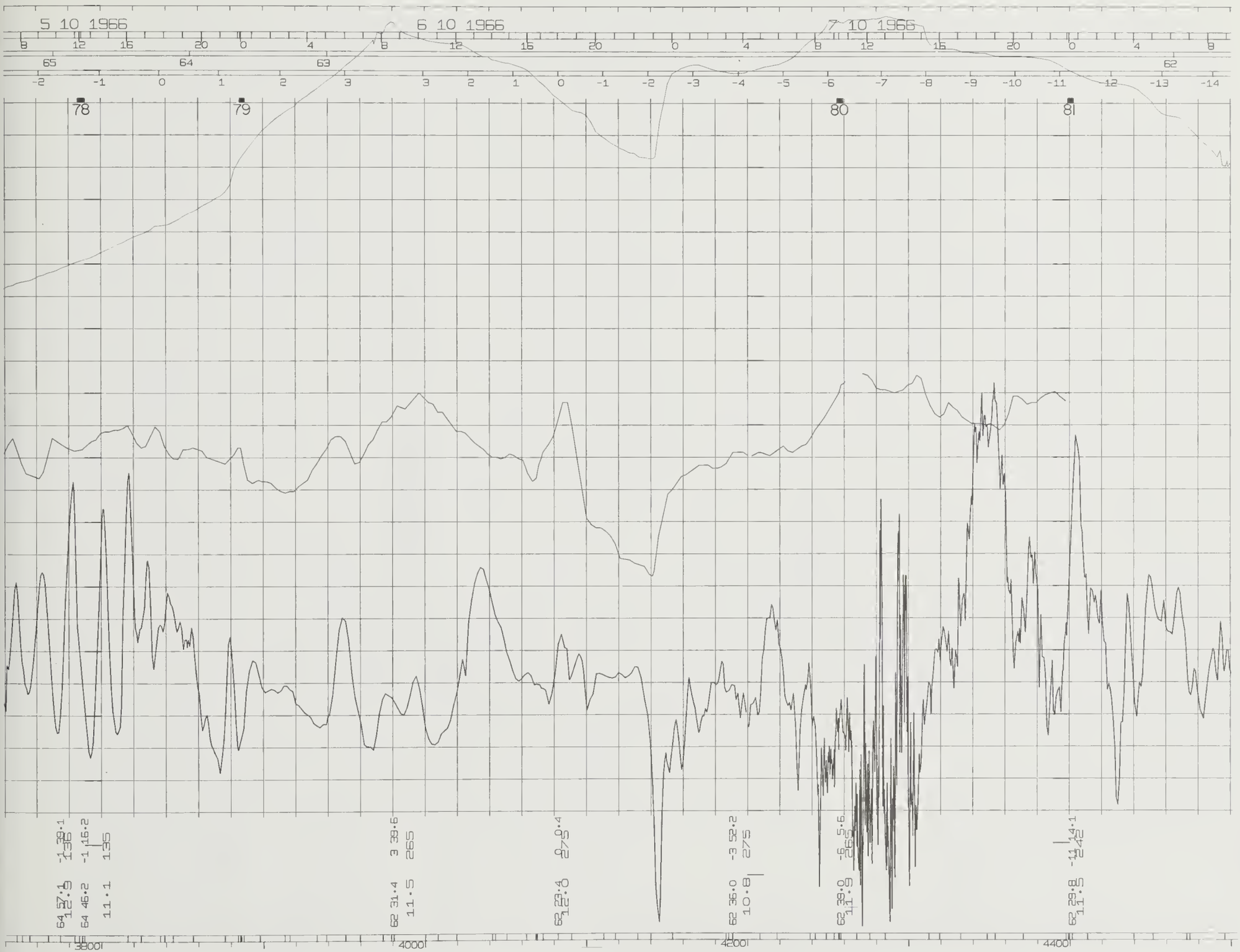

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9·8 266
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63 55·4 -24 1·0
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5·4 177
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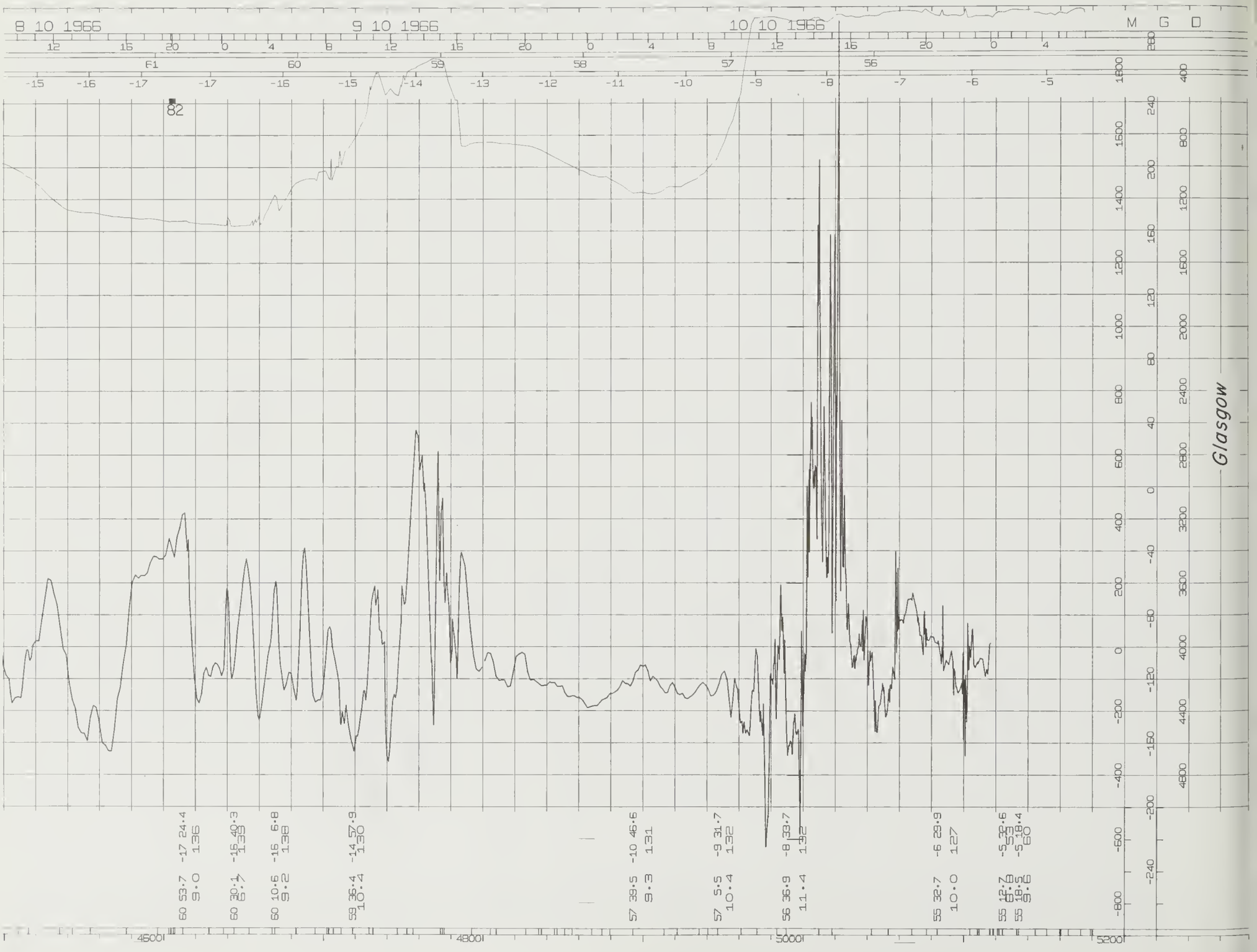

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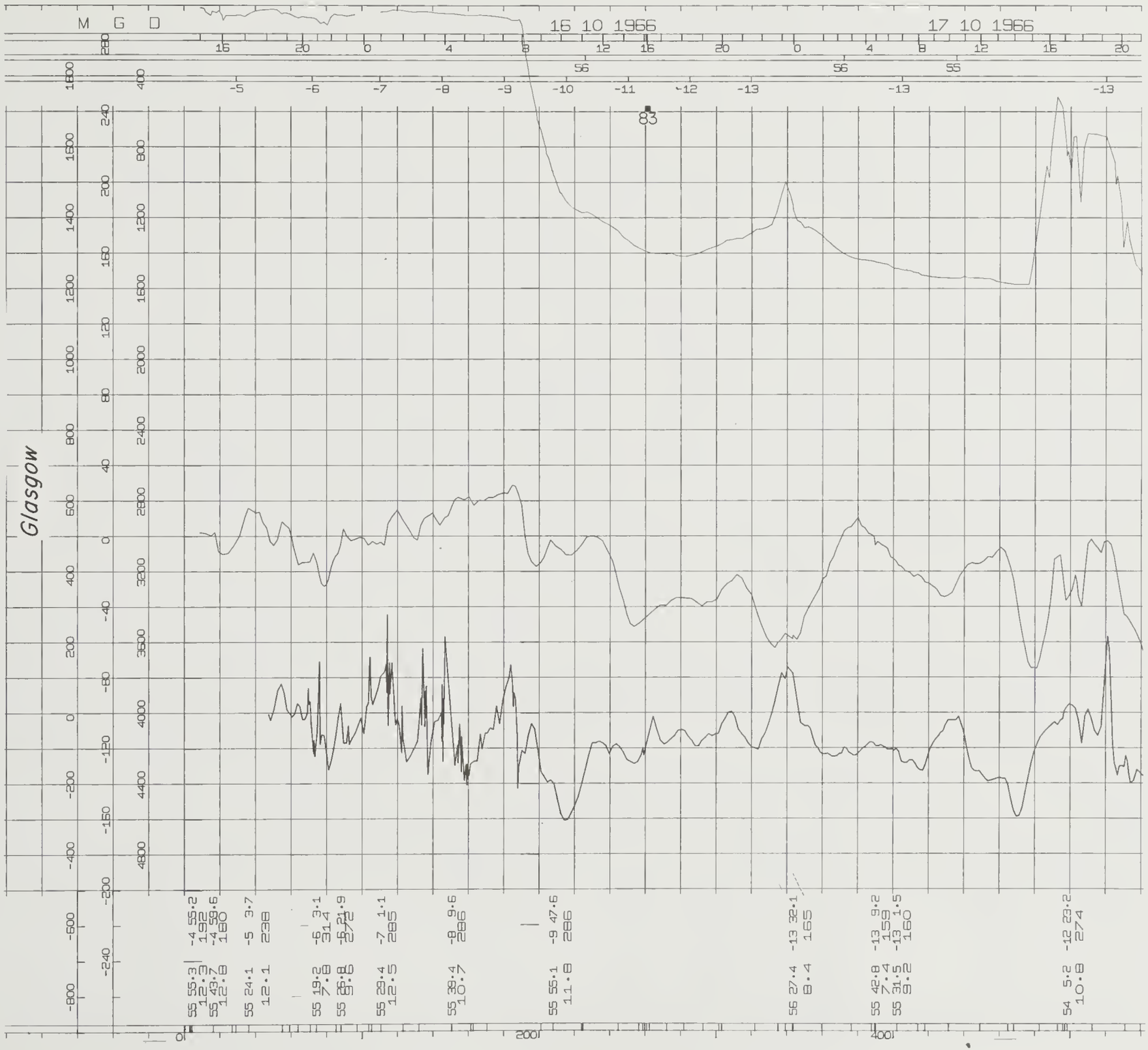

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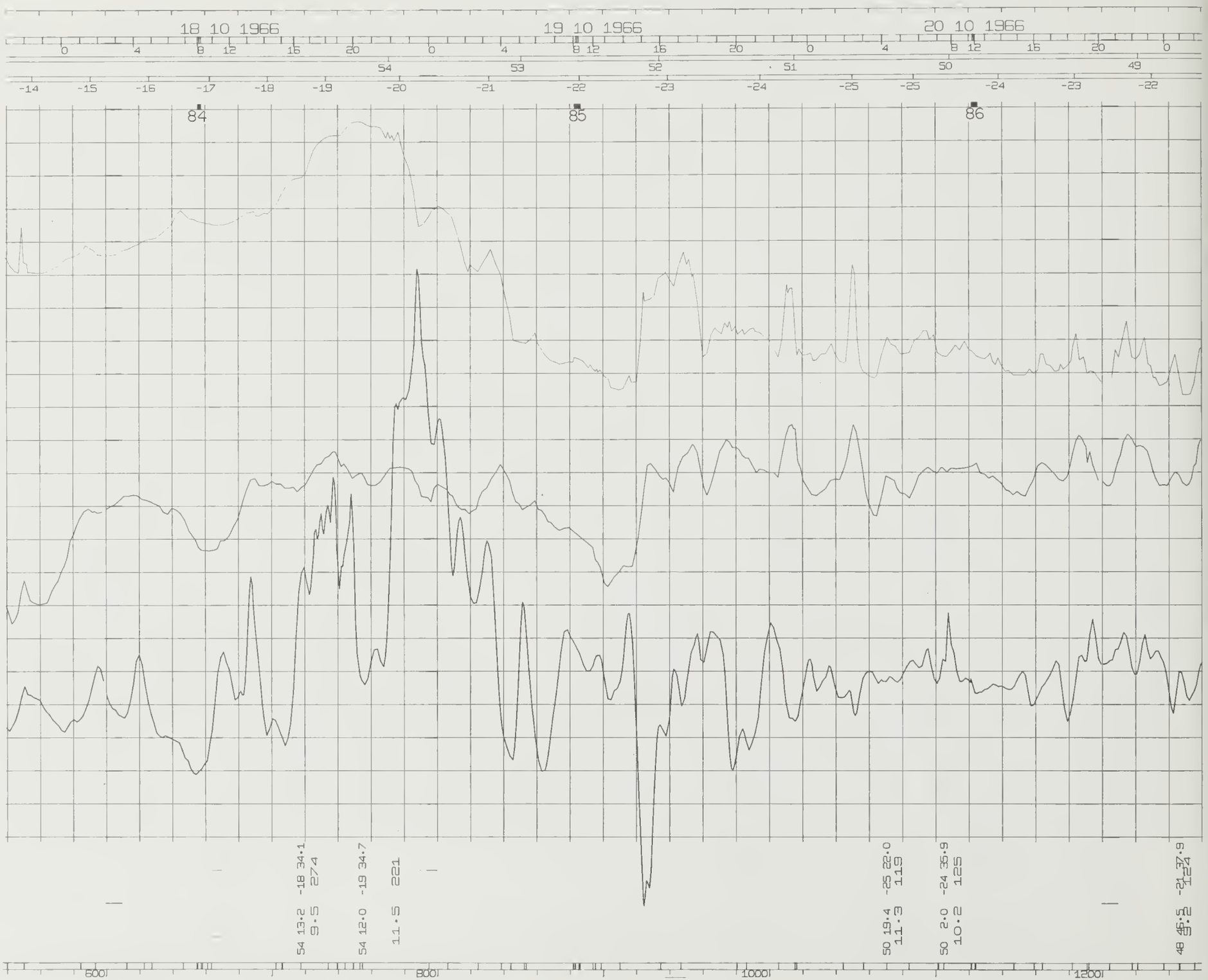

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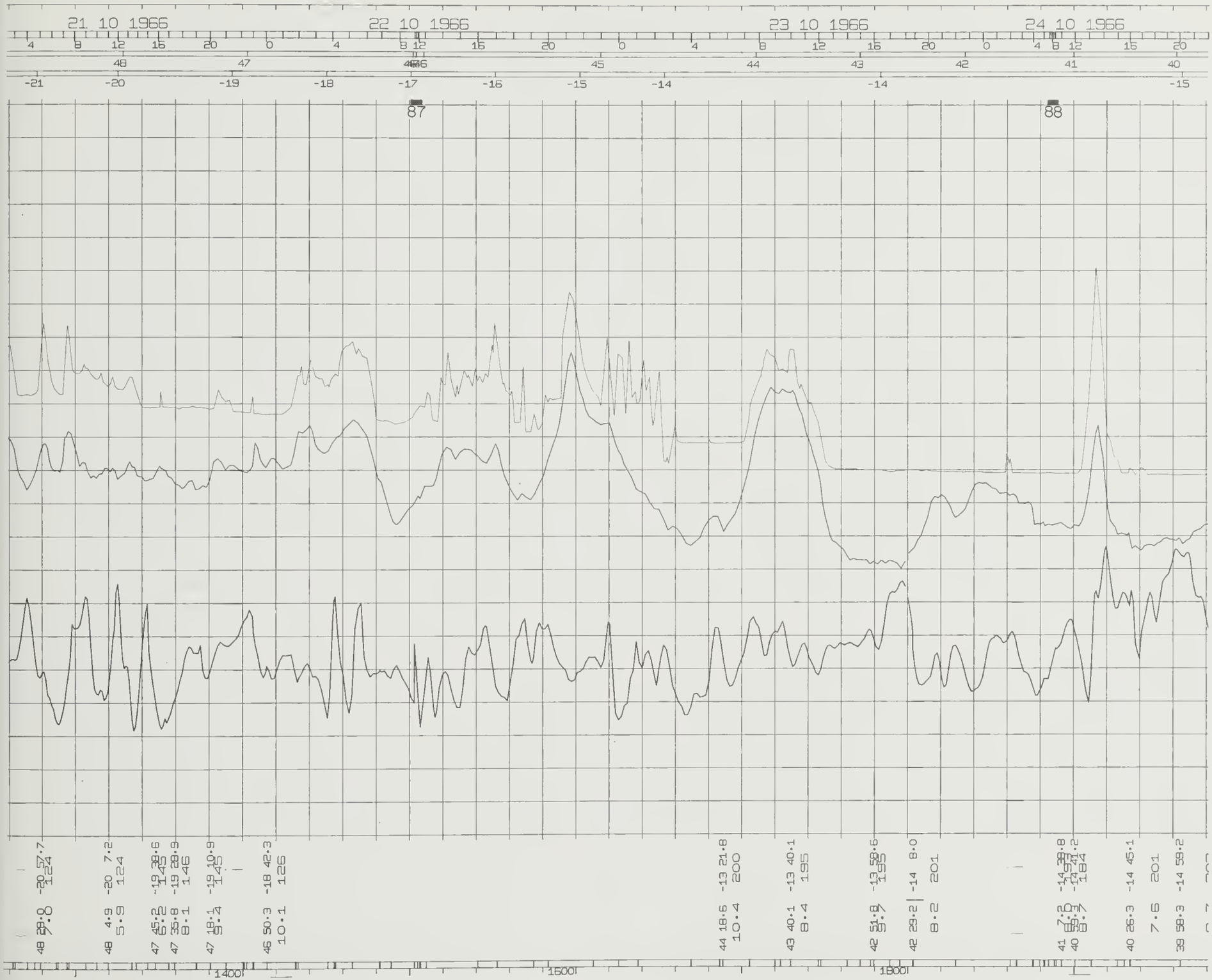

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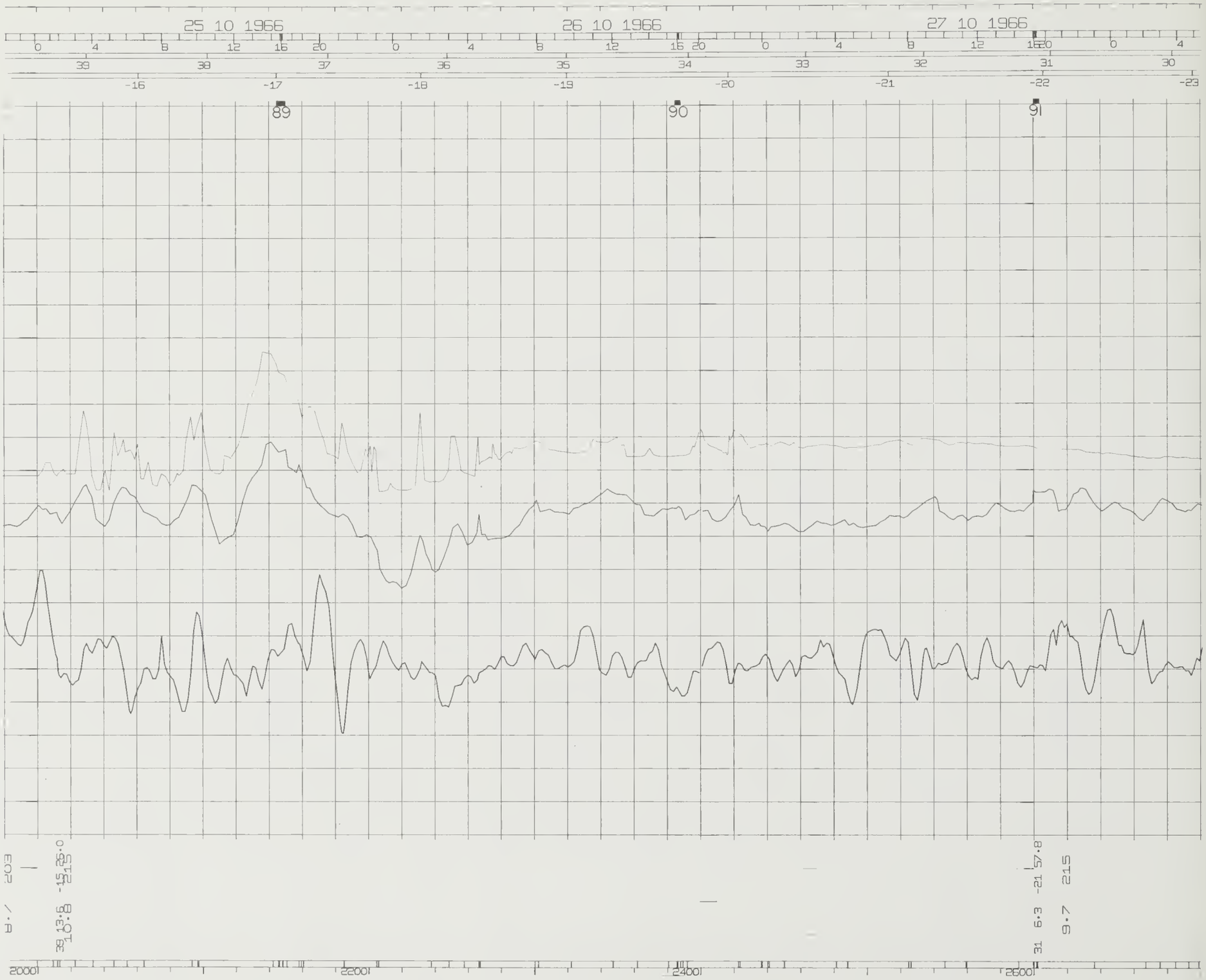

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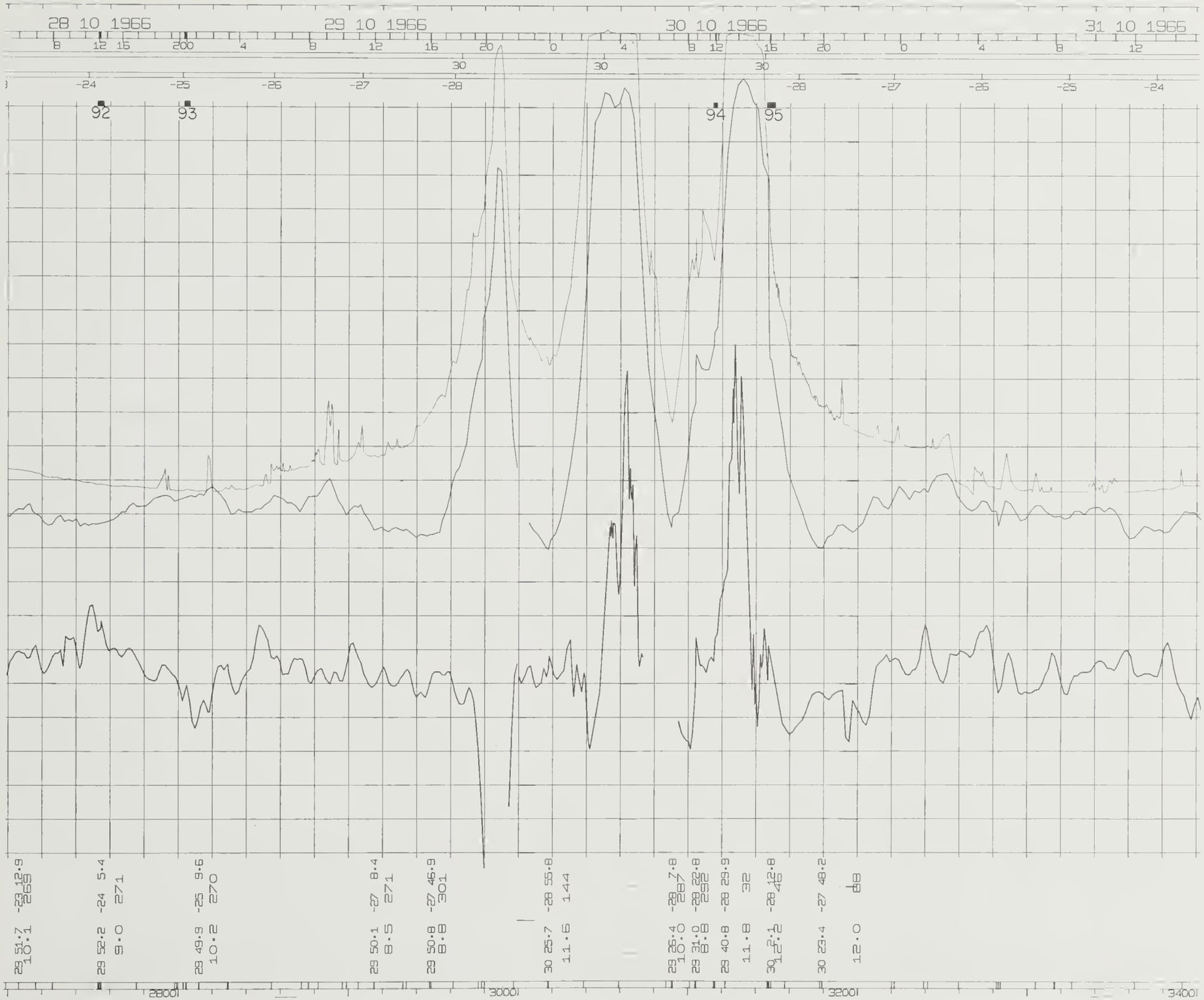

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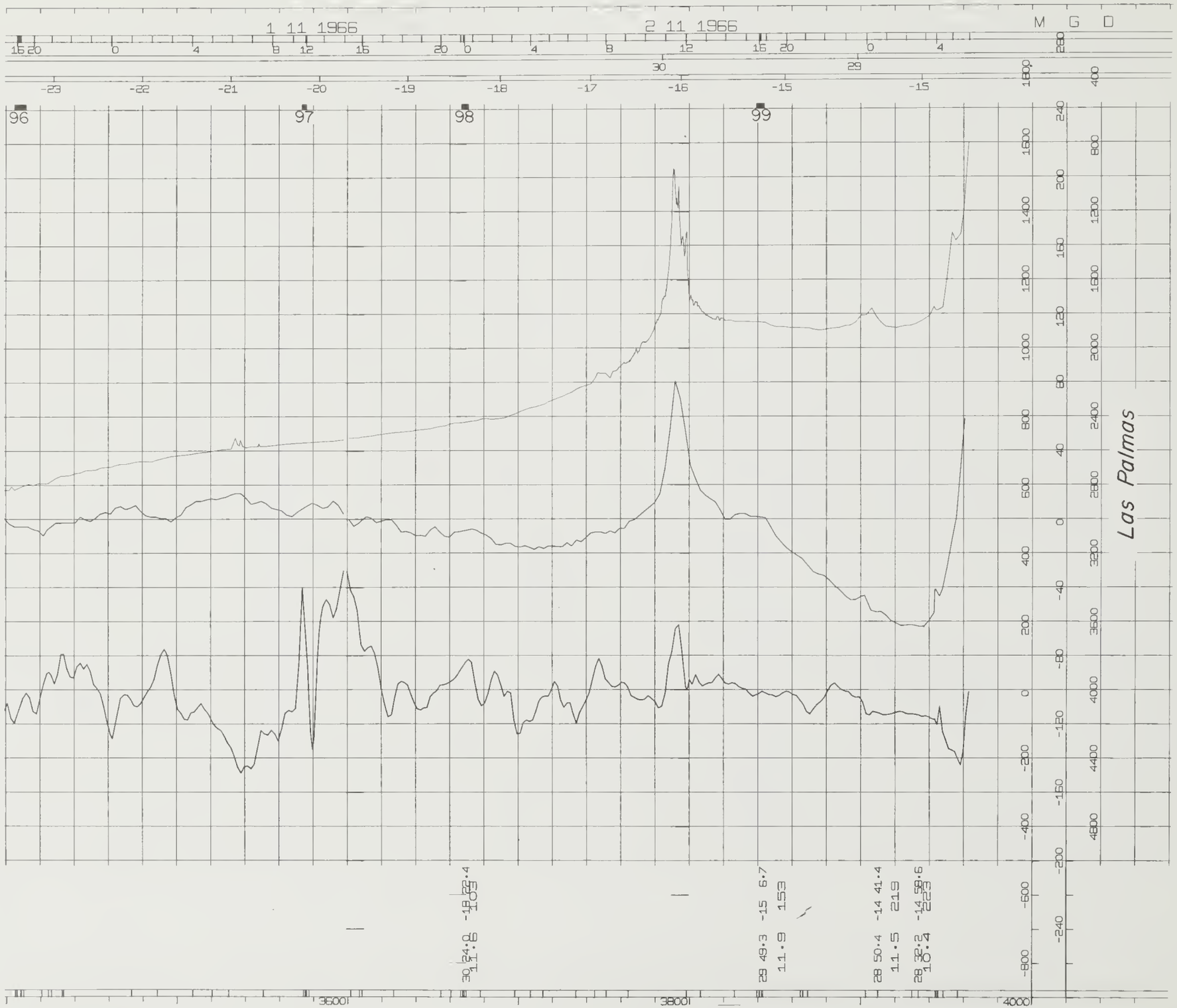

M G D
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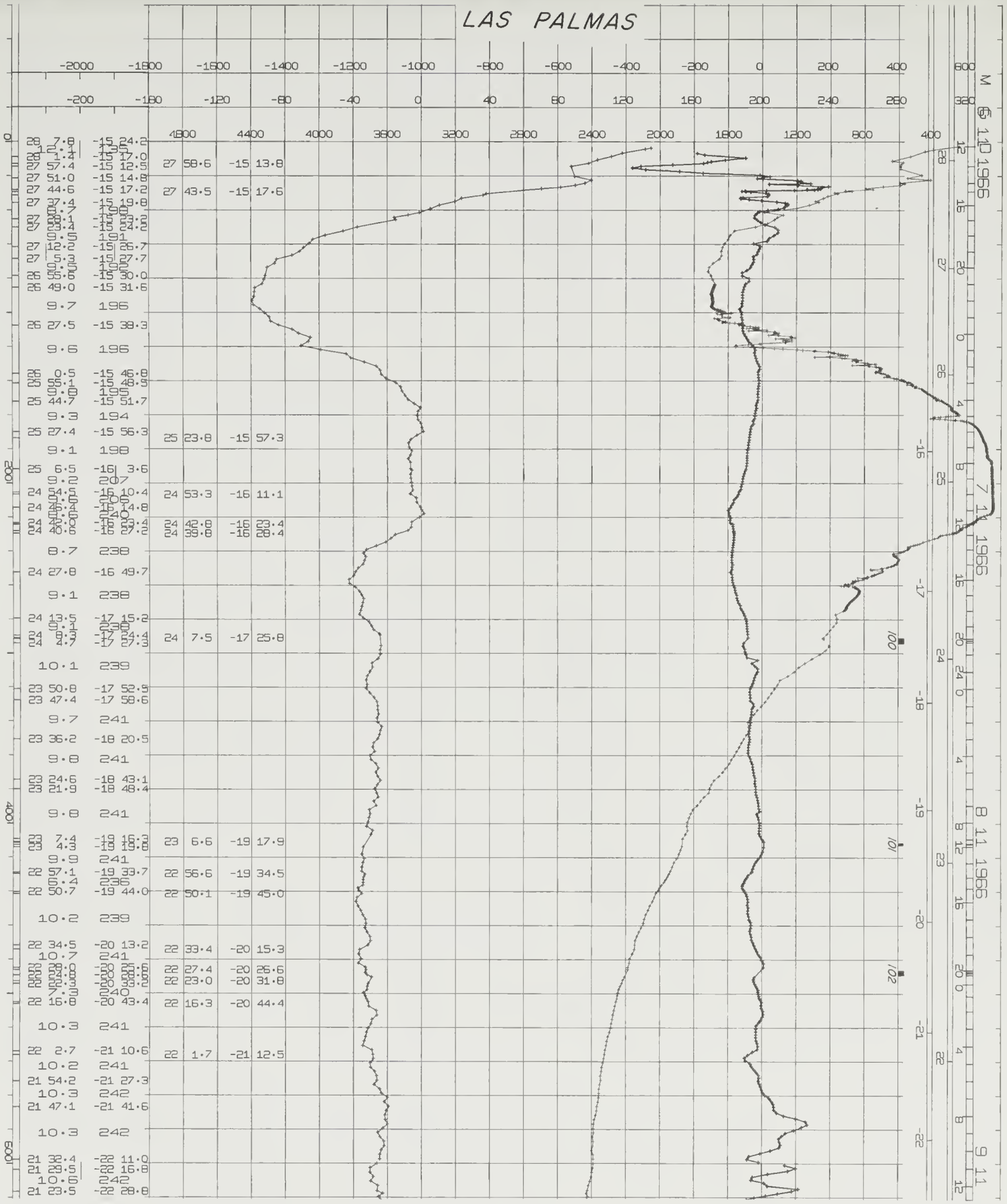

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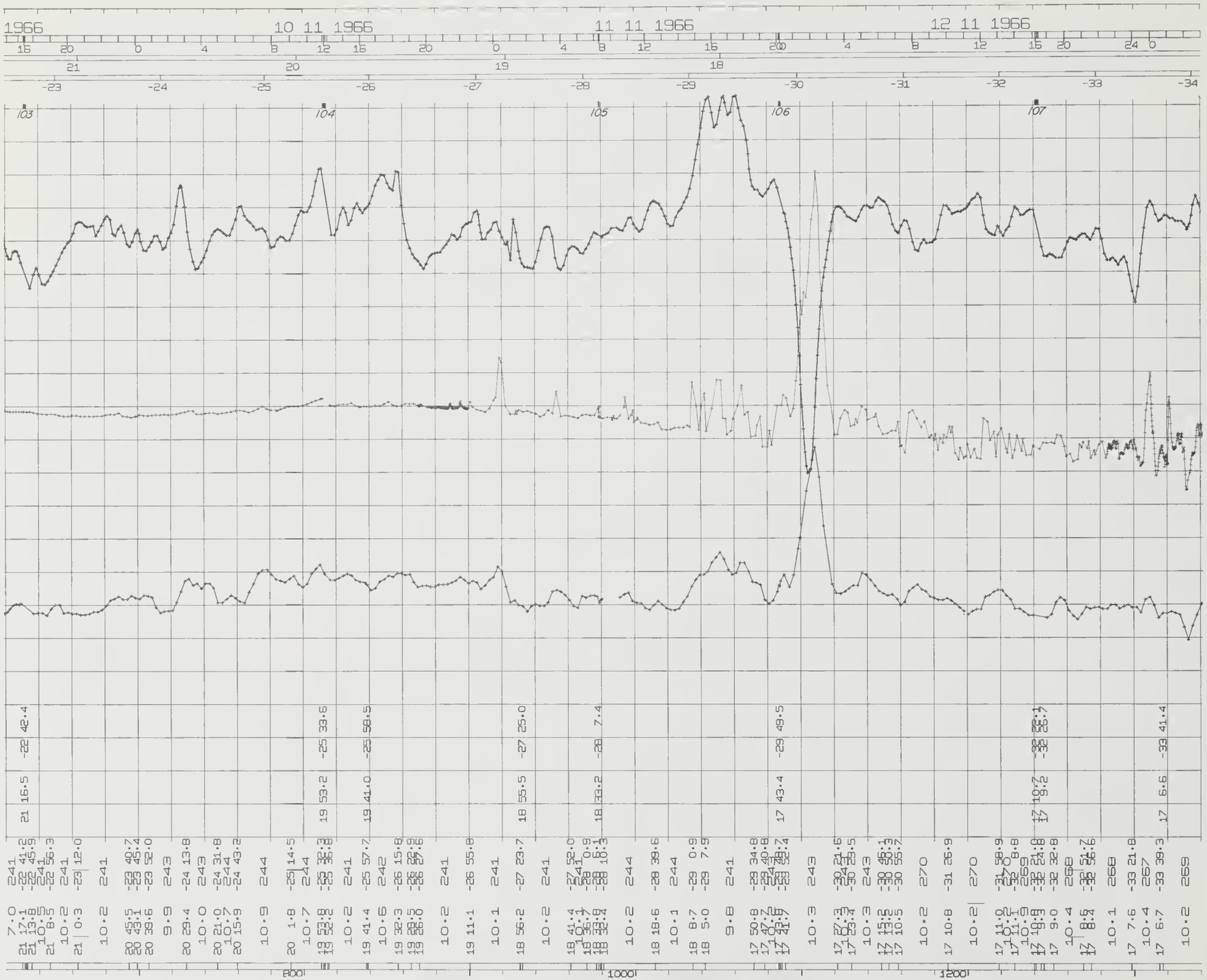

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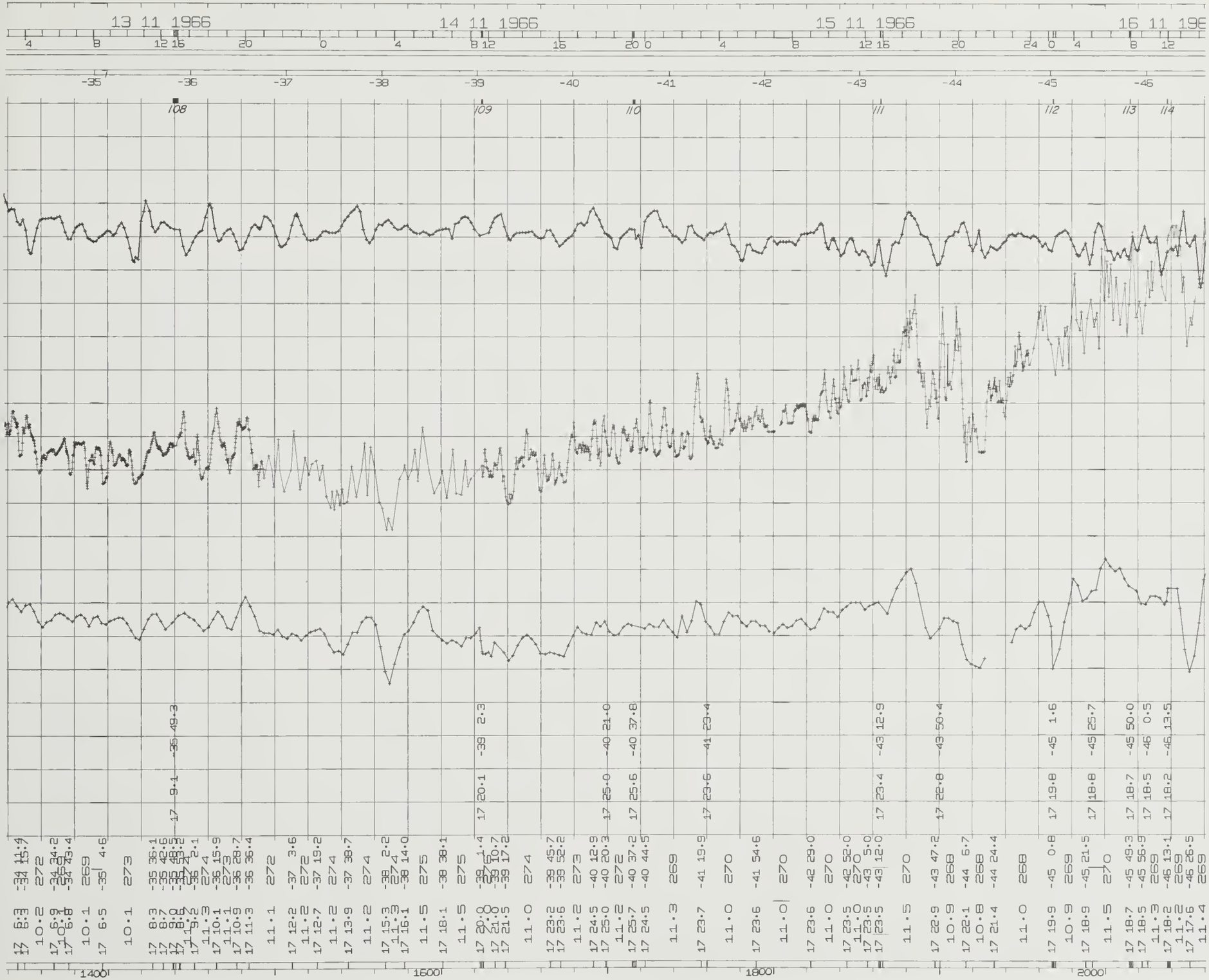

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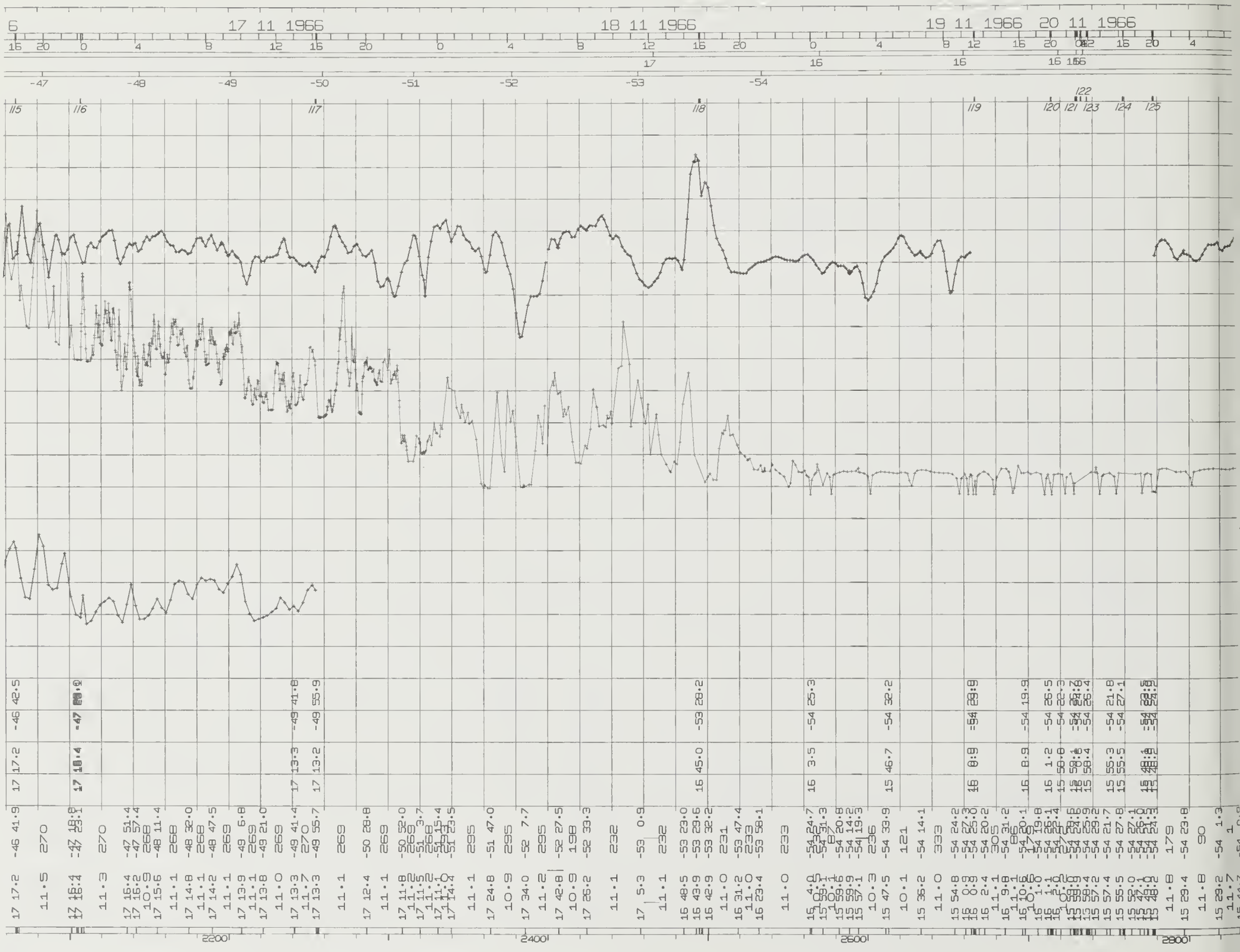

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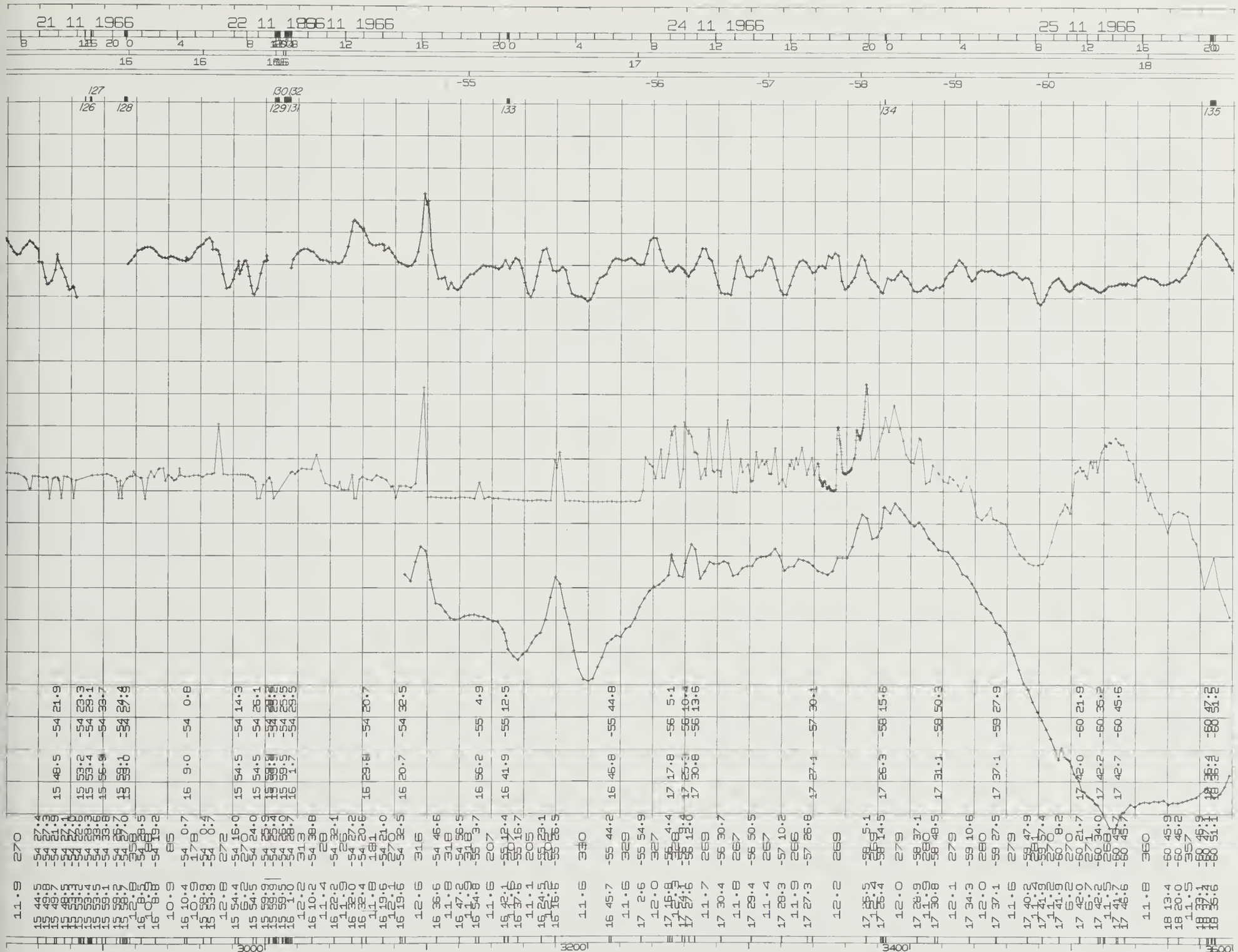

1 11 1966
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Las Palmas


LAS PALMAS
M 6 11 1966
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101
102

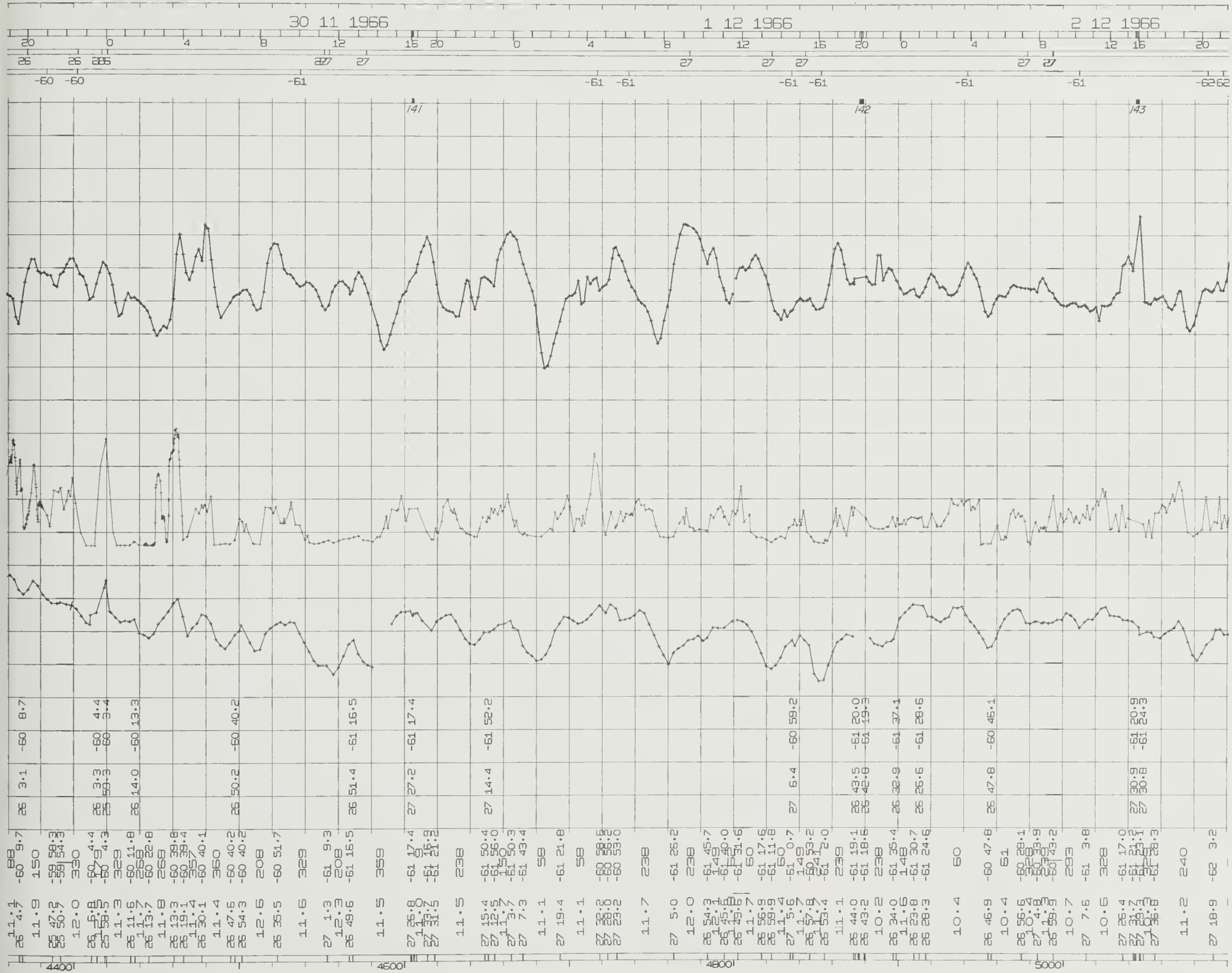

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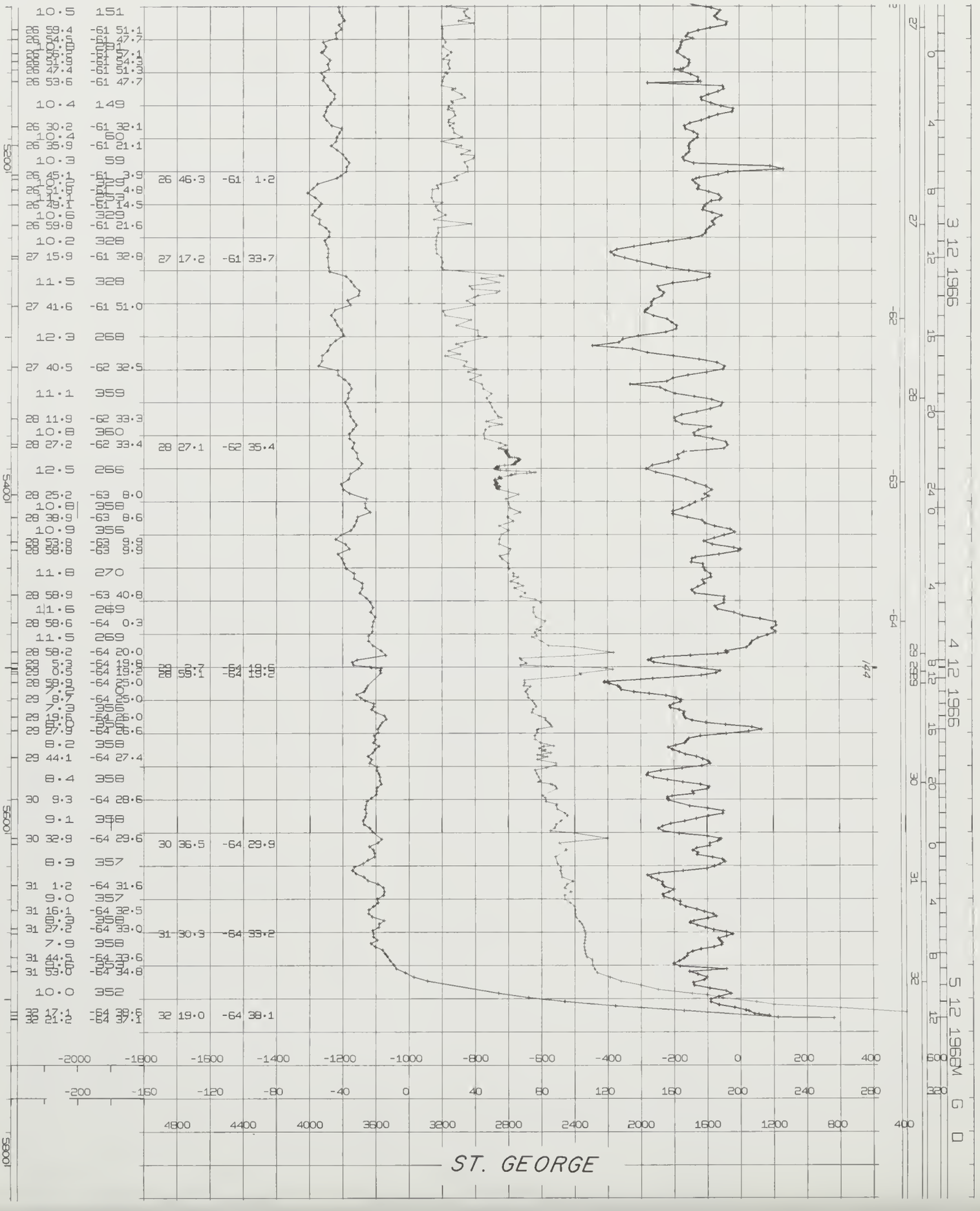

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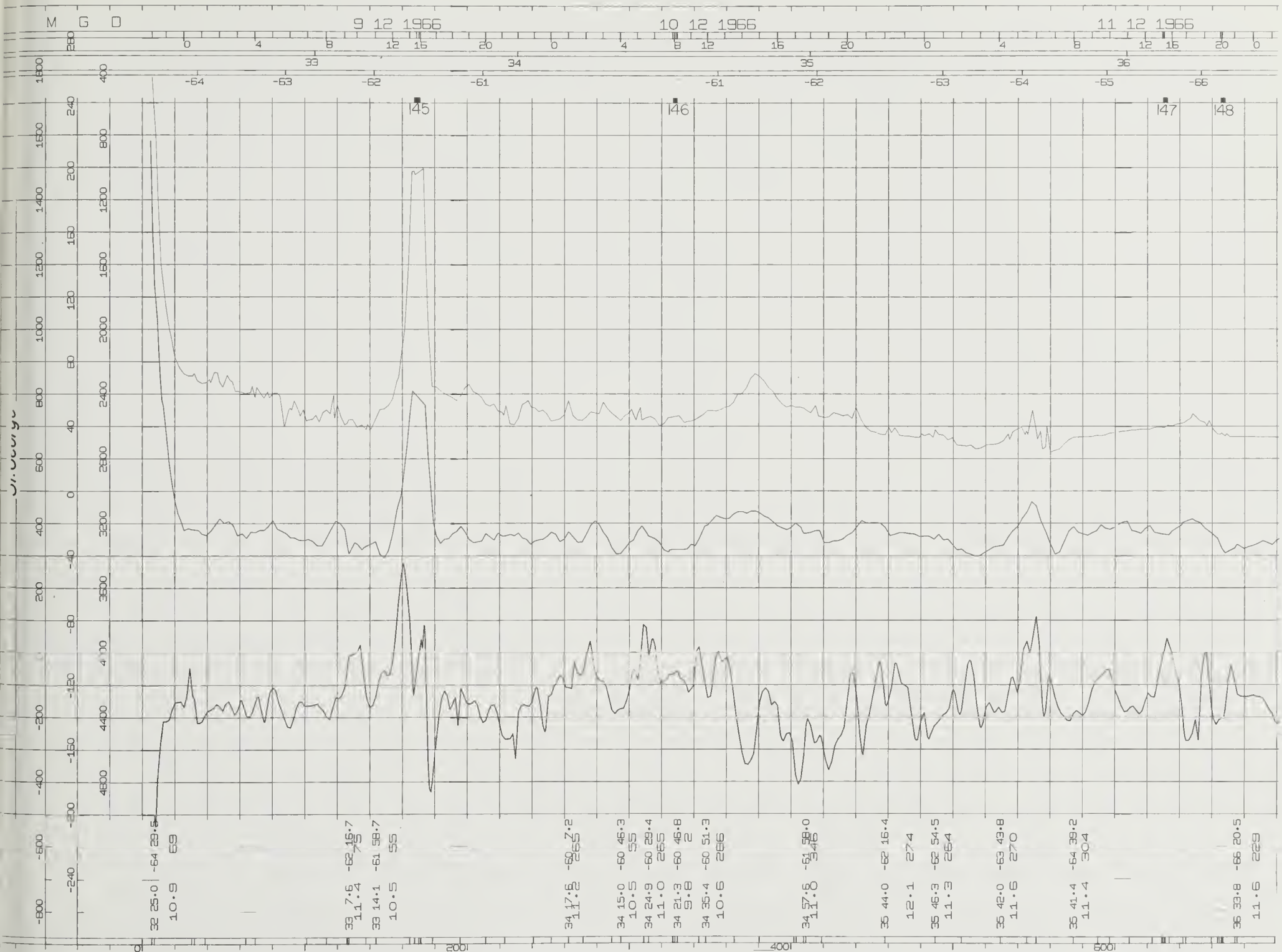

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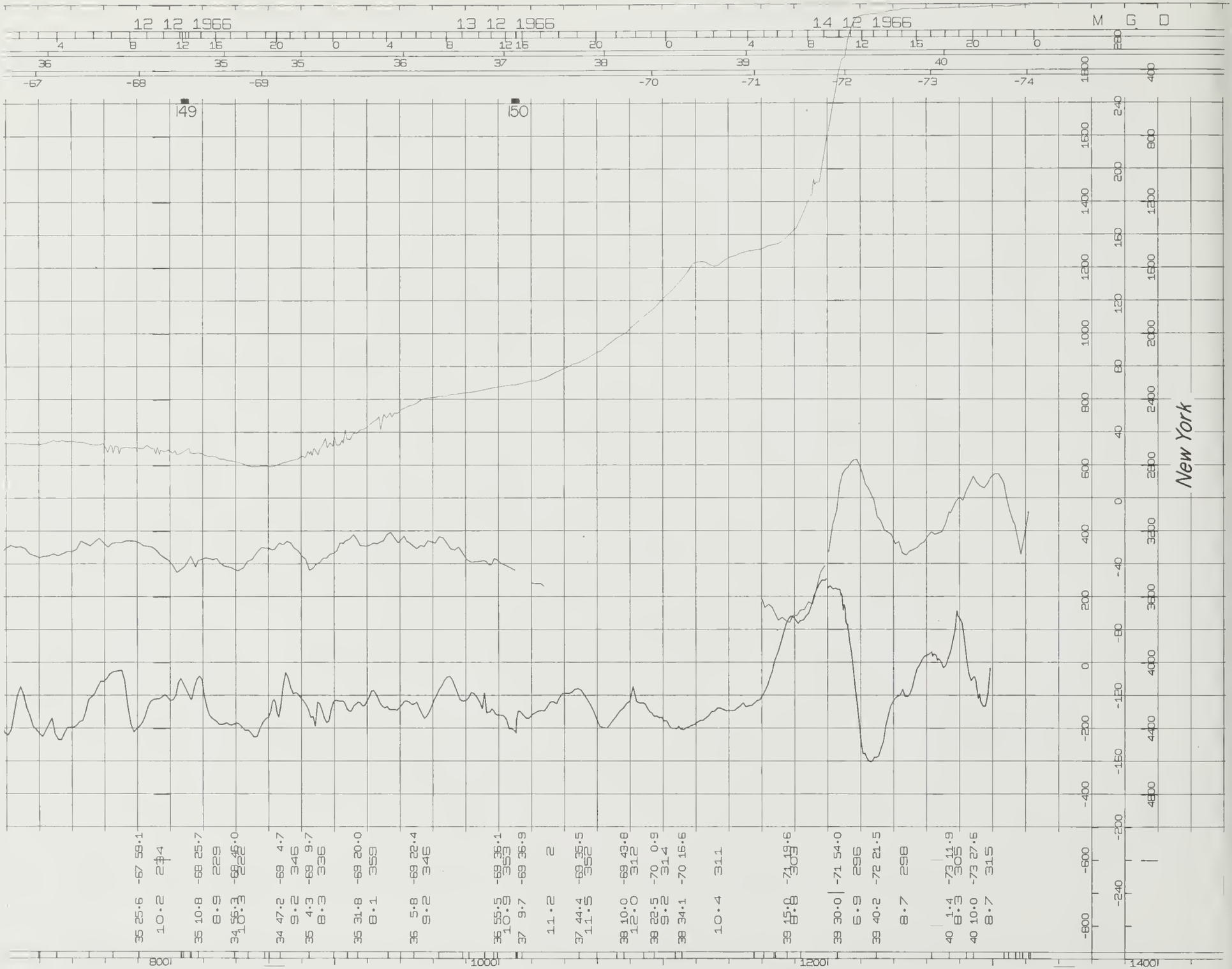

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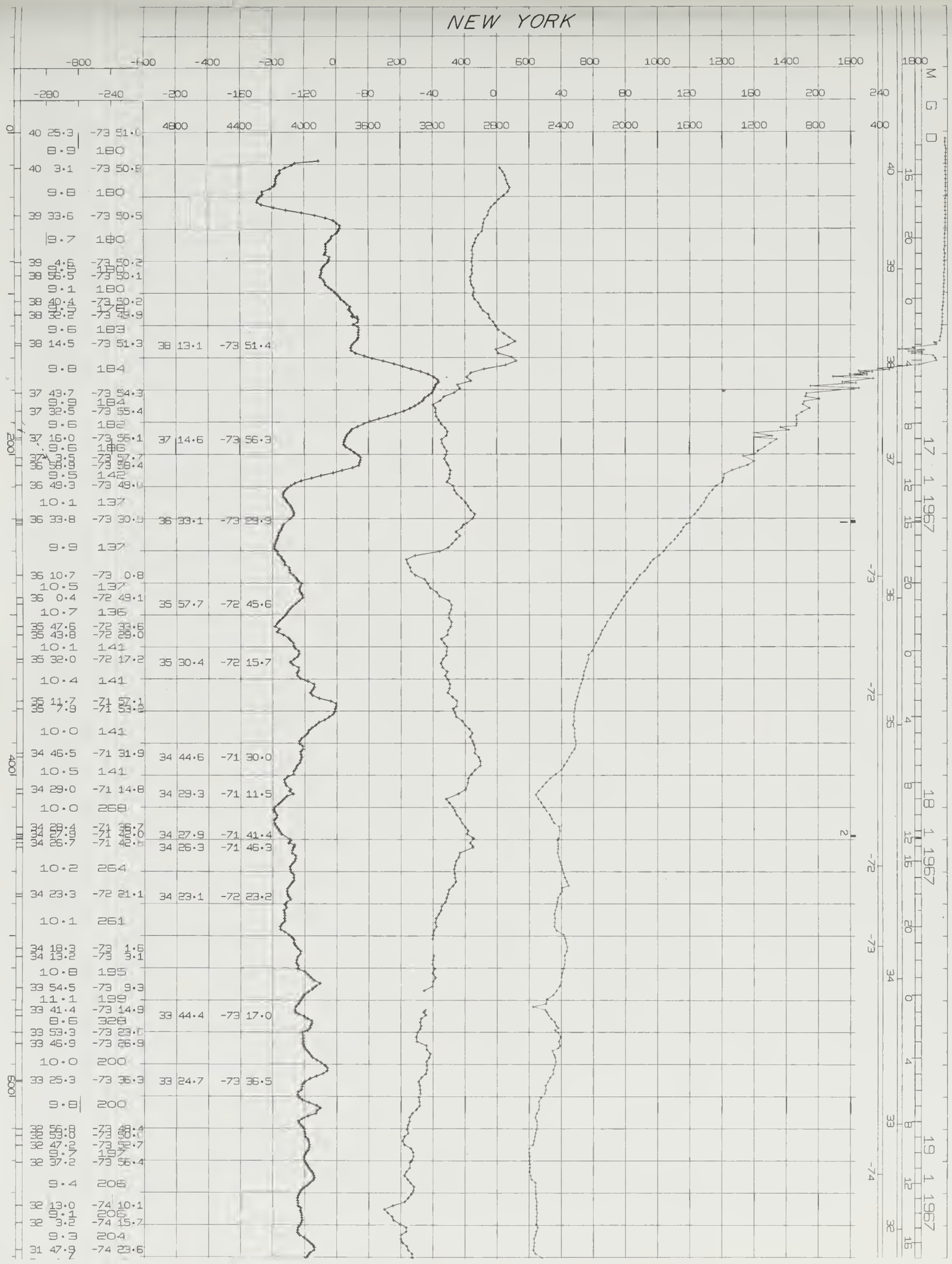
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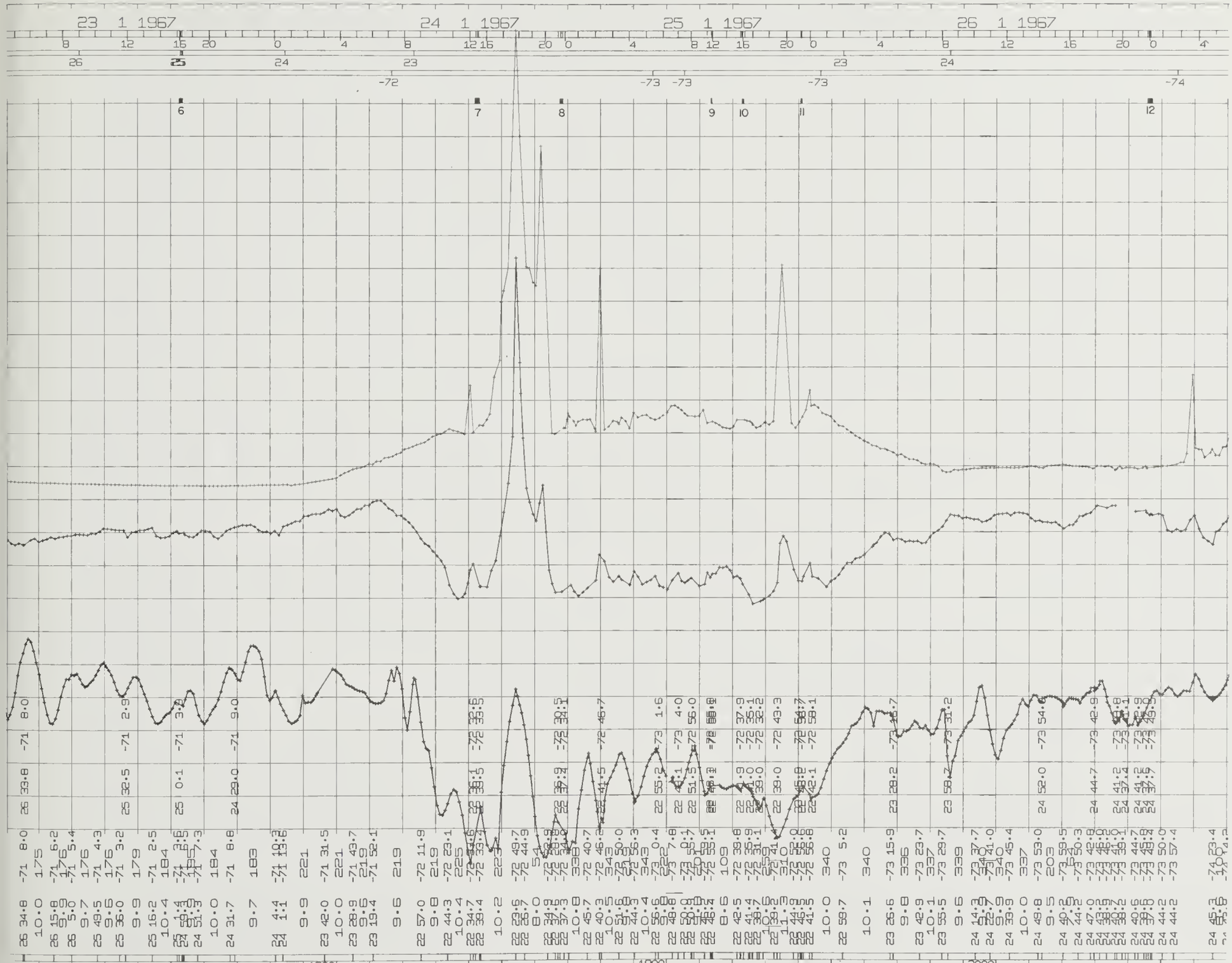

ST. GEORGE
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80
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200
240
280
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4400
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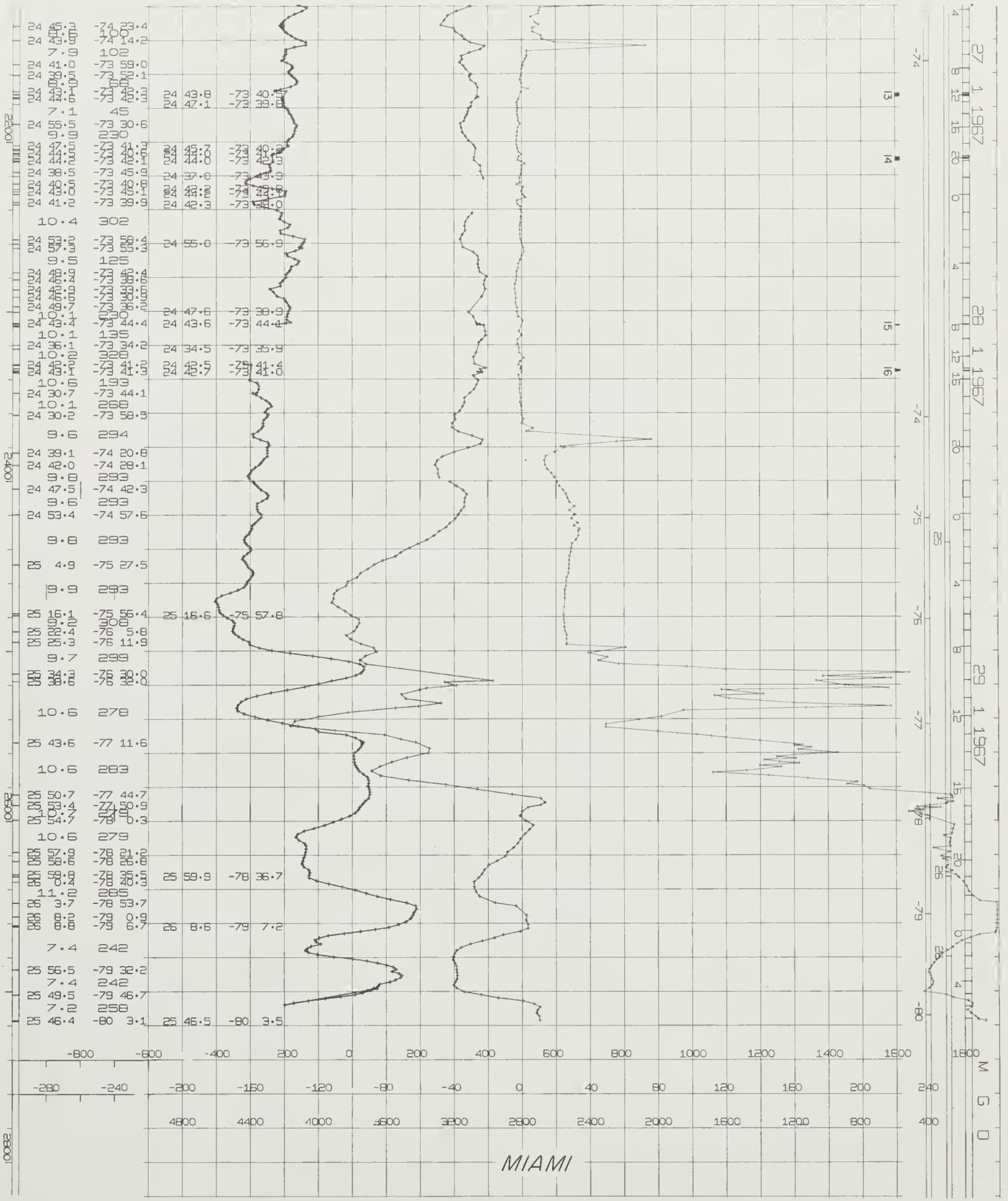

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12 12 1966
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M G D
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150
New York


NEW YORK
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4800 4400 4000 3600 3200 2800 2400 2000 1600 1200 800 400
M G D
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19 1 1967
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38 56.5 -73 50.1
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38 40.4 -73 50.2
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38 32.2 -73 49.9
9.6 183
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38 13.1 -73 51.4
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37 43.7 -73 54.3
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37 32.5 -73 55.4
9.6 182
37 16.0 -73 56.1
37 14.6 -73 56.3
9.6 186
37 3.5 -73 57.7
36 58.9 -73 58.4
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10.1 137
36 33.8 -73 30.0
36 33.1 -73 29.3
9.9 137
36 10.7 -73 0.8
10.5 137
36 0.4 -72 49.1
35 57.7 -72 45.6
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36 47.6 -72 33.6
35 43.8 -72 29.0
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36 32.0 -72 17.2
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35 7.9 -71 53.3
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11.1 199
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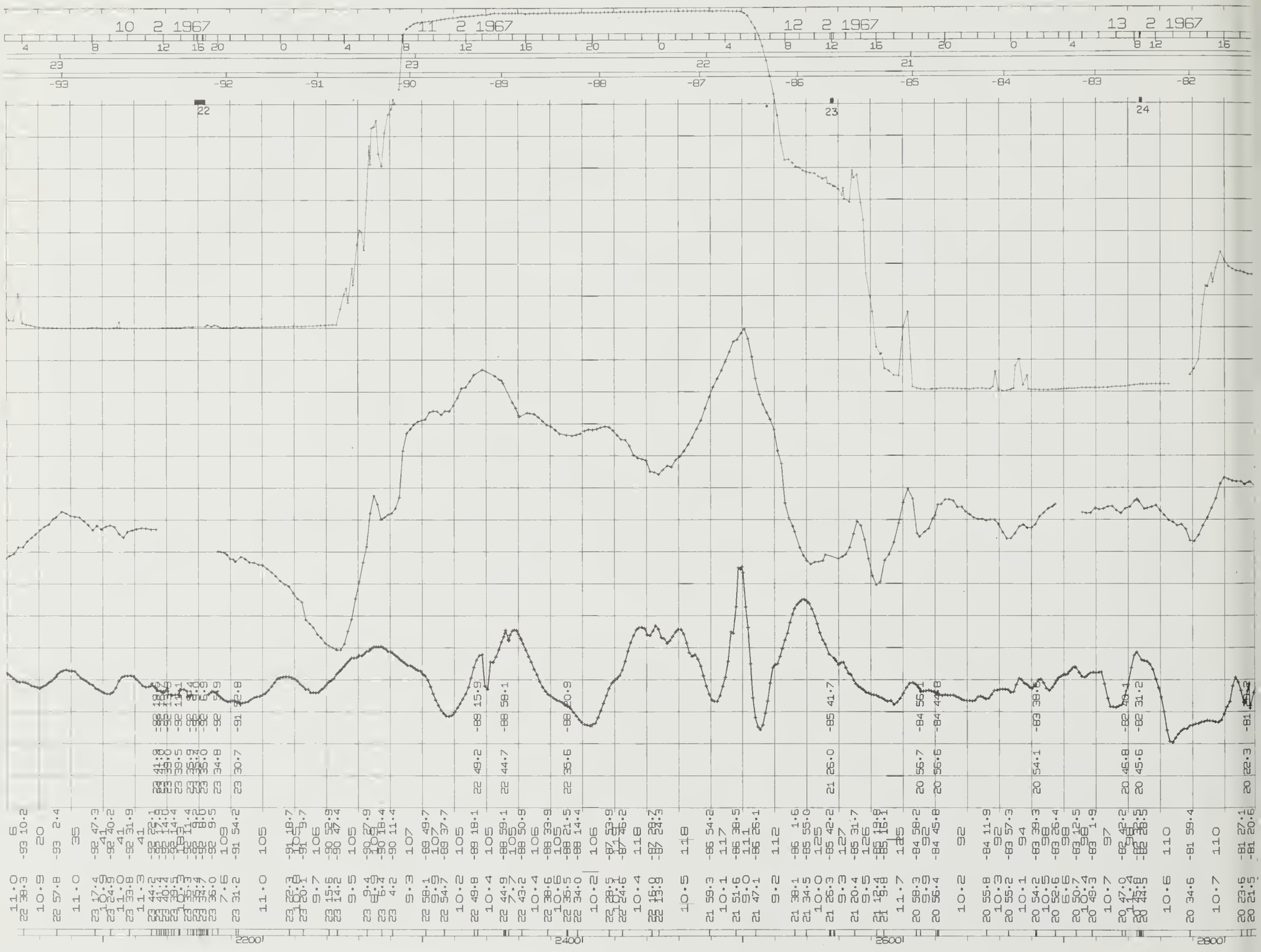

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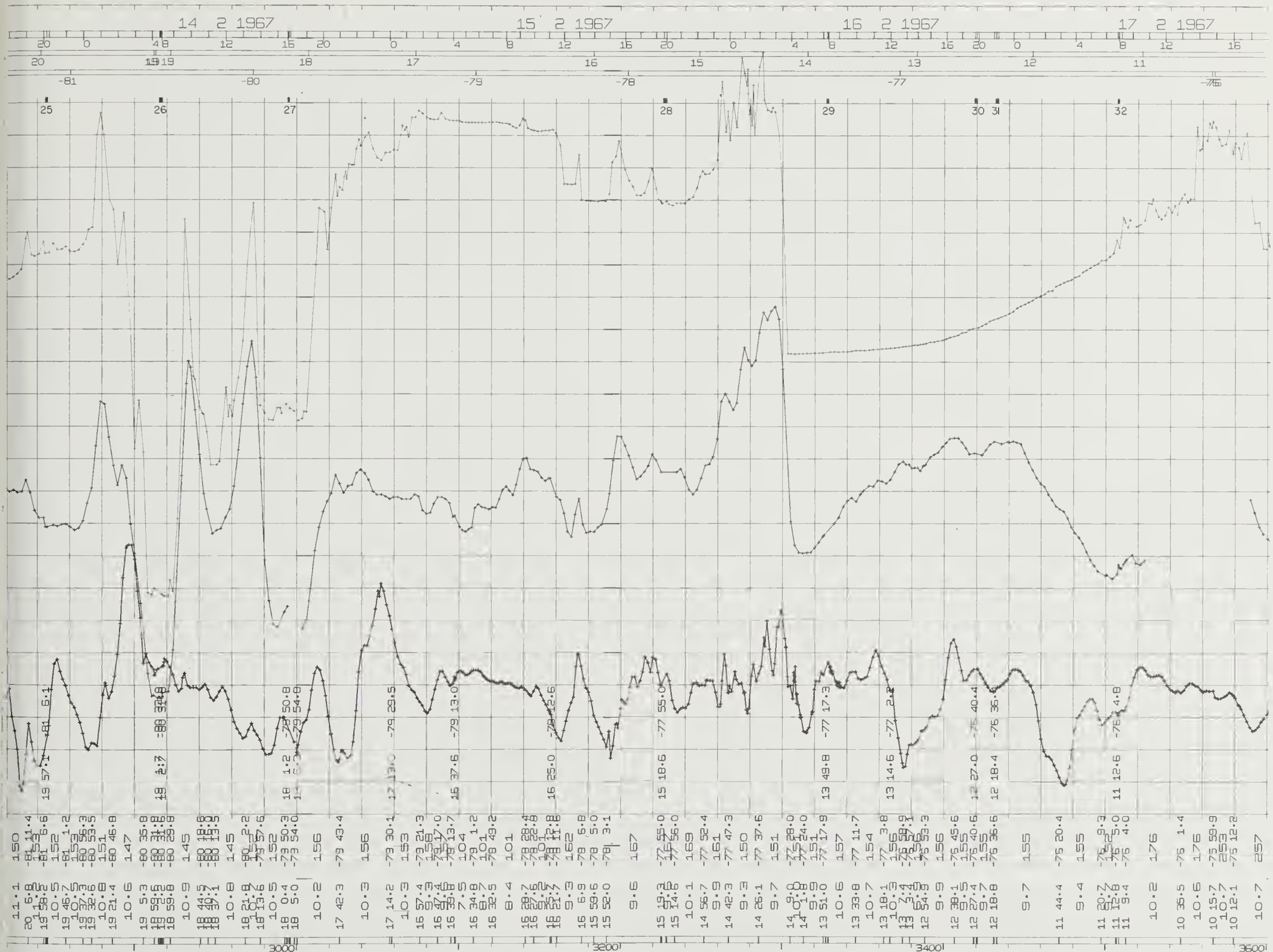

MIAMI
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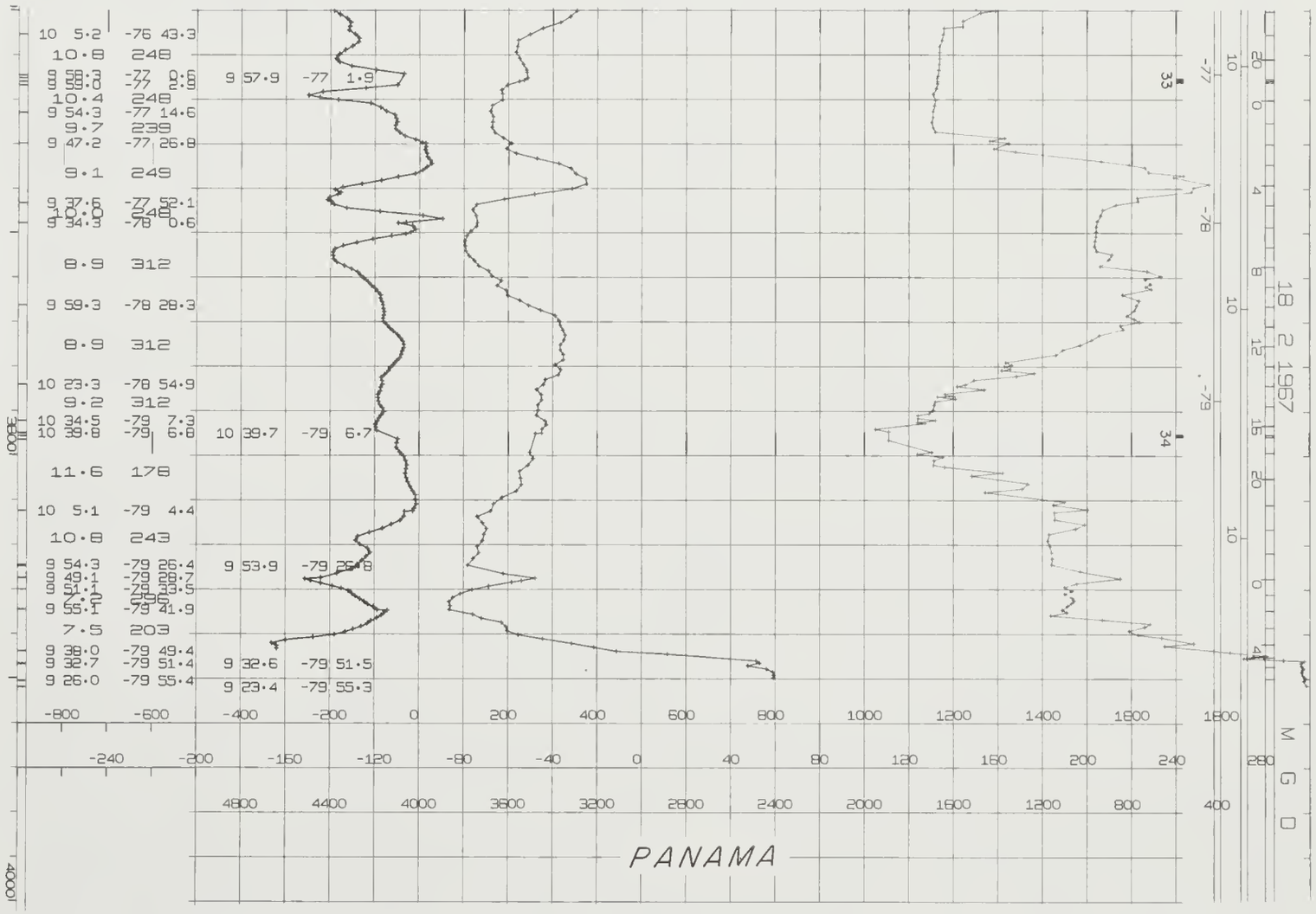
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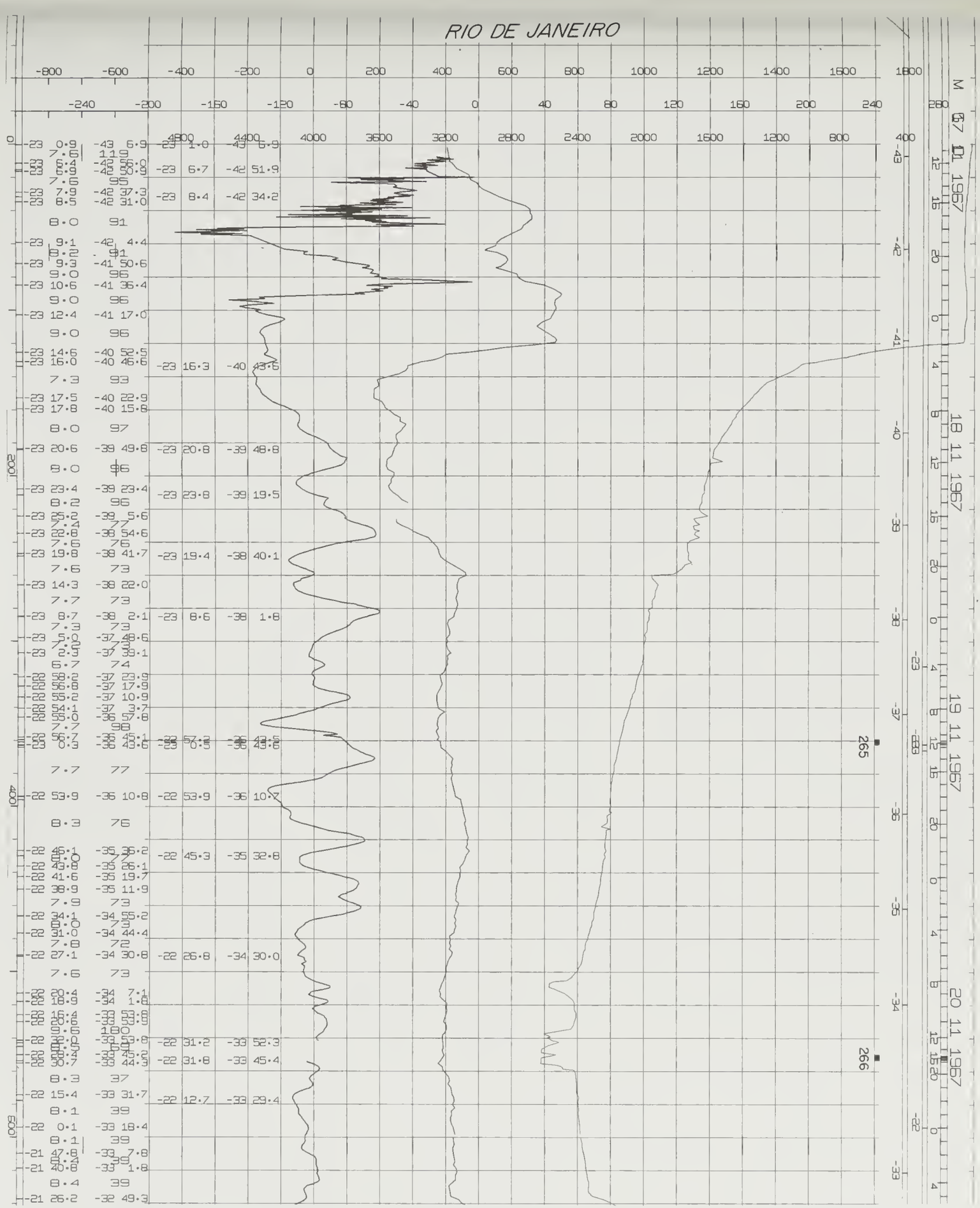
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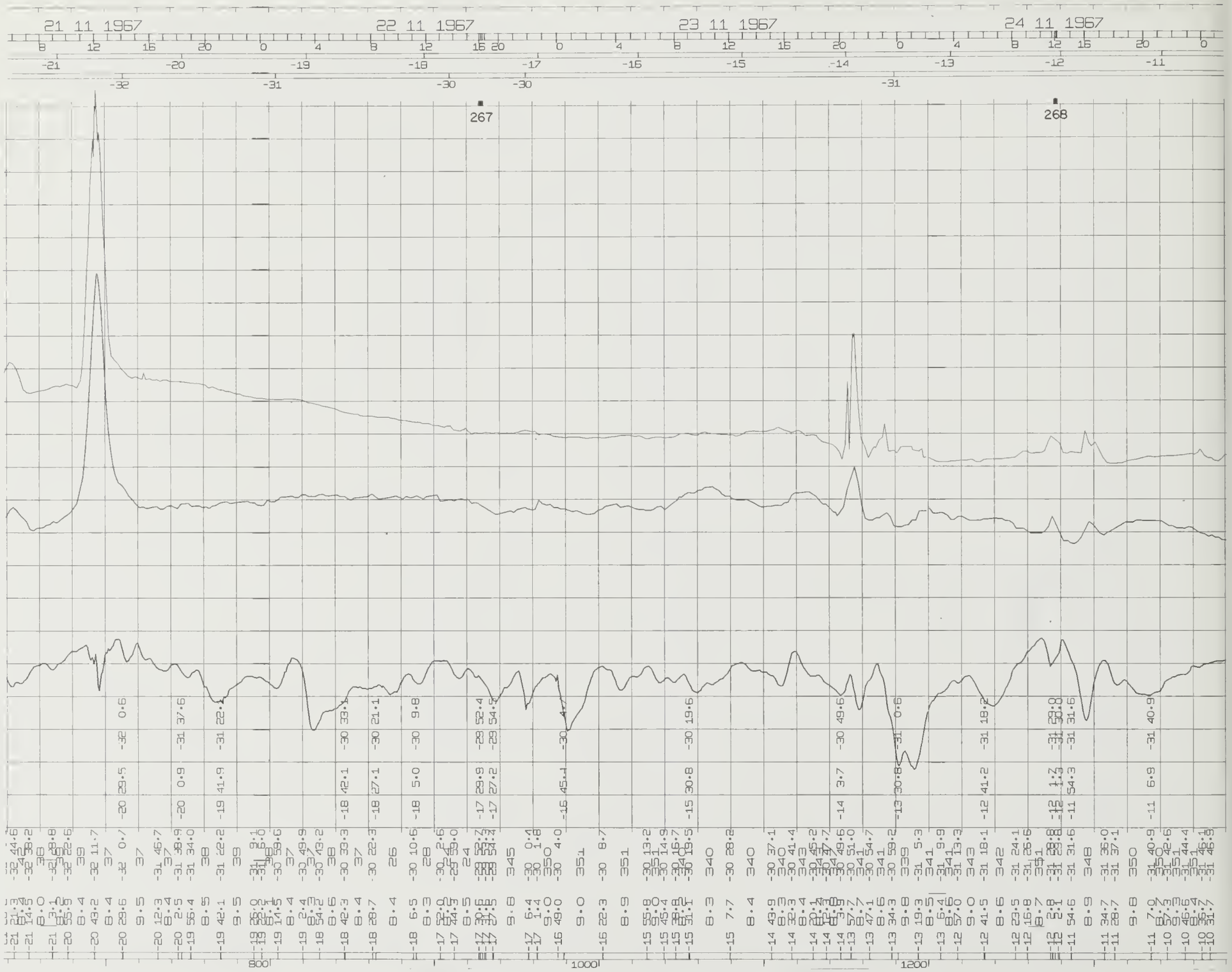
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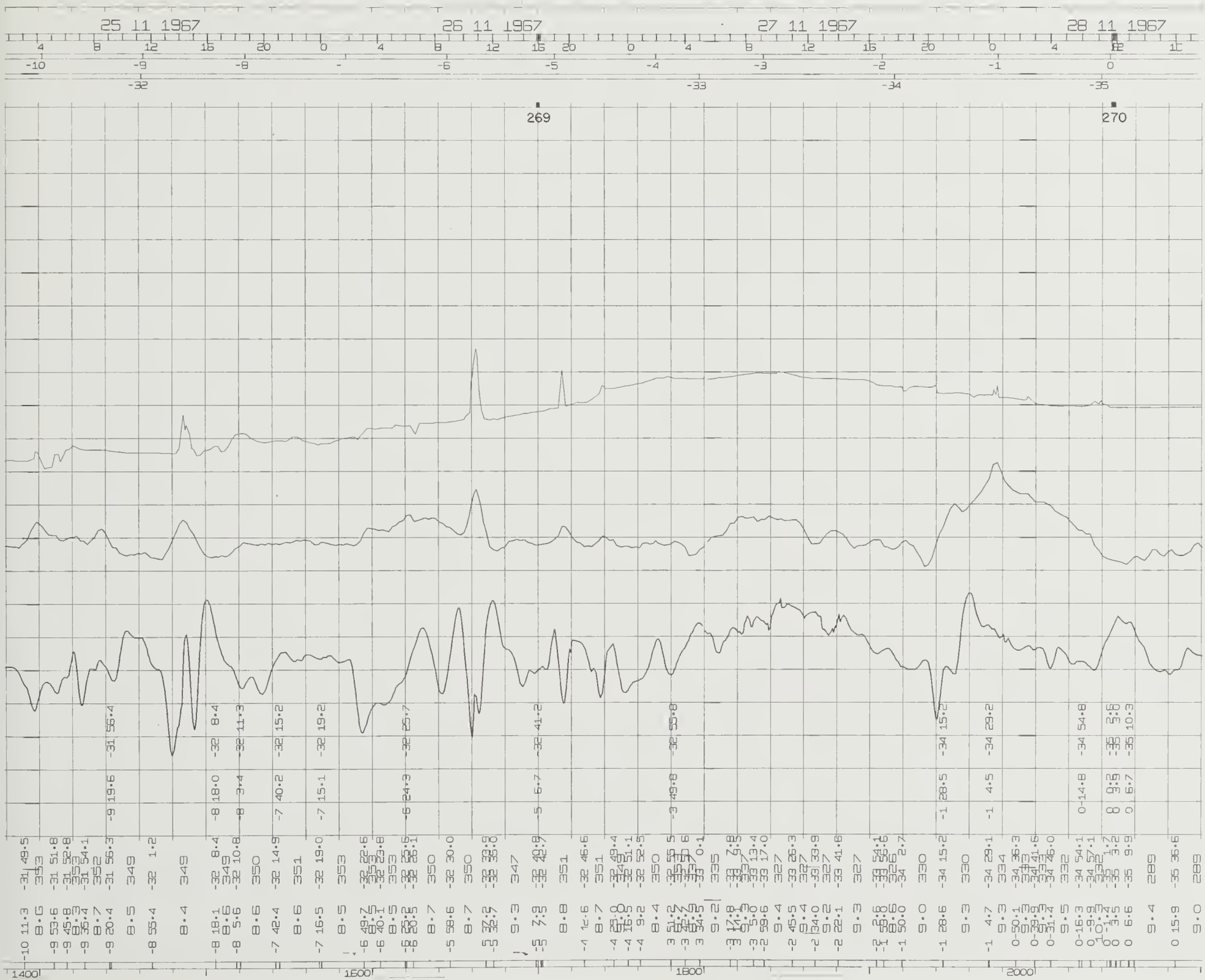

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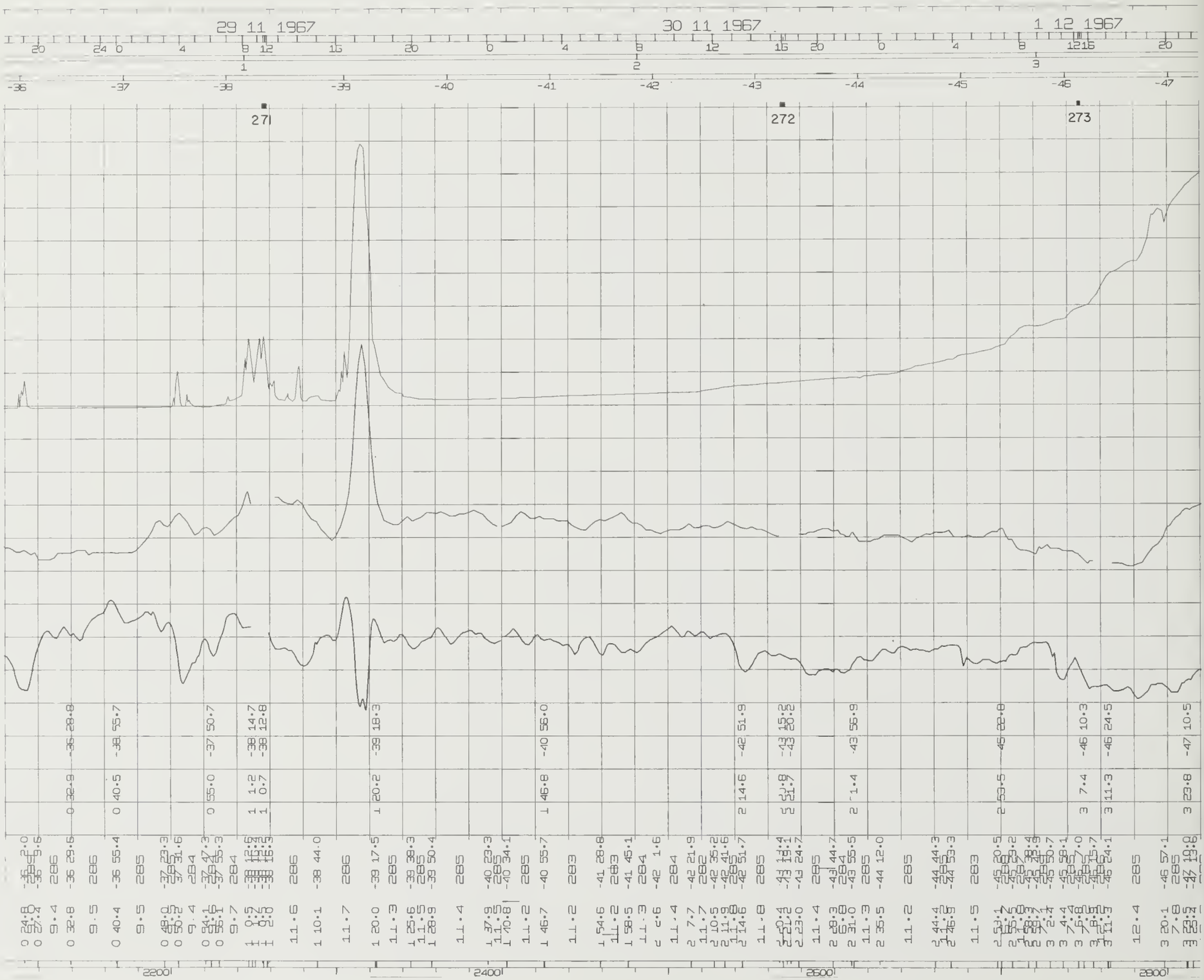

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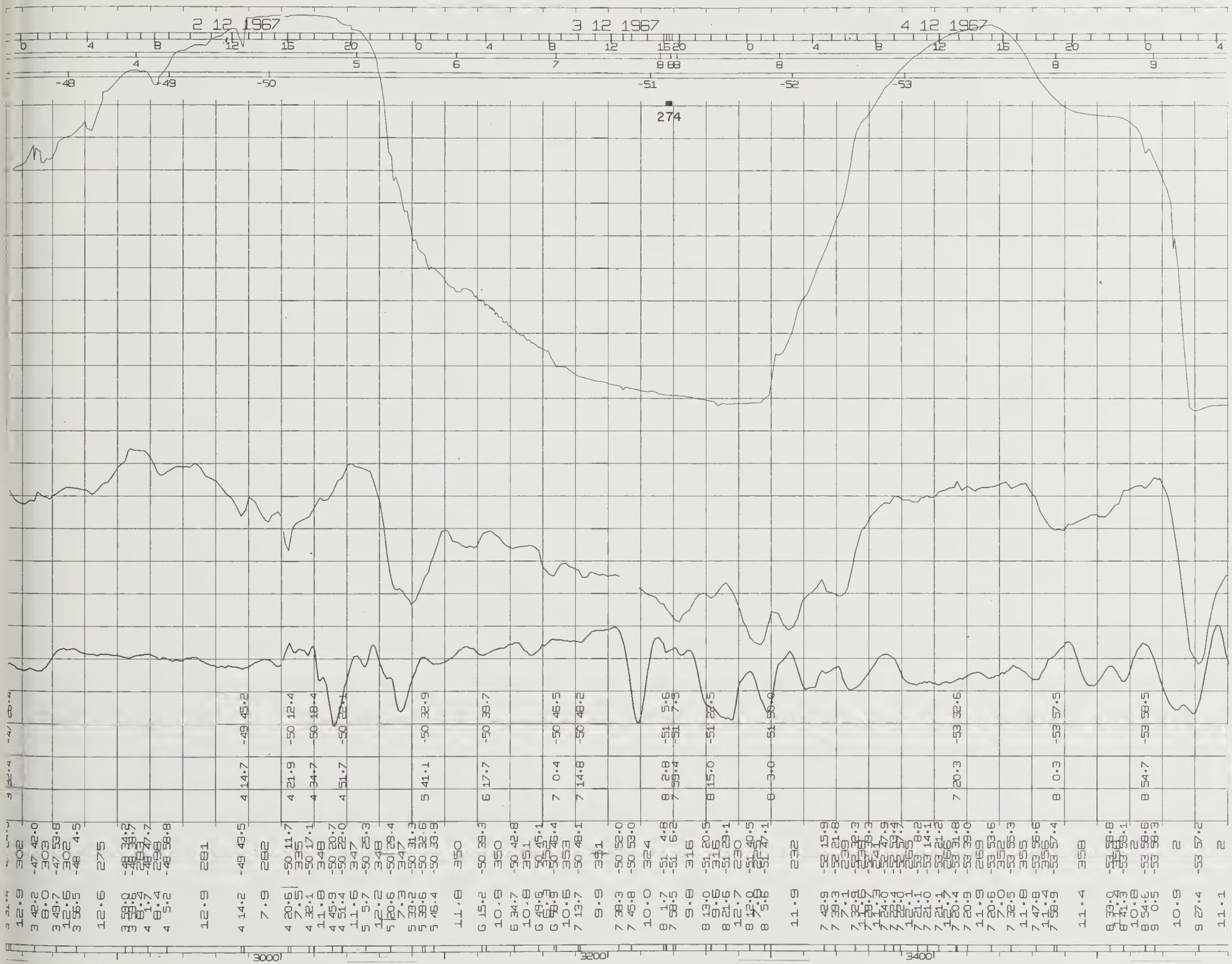

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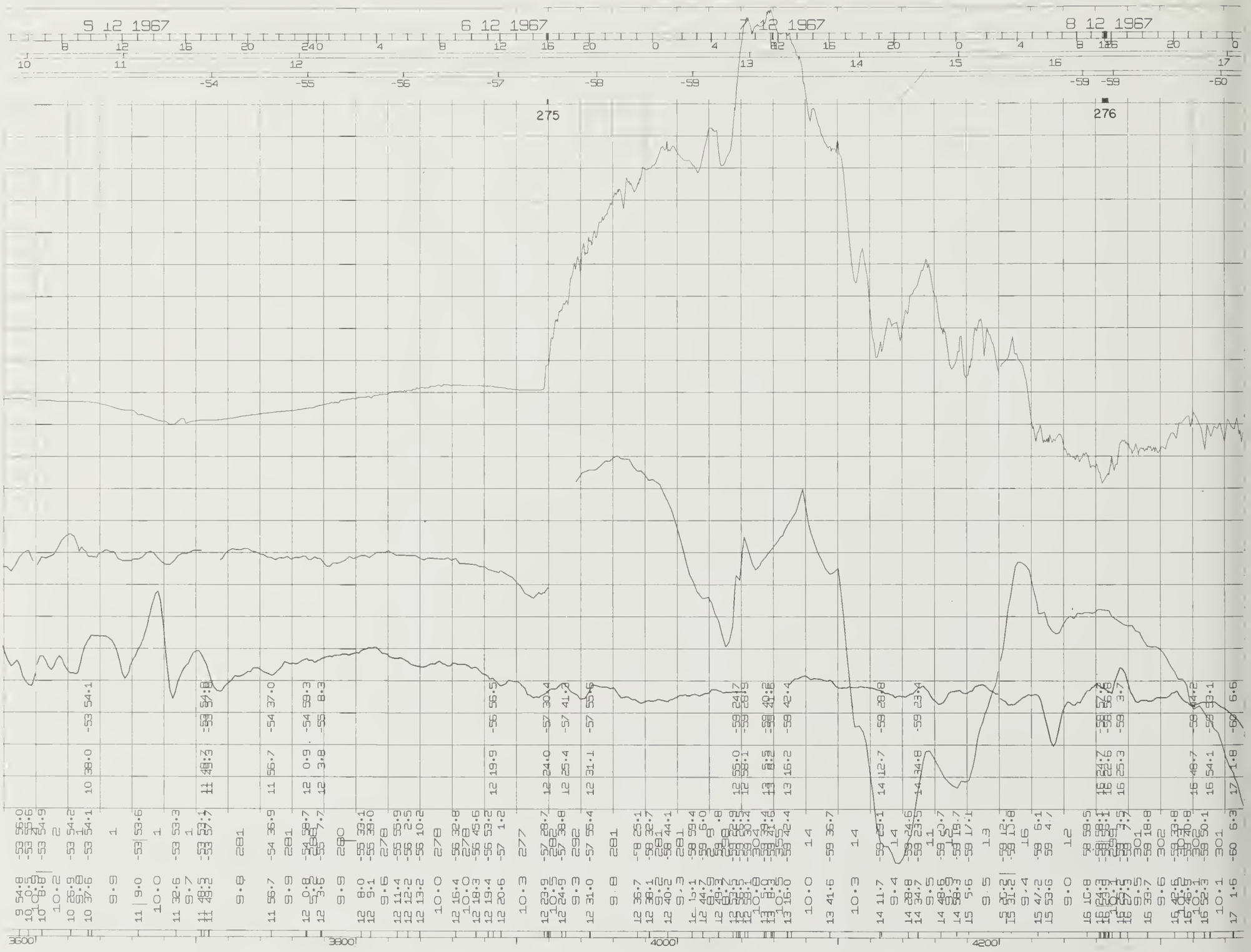

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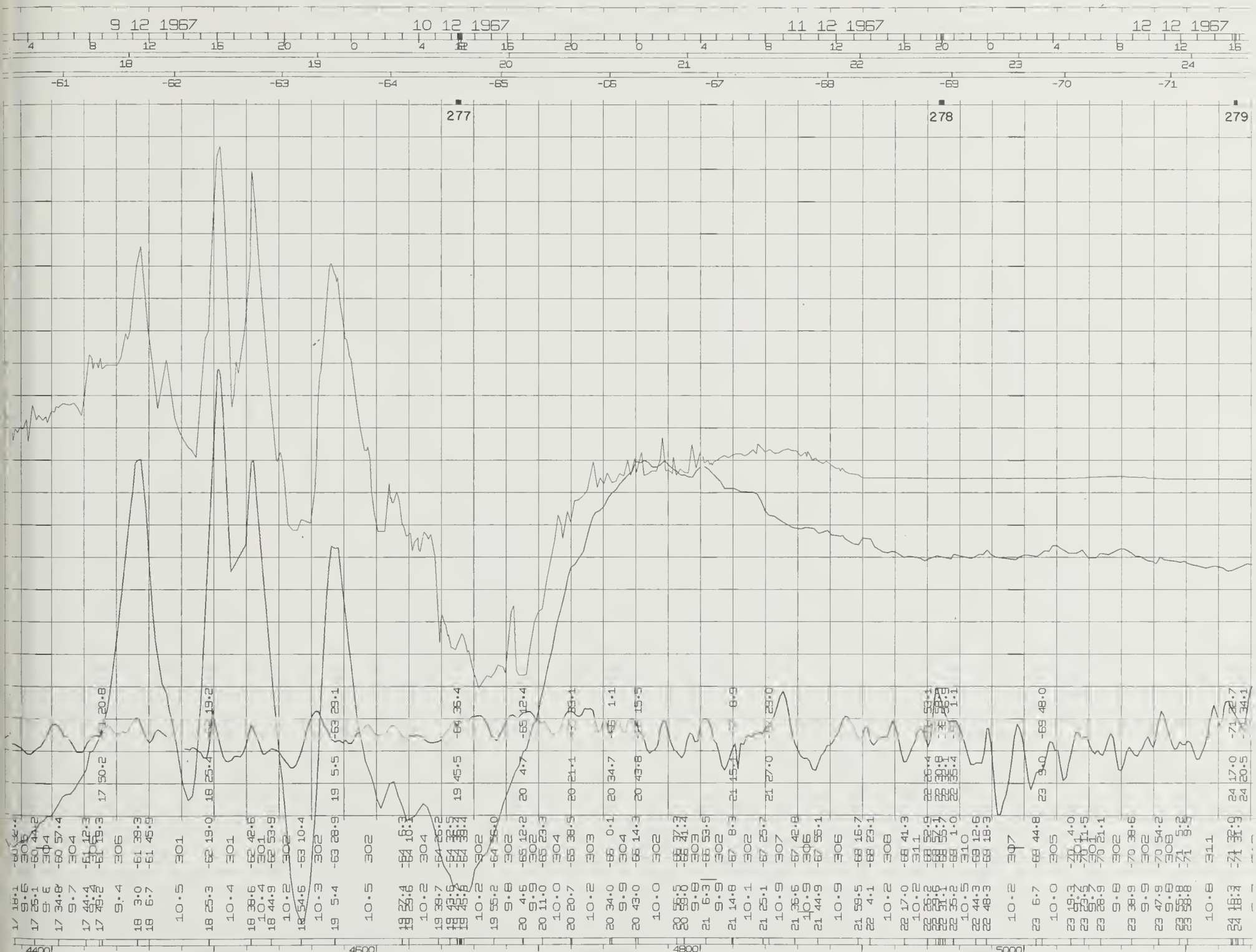

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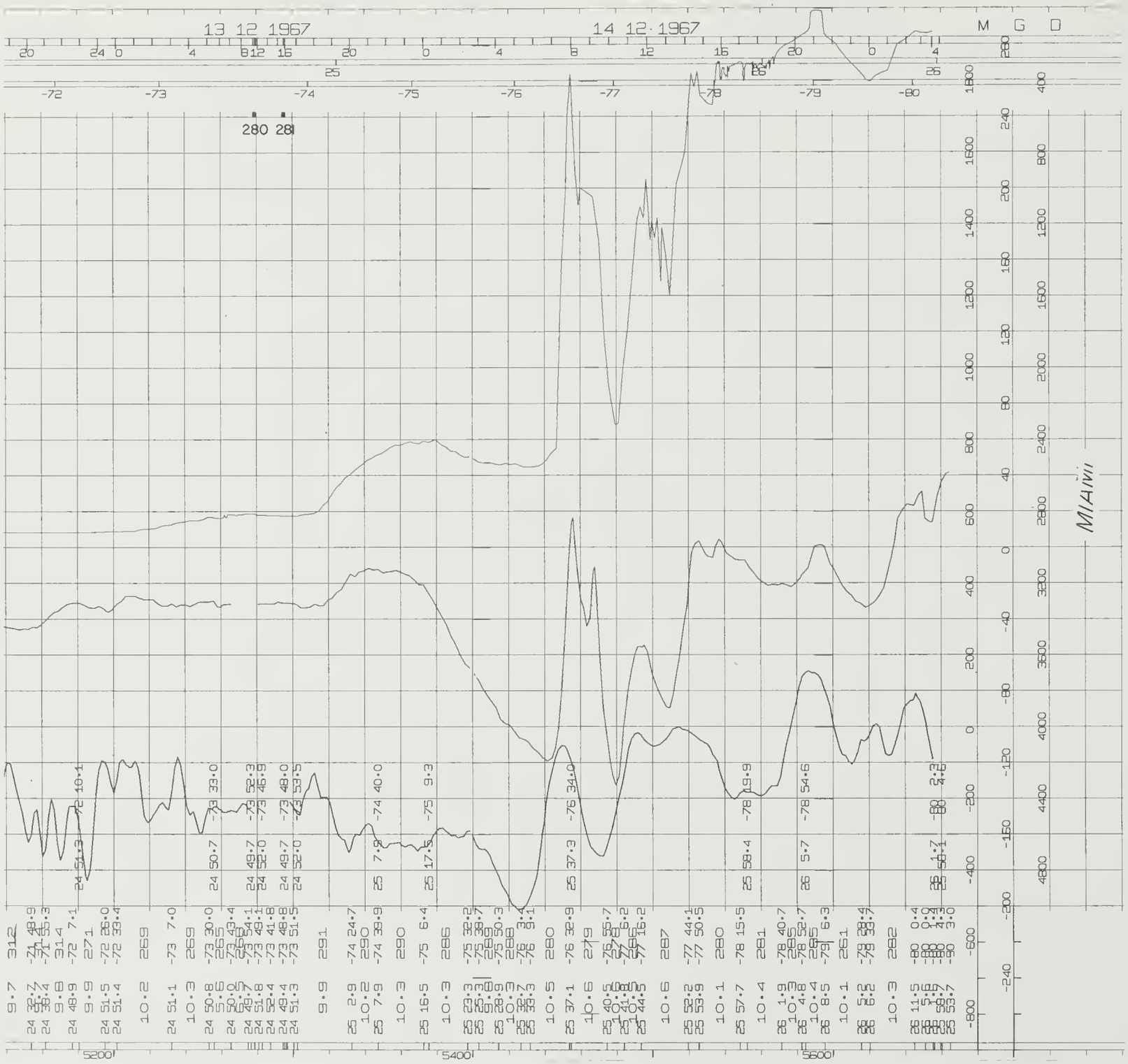

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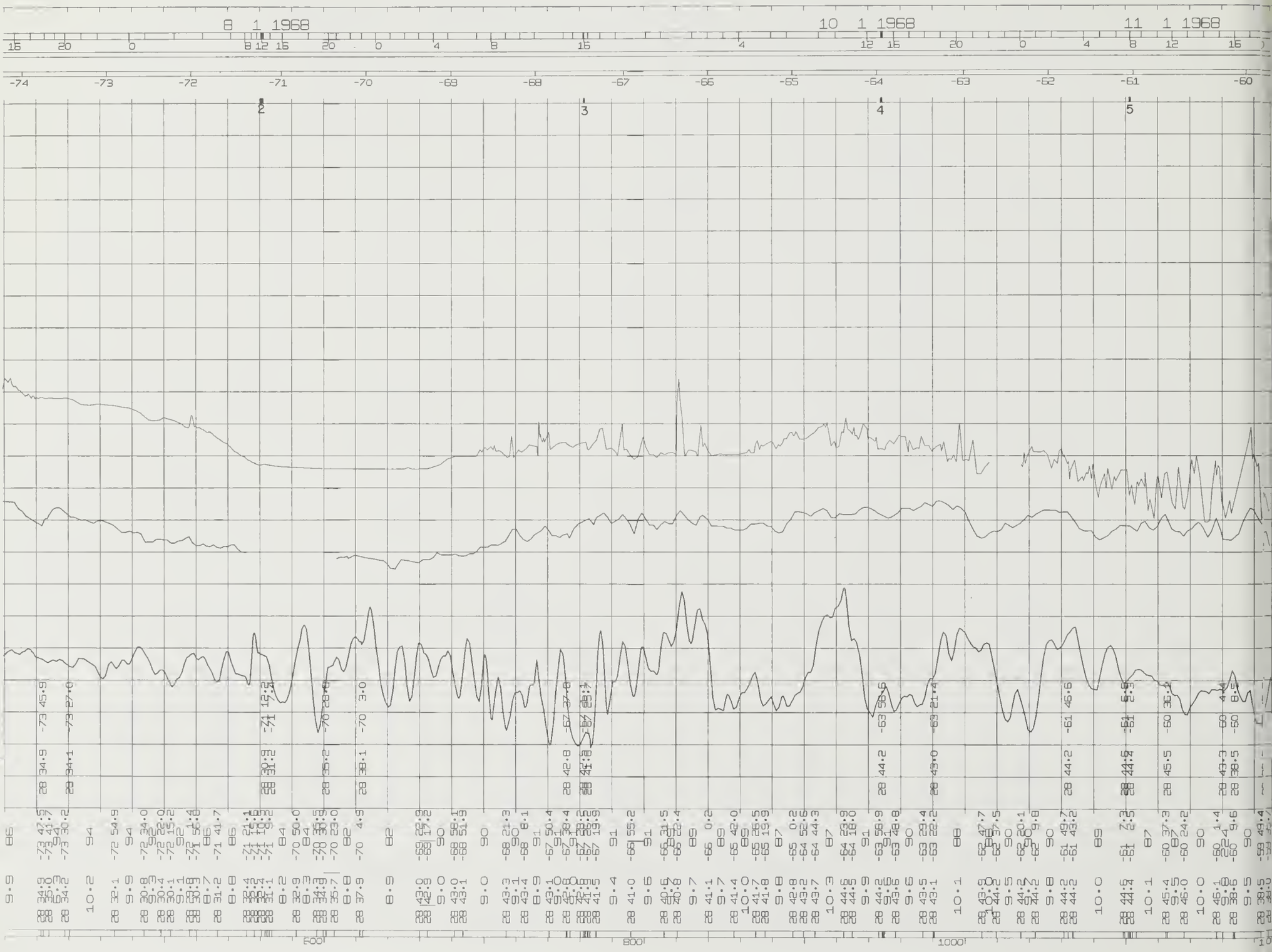

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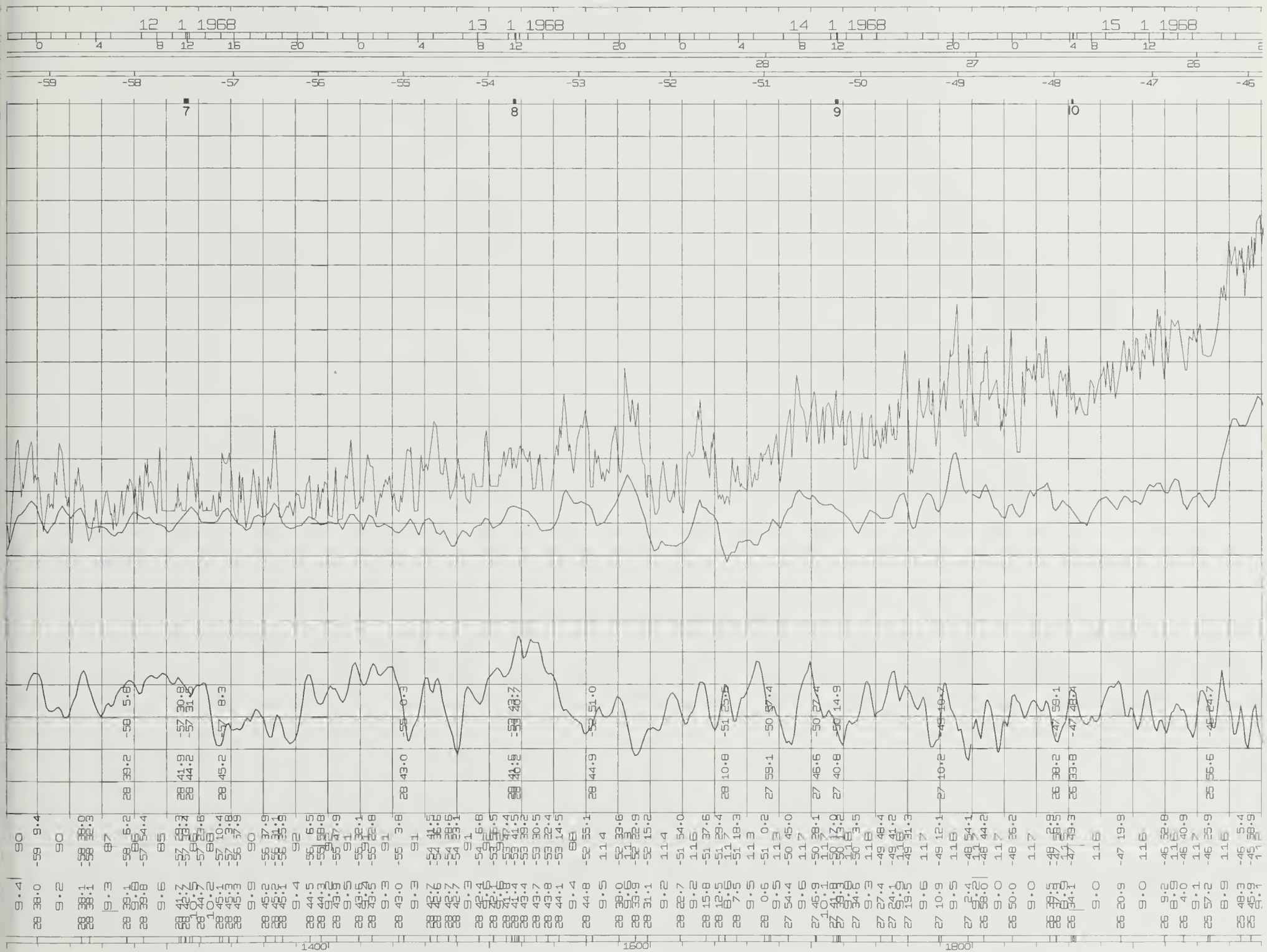

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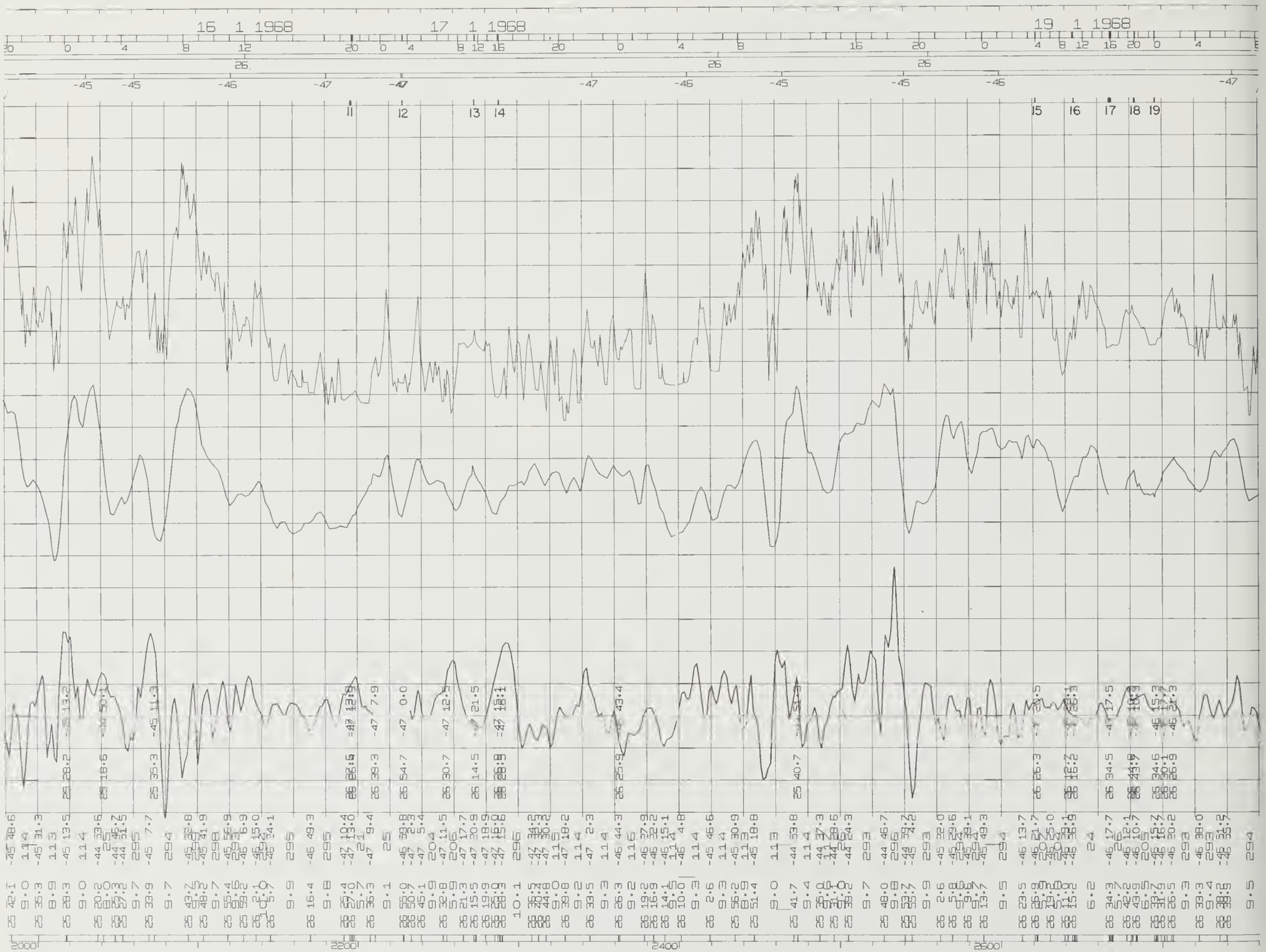

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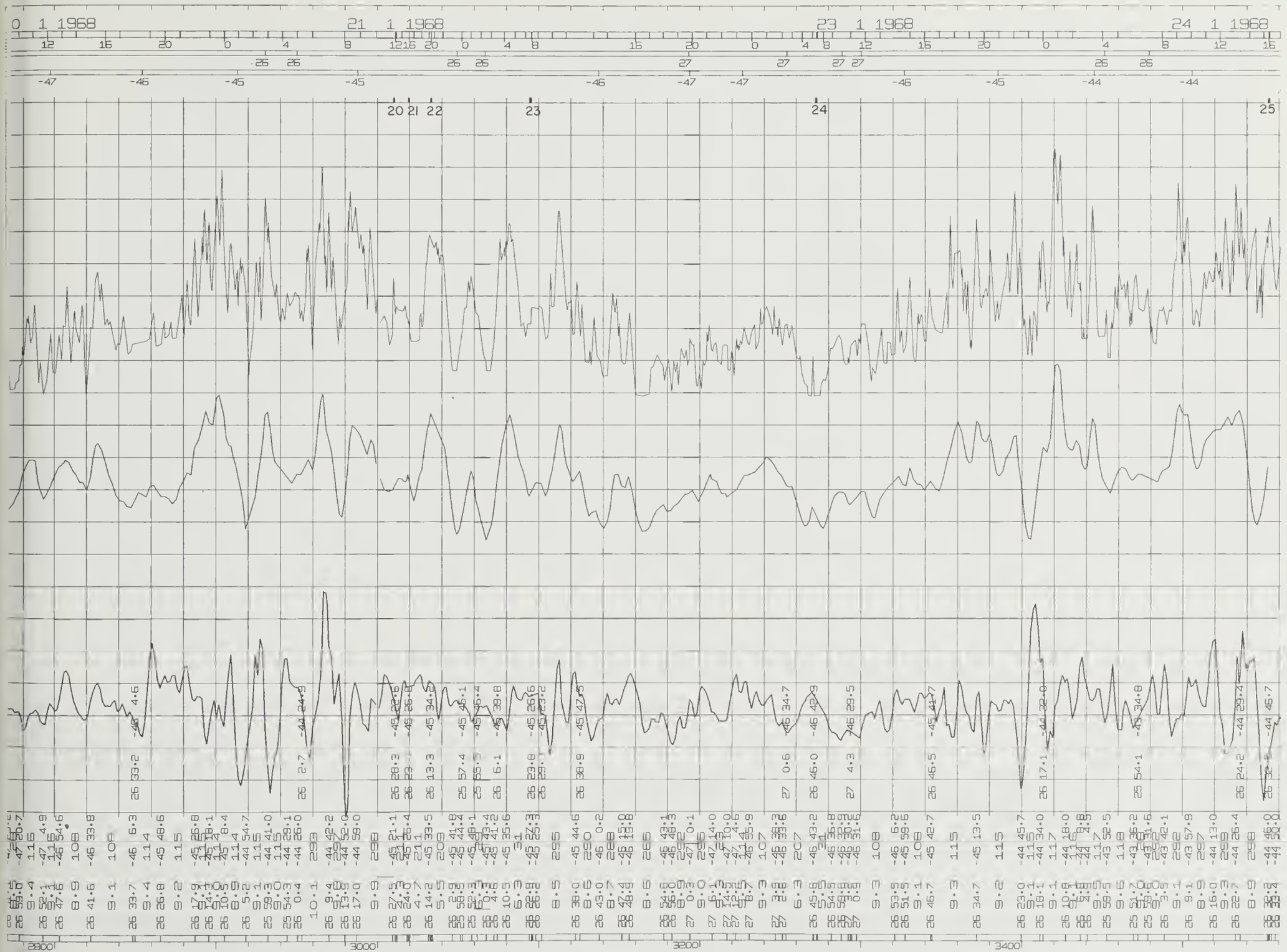

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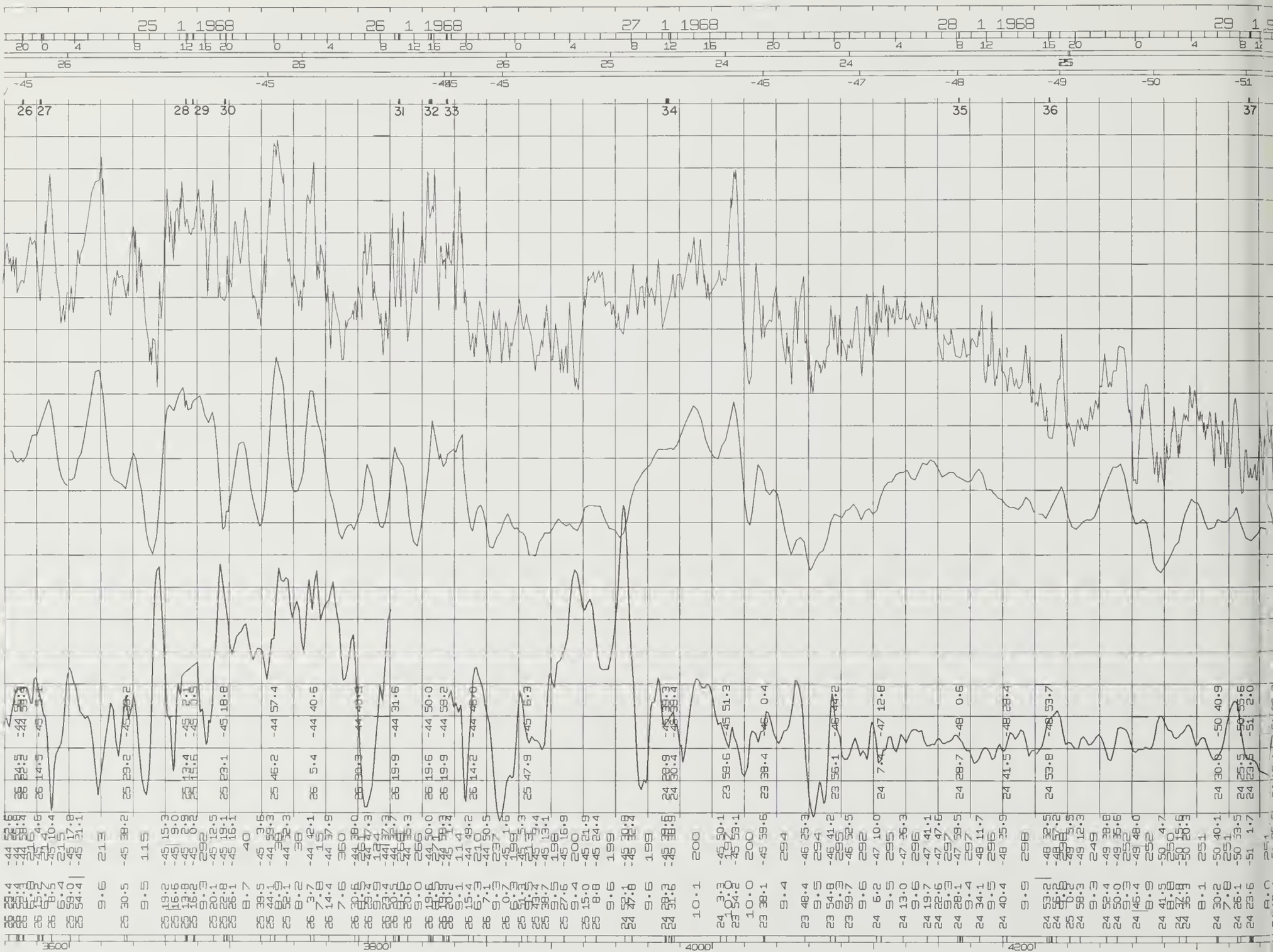
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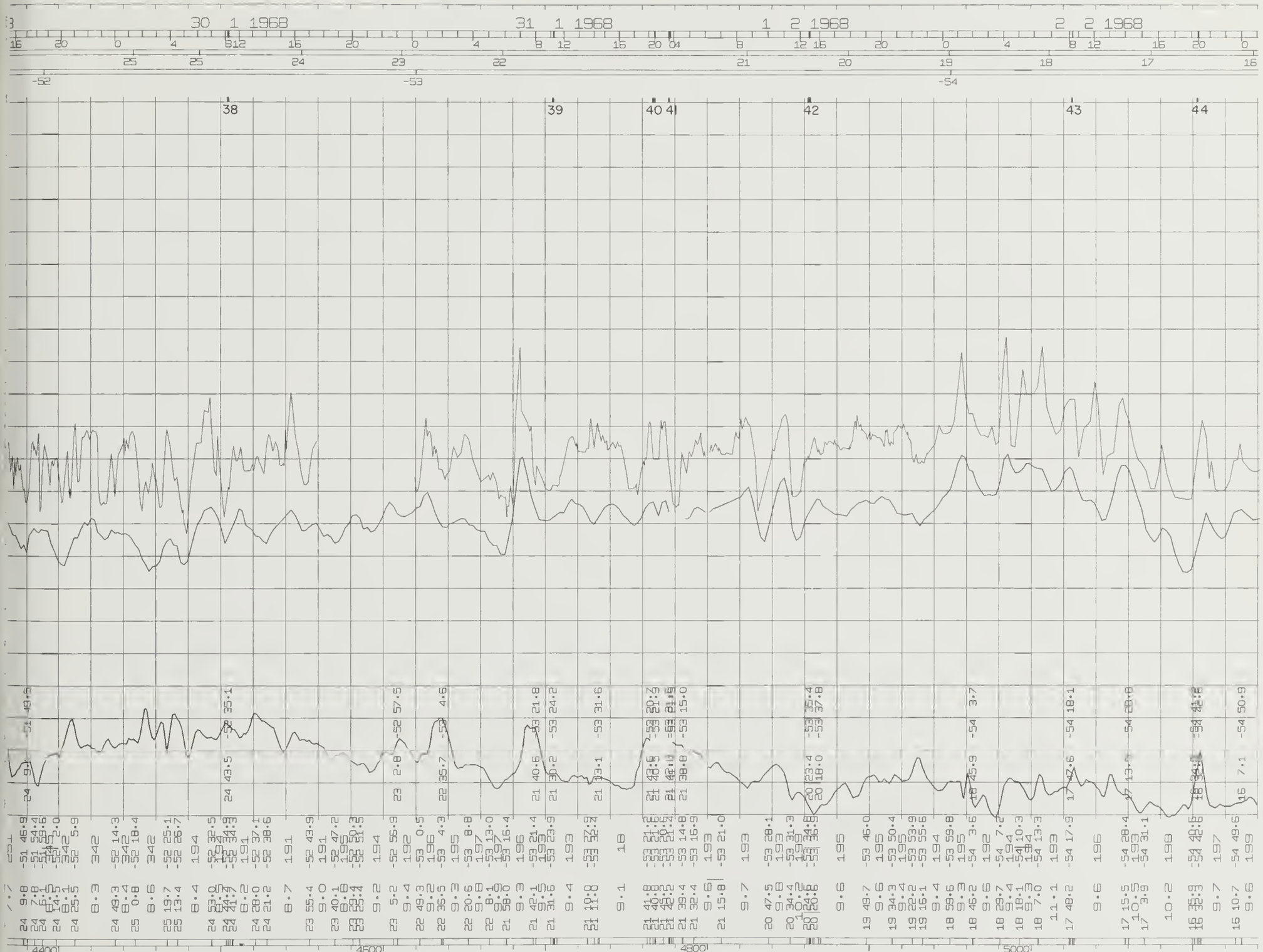

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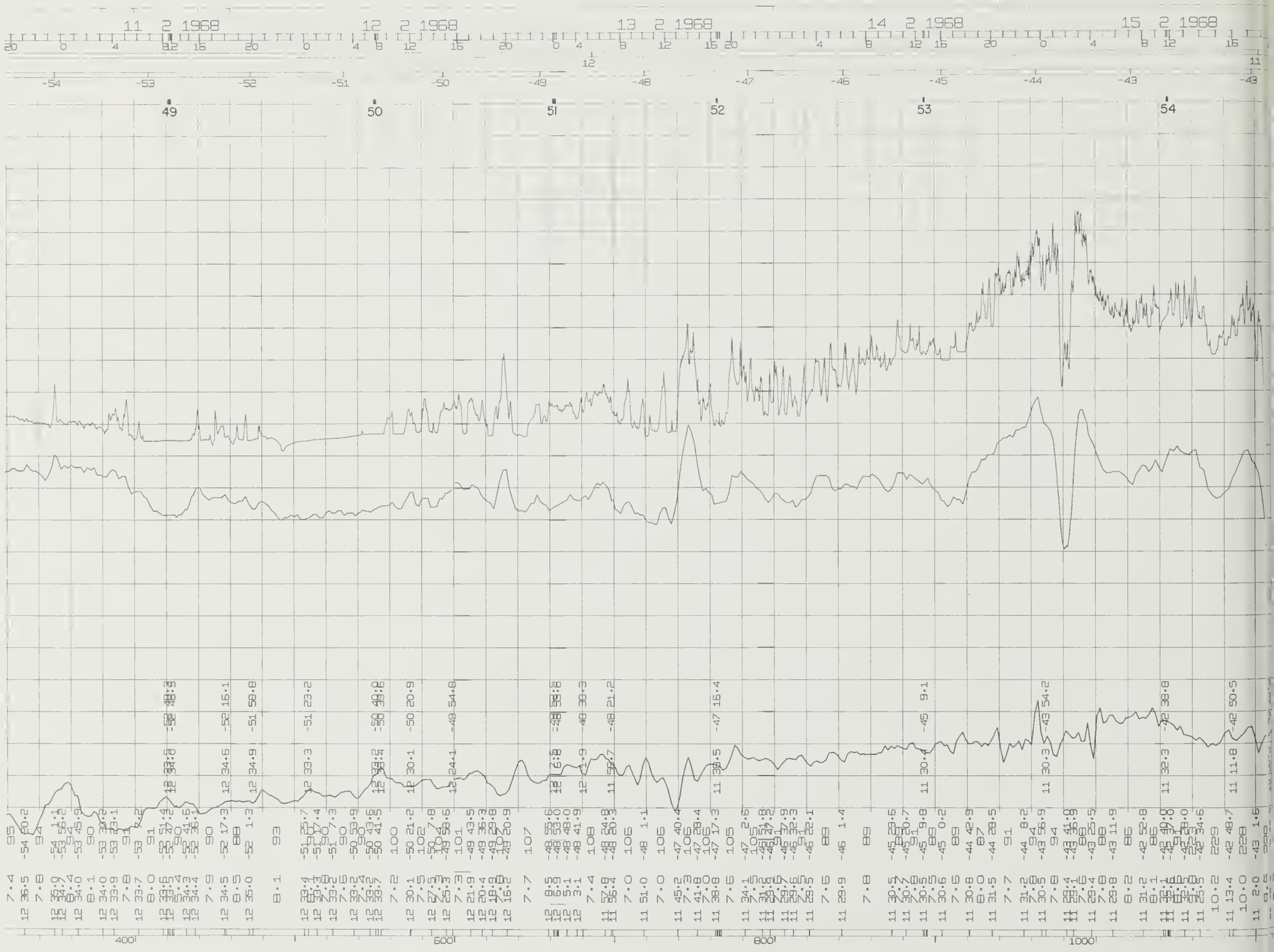

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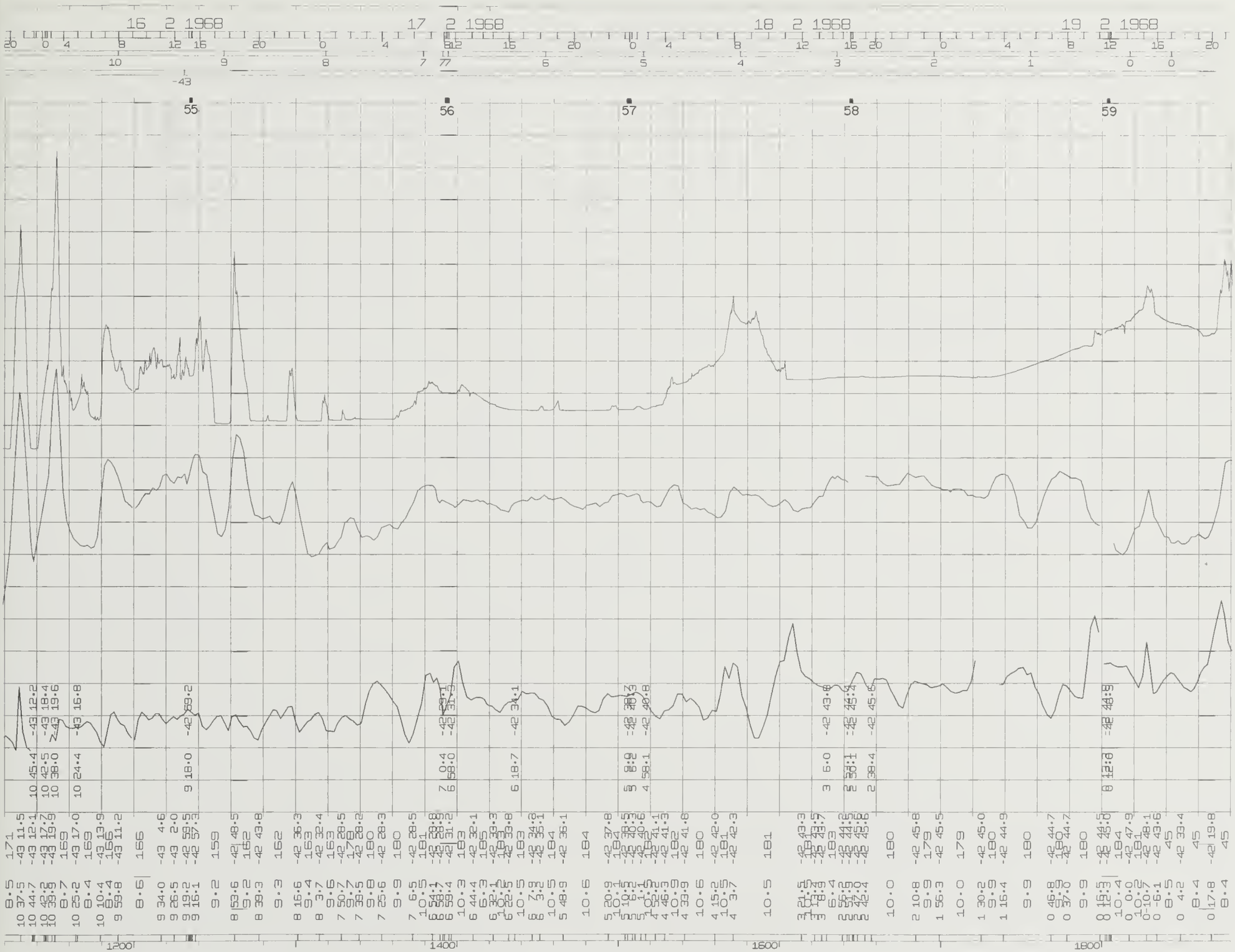

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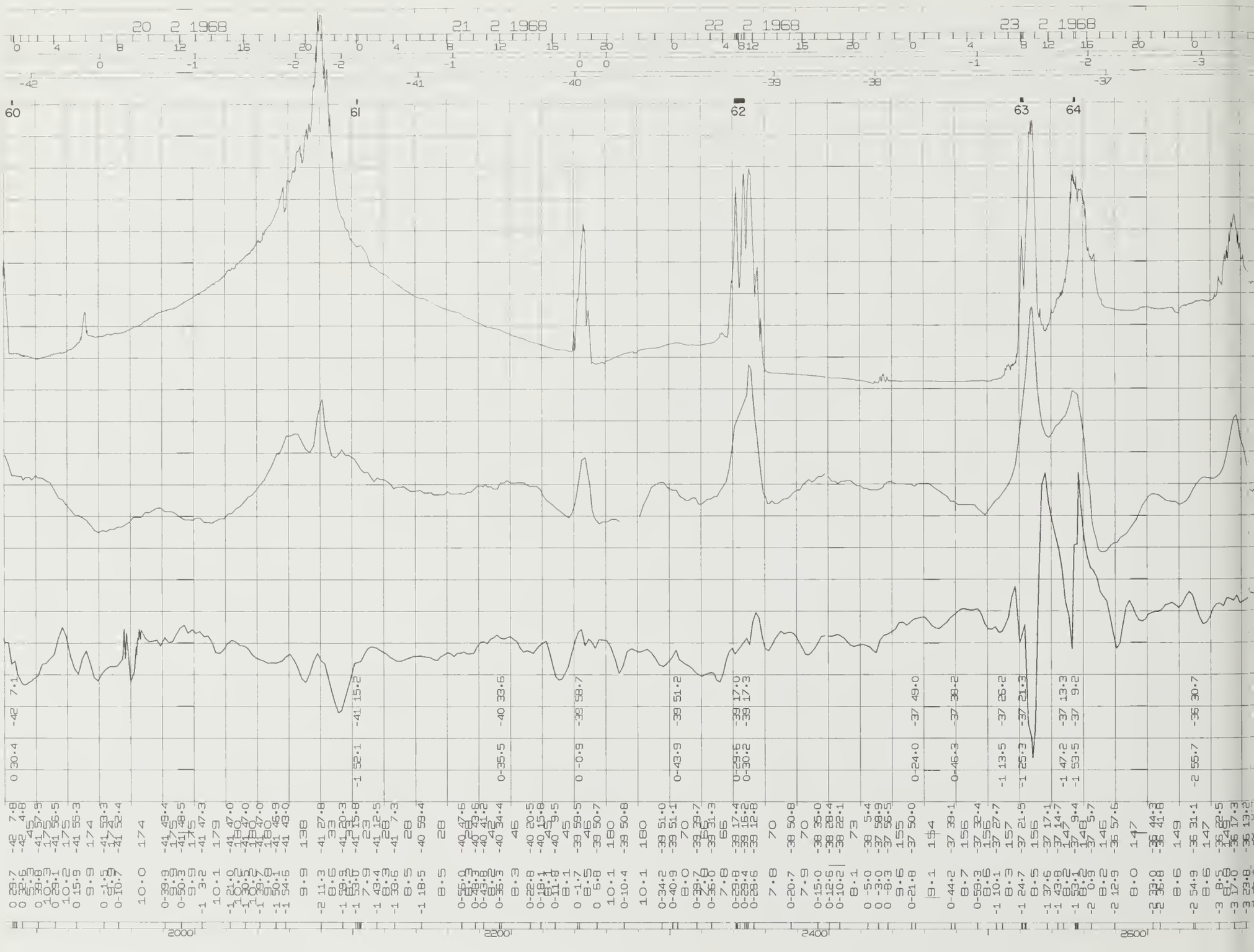

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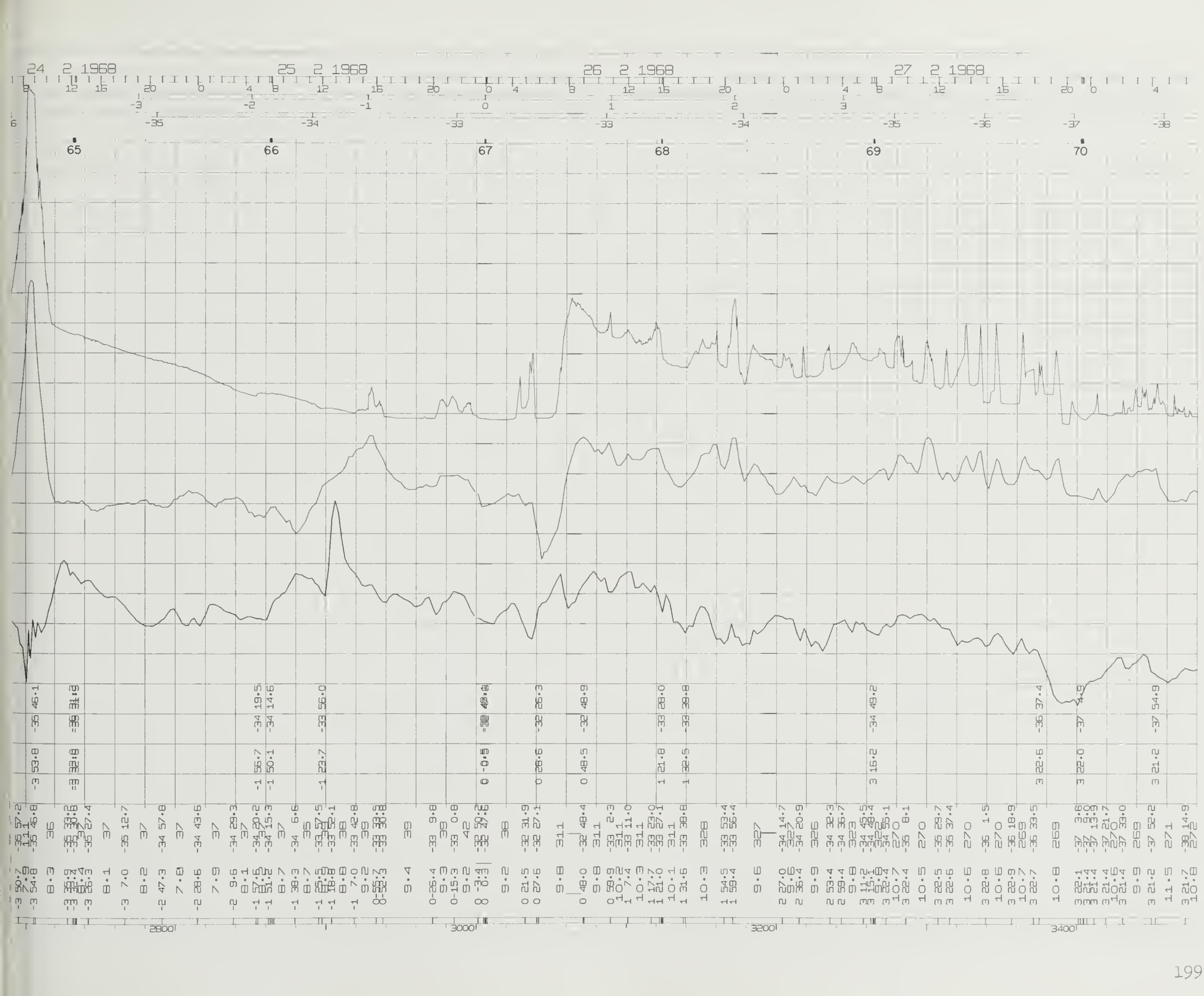
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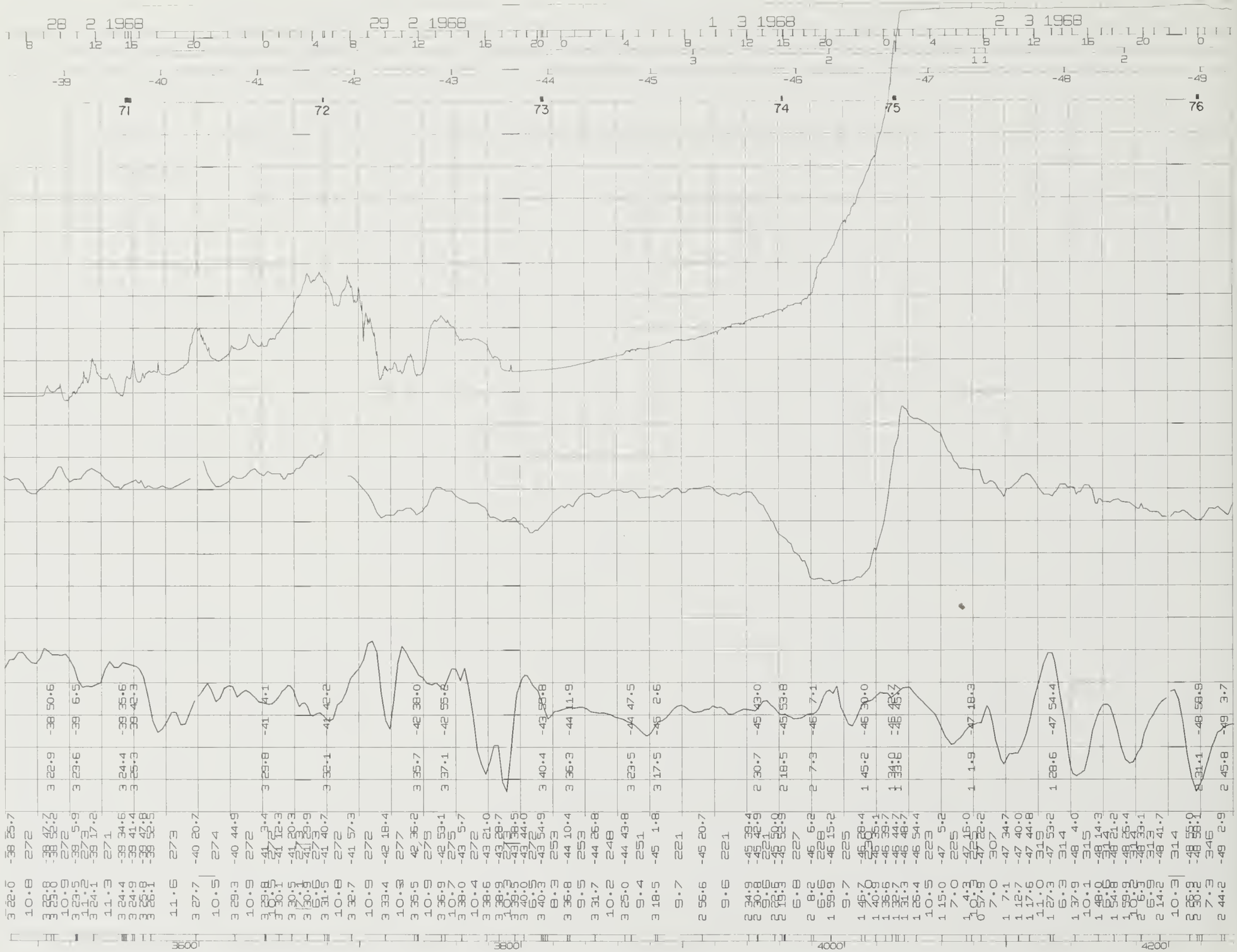
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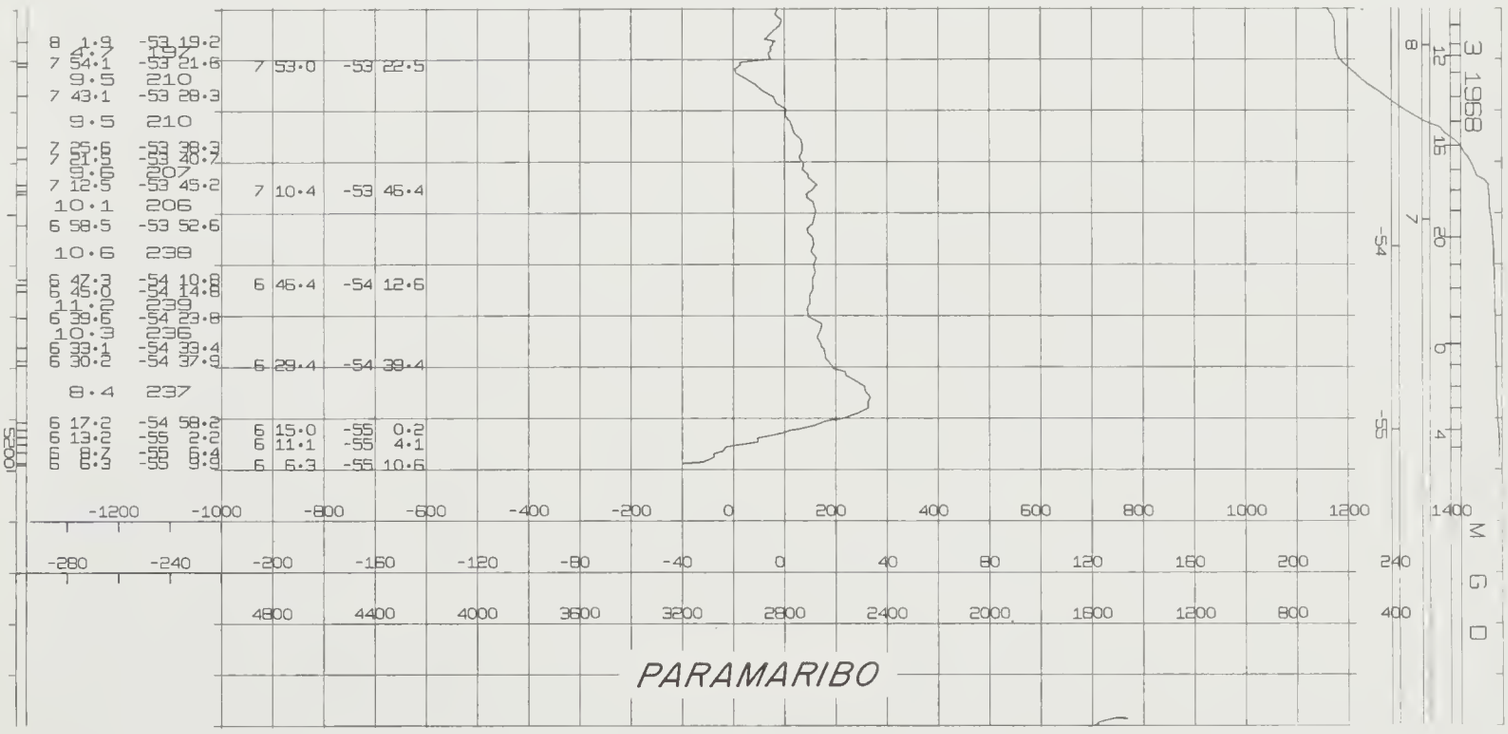

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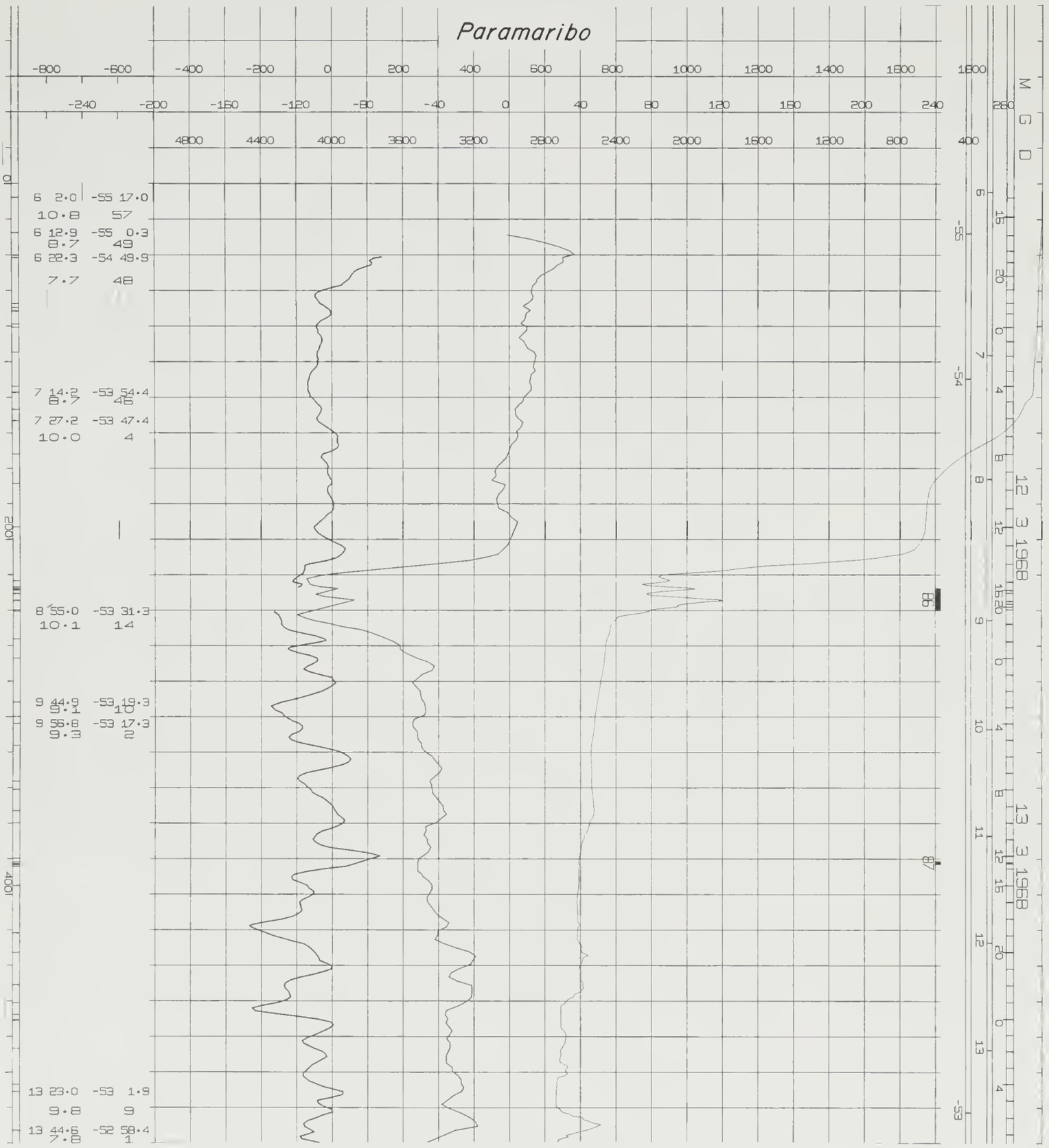

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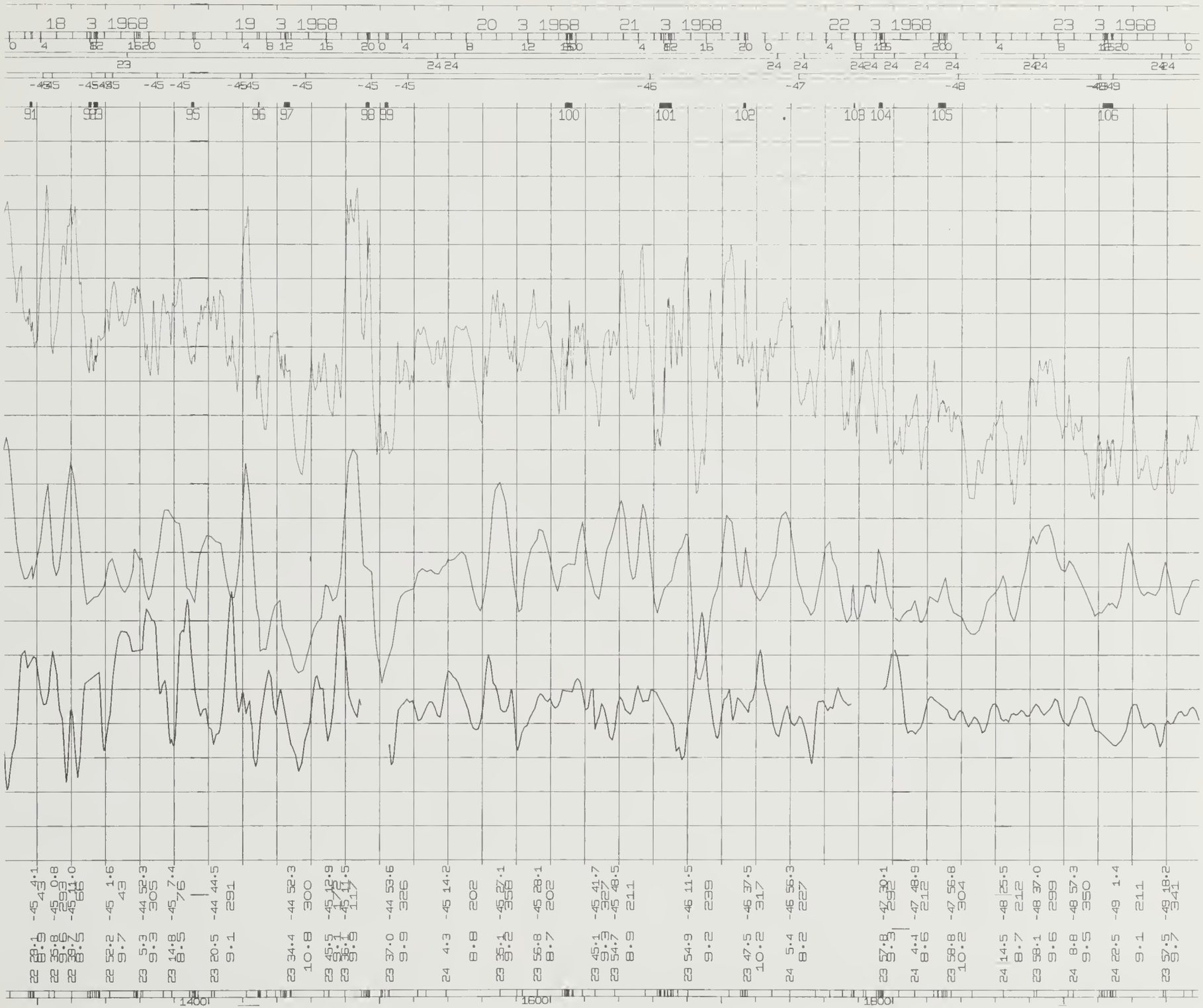

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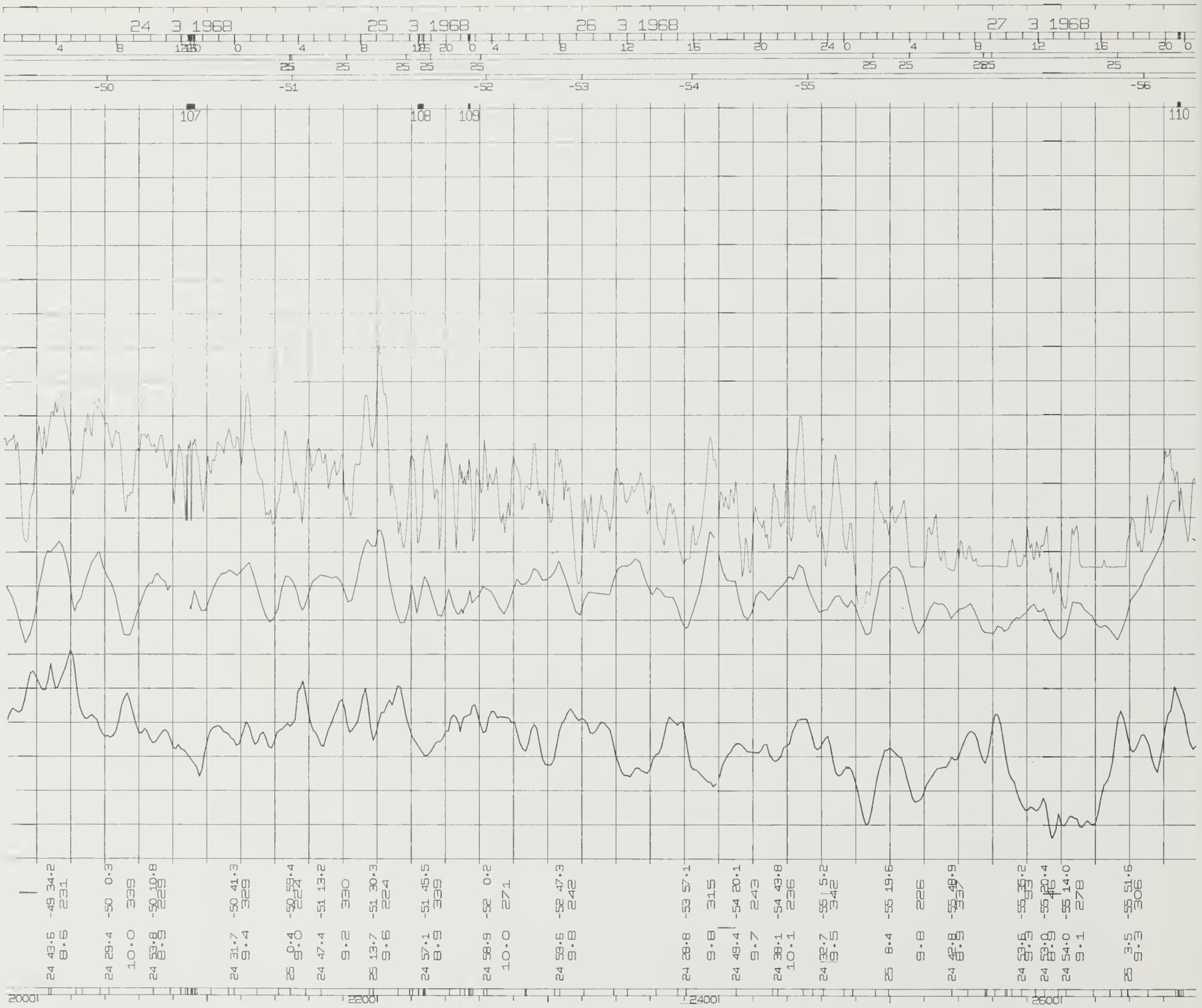
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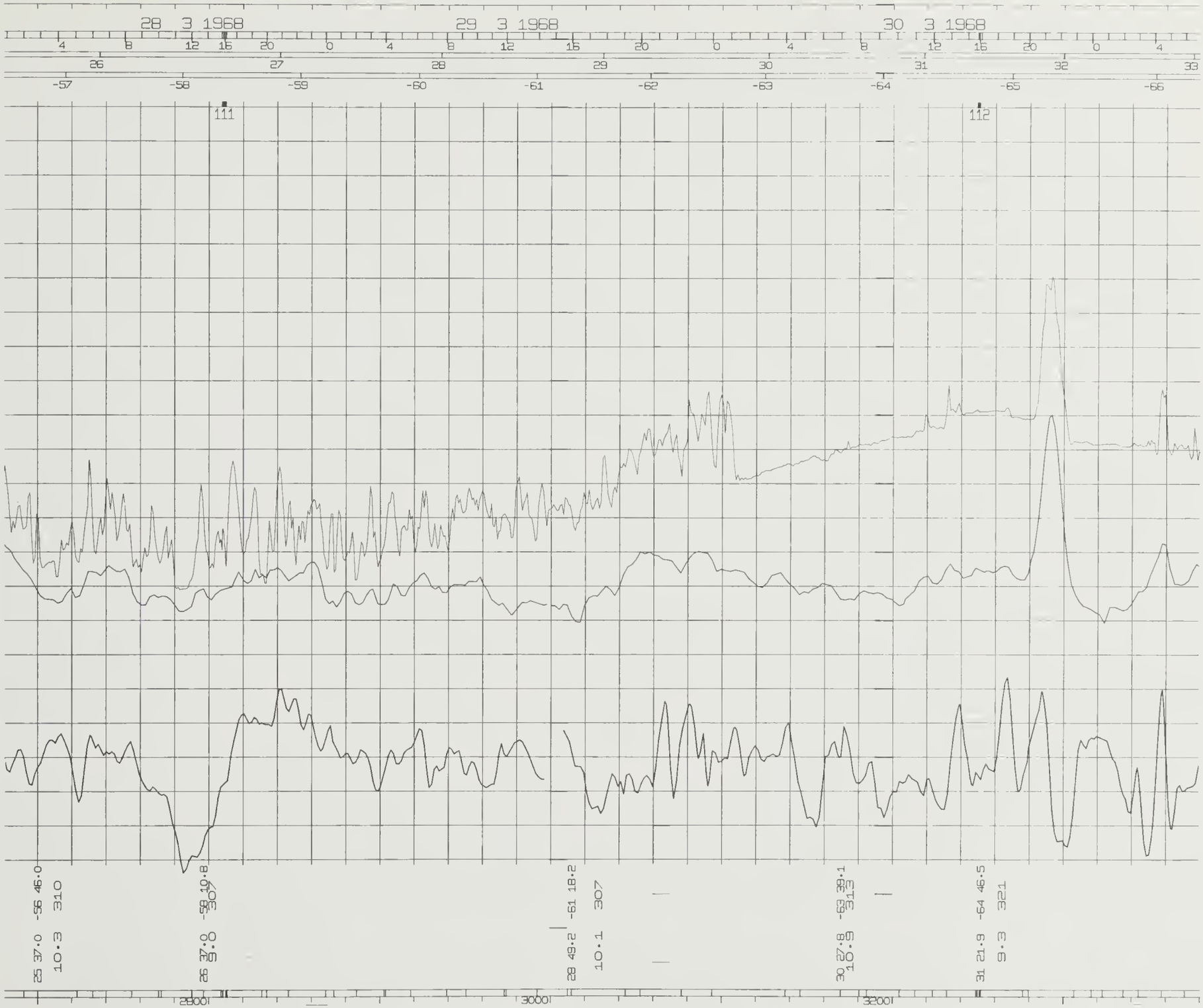

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6 47.3 -54 10.8
6 45.0 -54 14.8
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6 39.6 -54 23.8
10.3 236
6 33.1 -54 33.4
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6 6.3 -55 9.5
7 53.0 -53 22.5
7 10.4 -53 46.4
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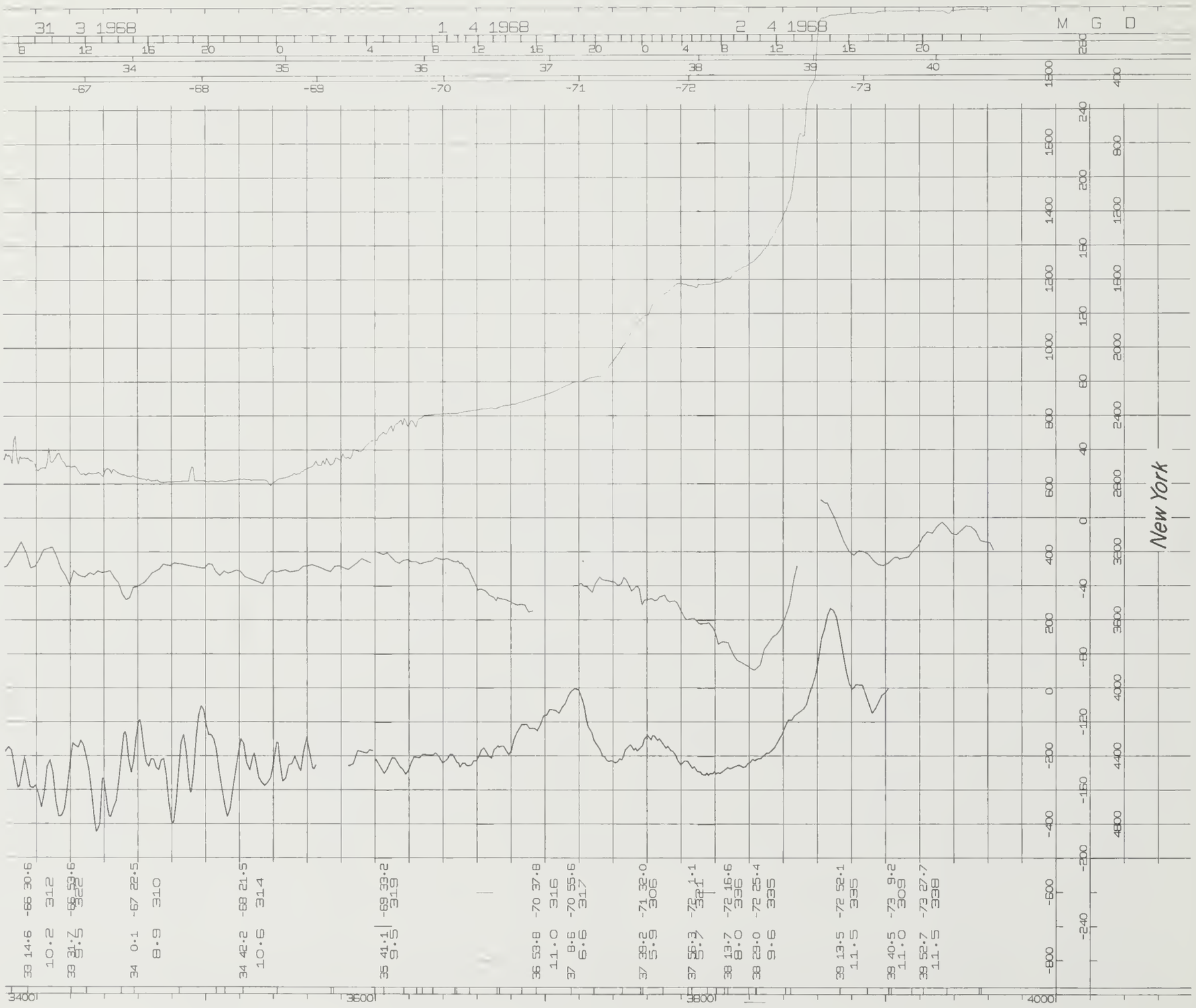

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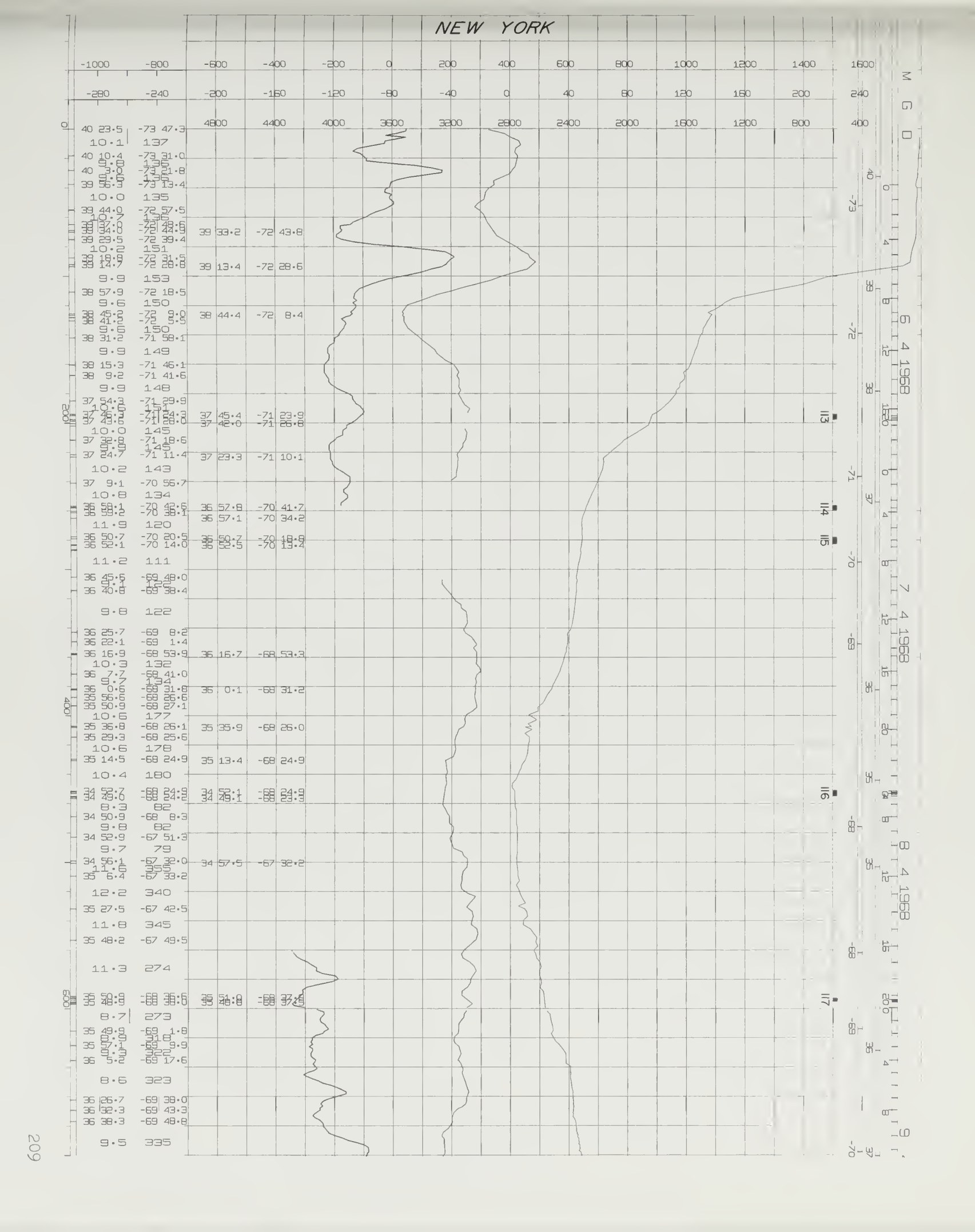

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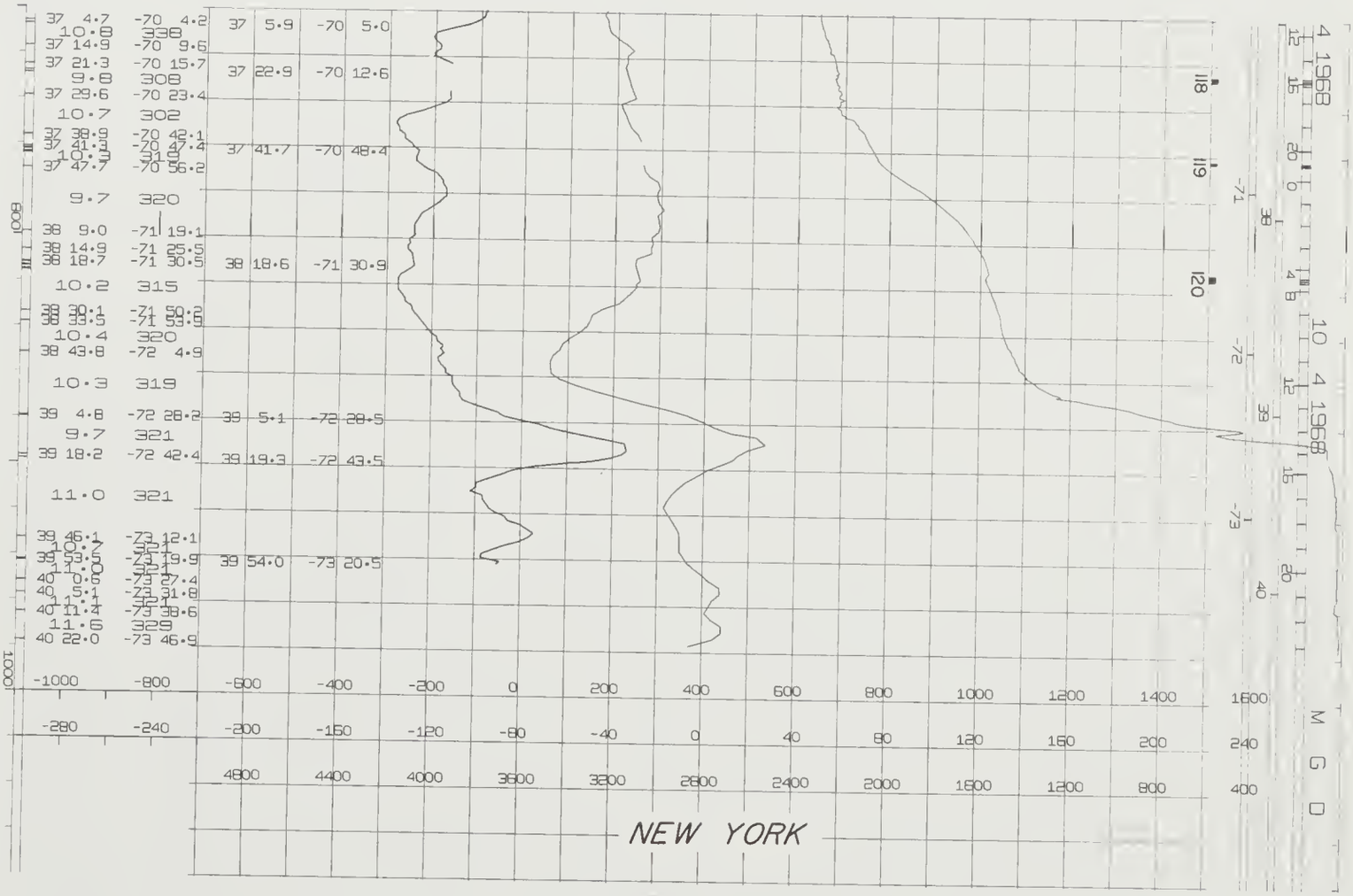

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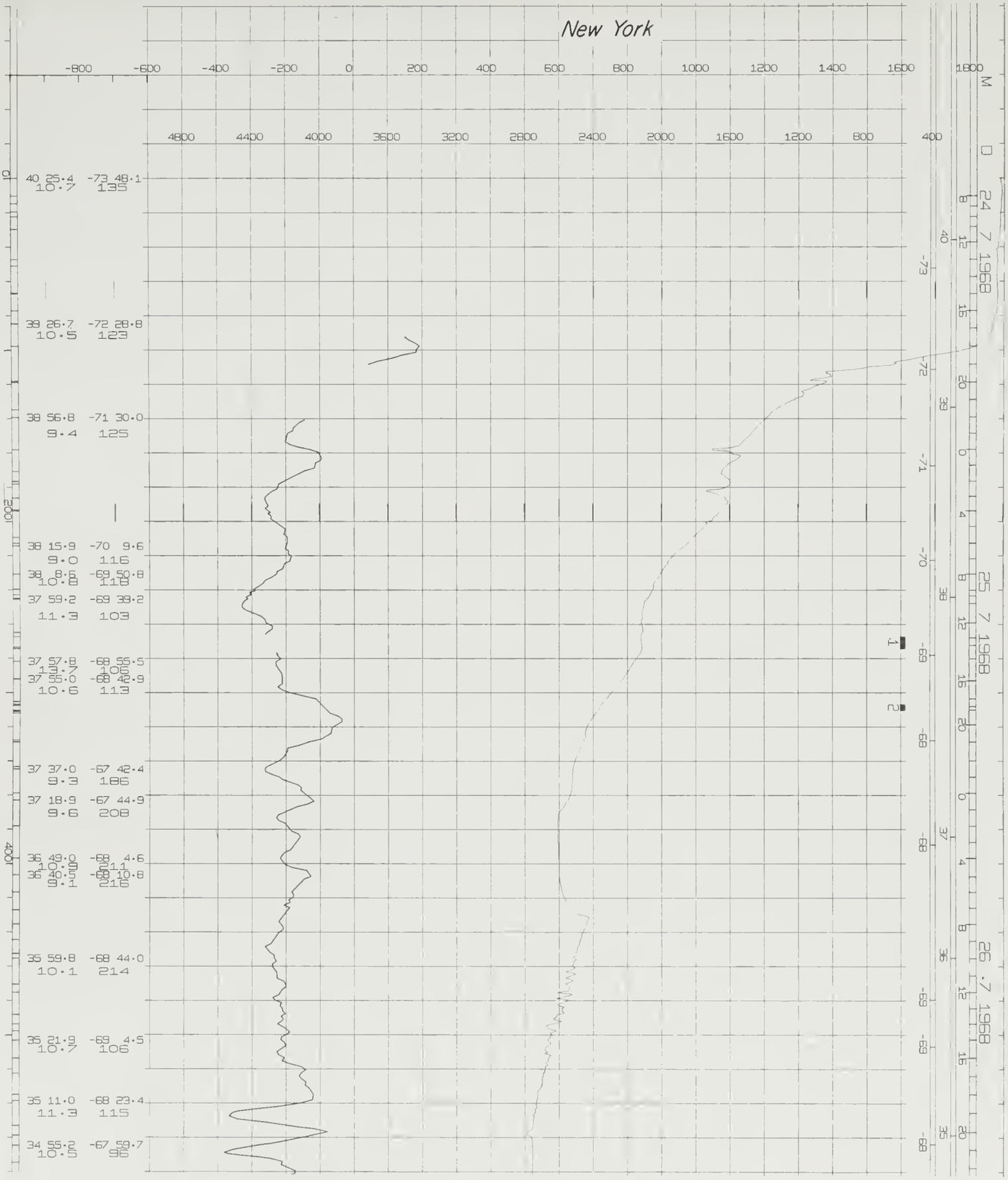

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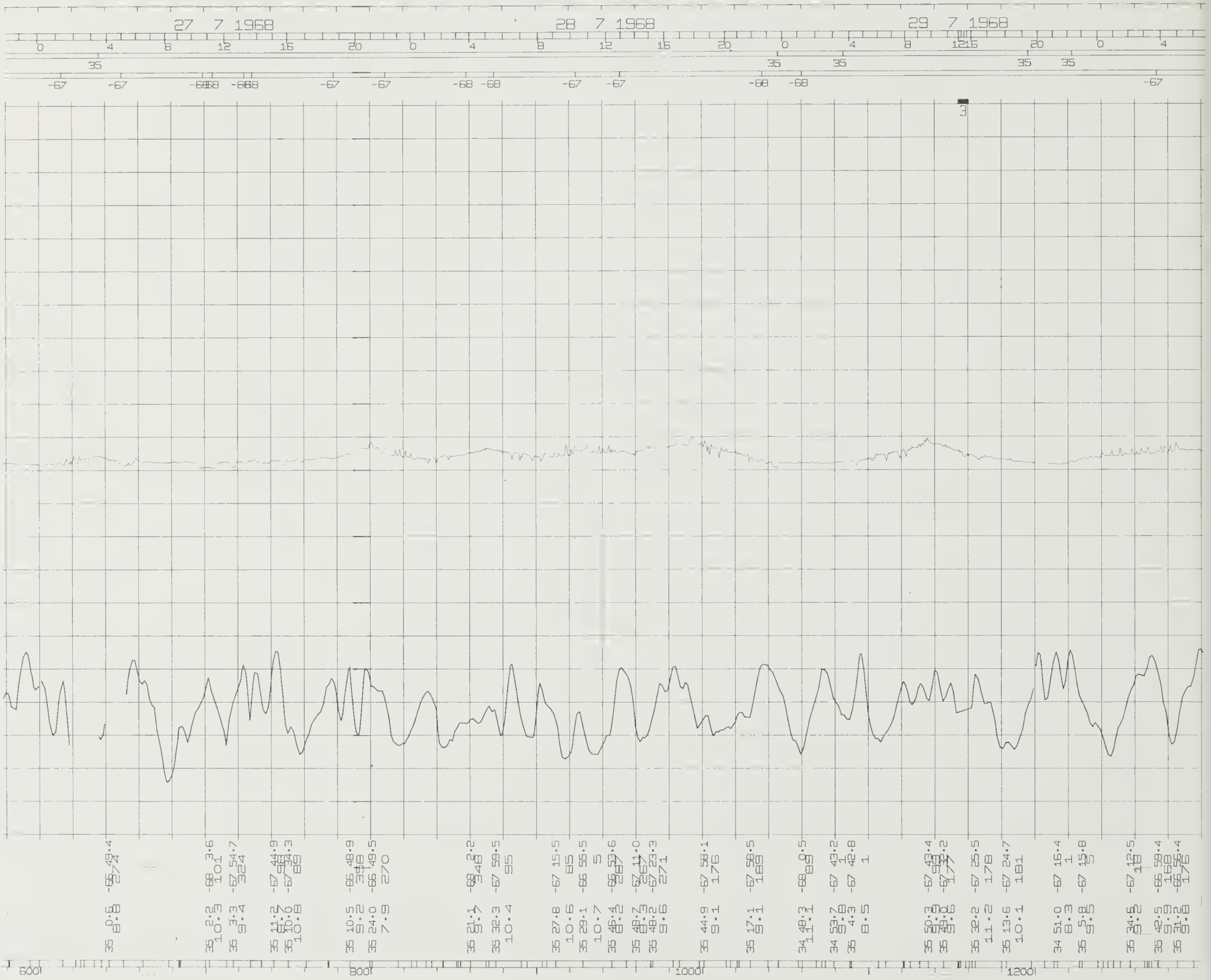

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31 3 1968
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M G D
New York


NEW YORK
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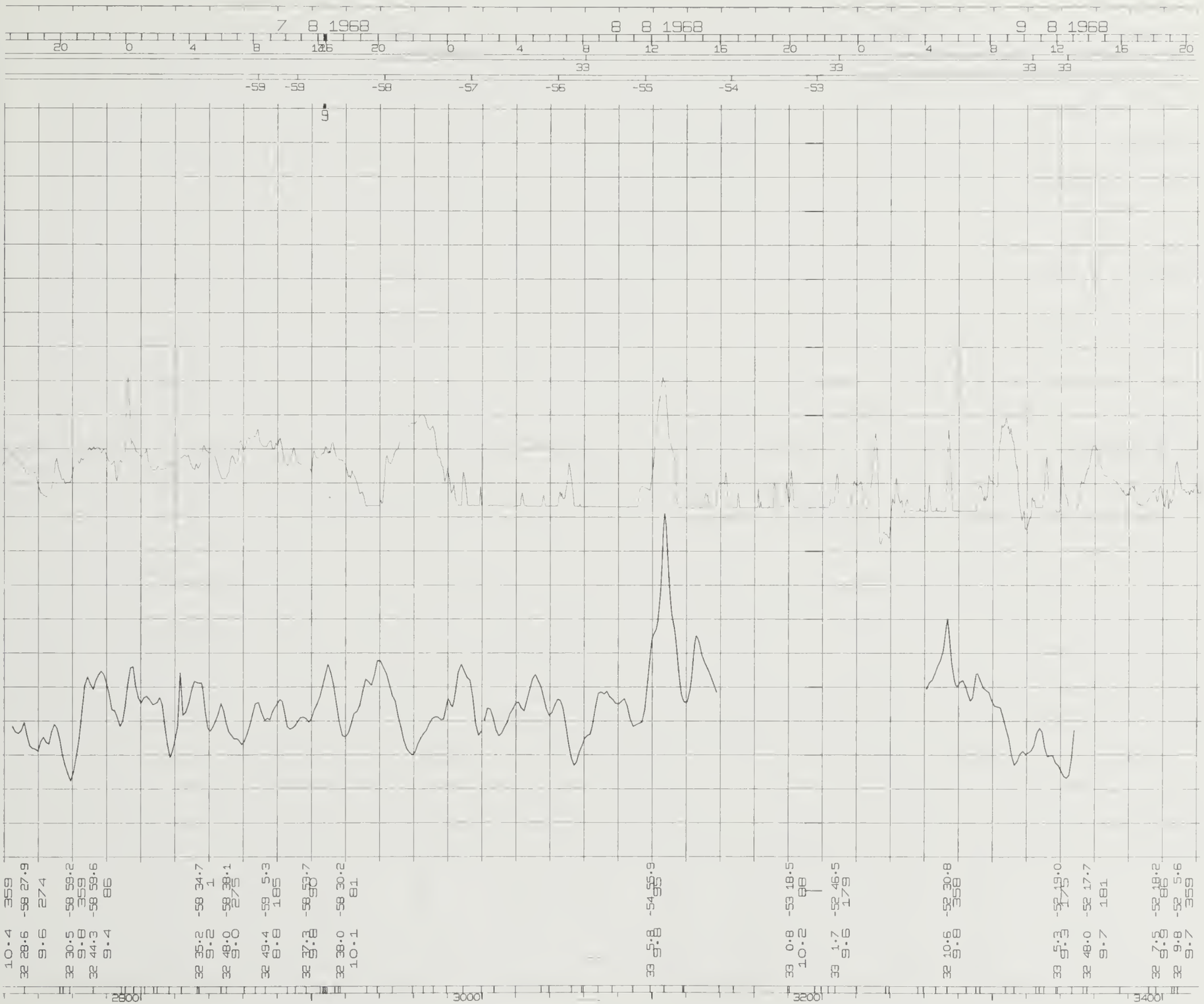

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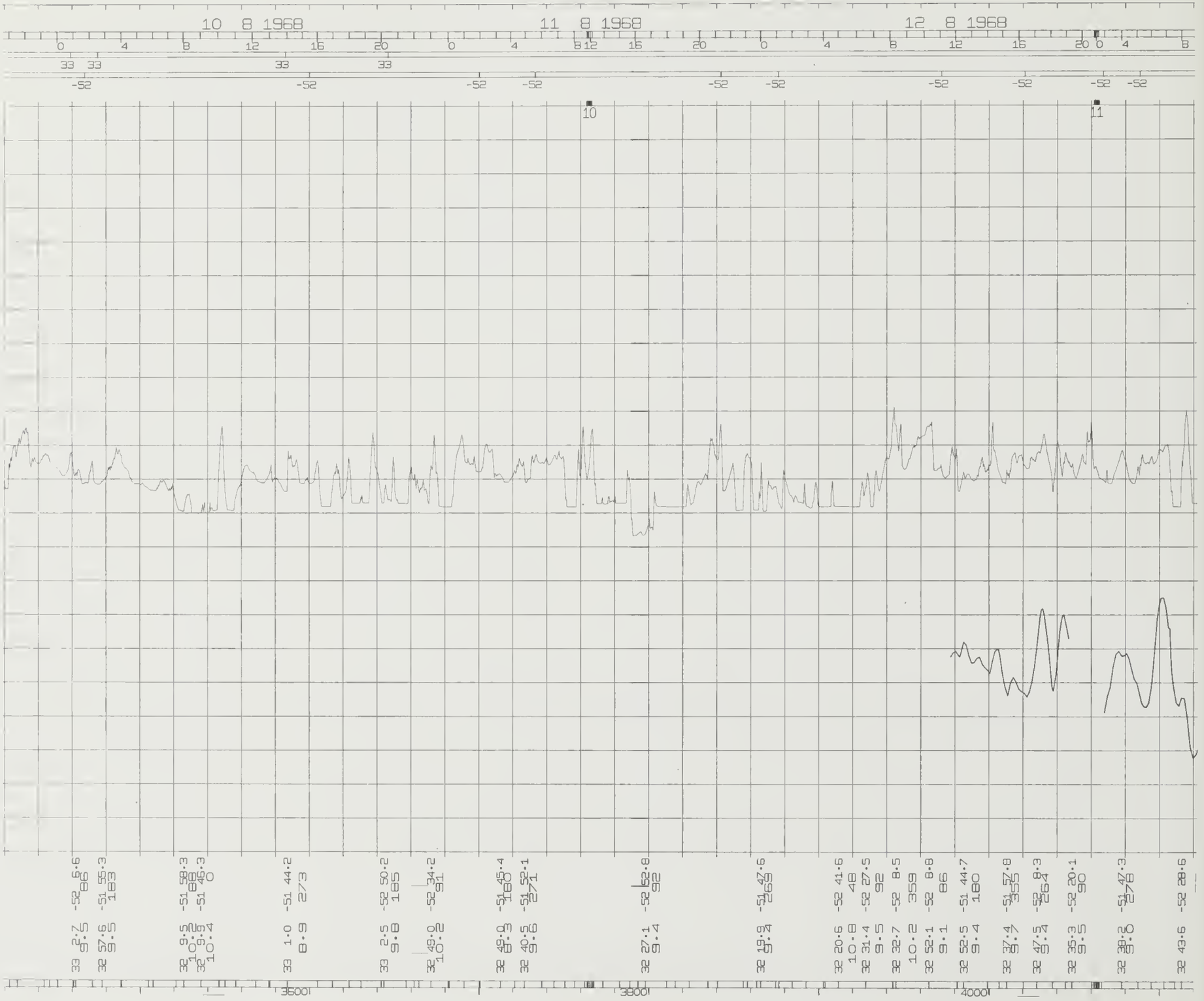

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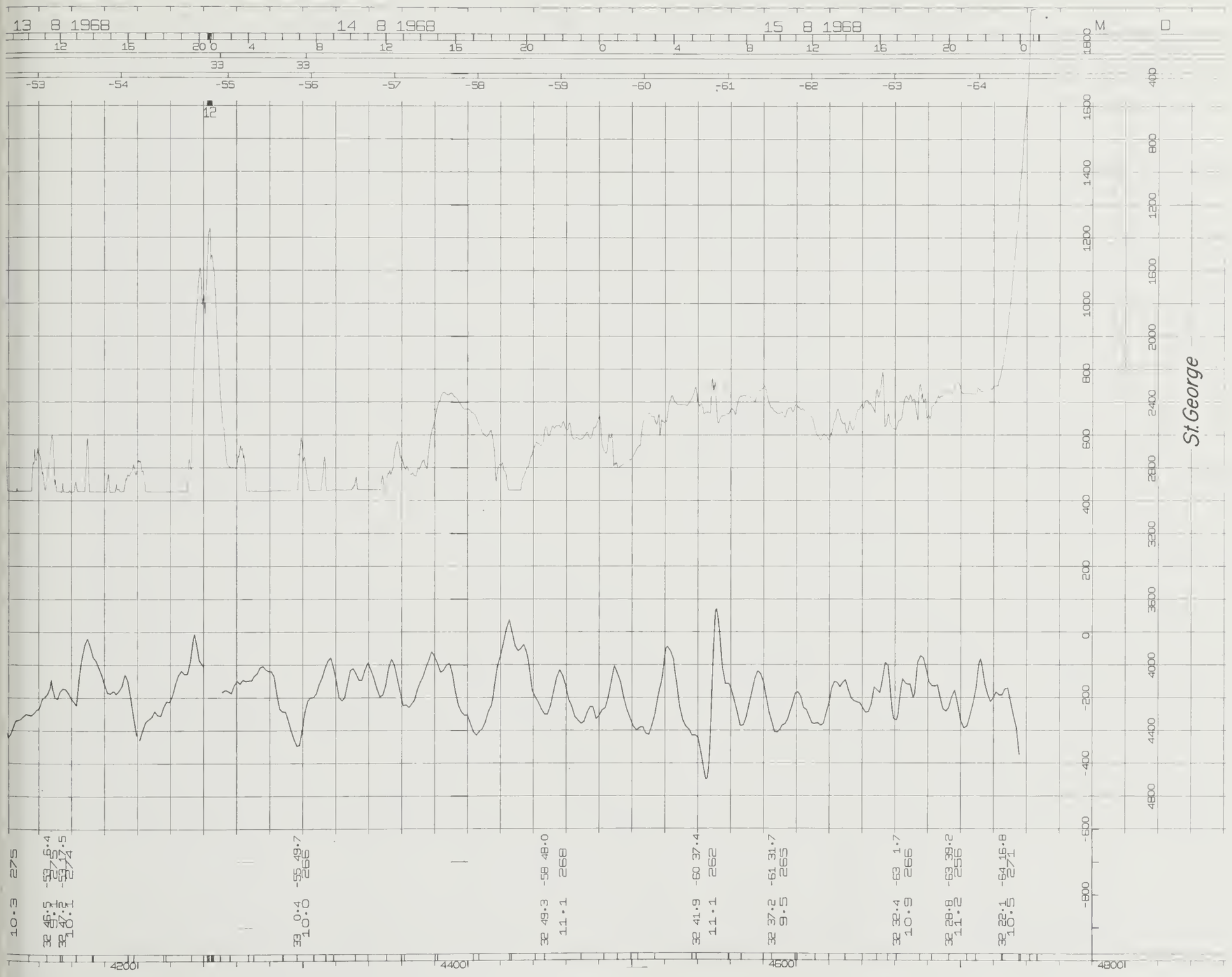

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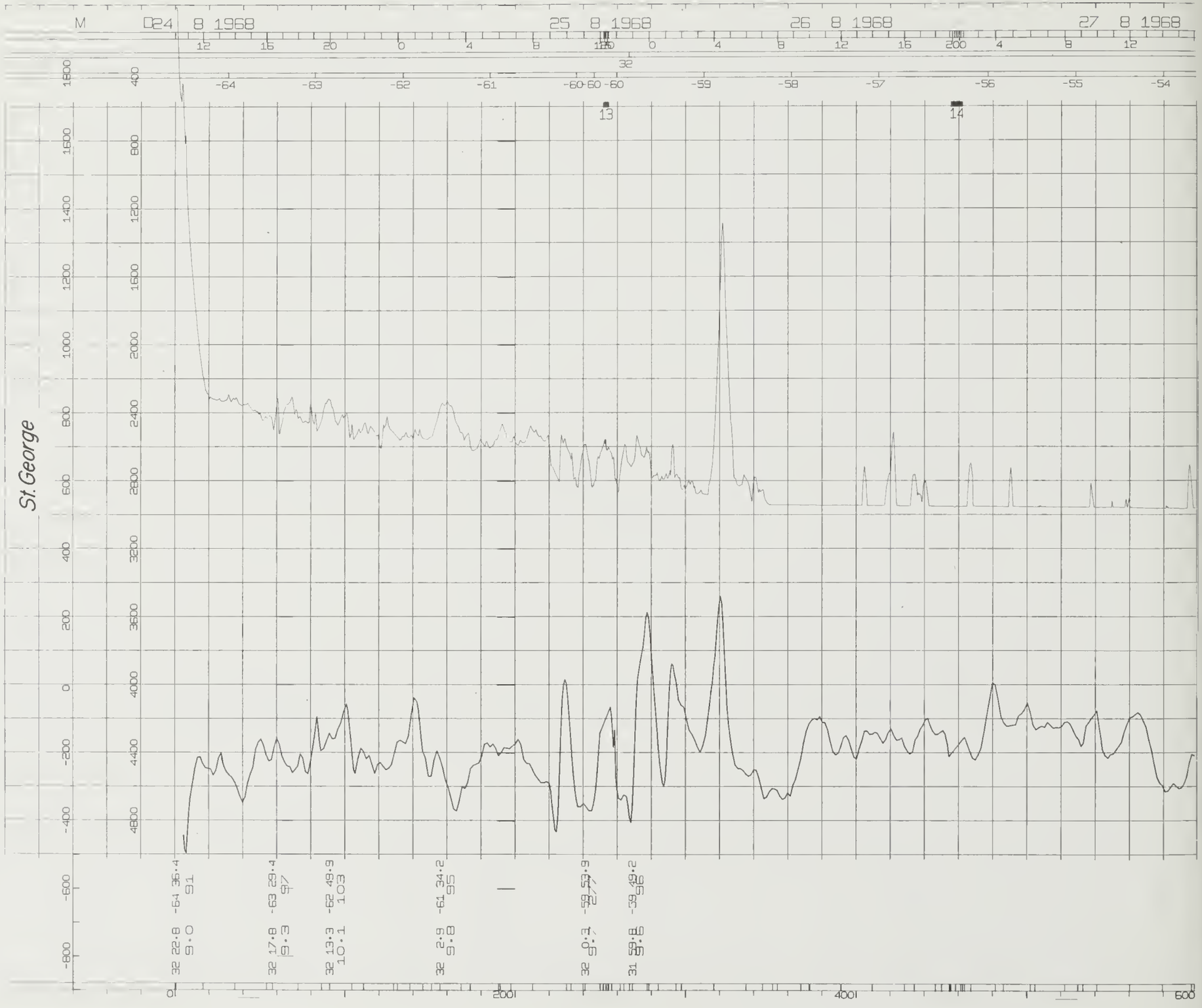

7 1968
31 7 1968
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2 8 1968
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2000


3 8 1968
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6 8 1968
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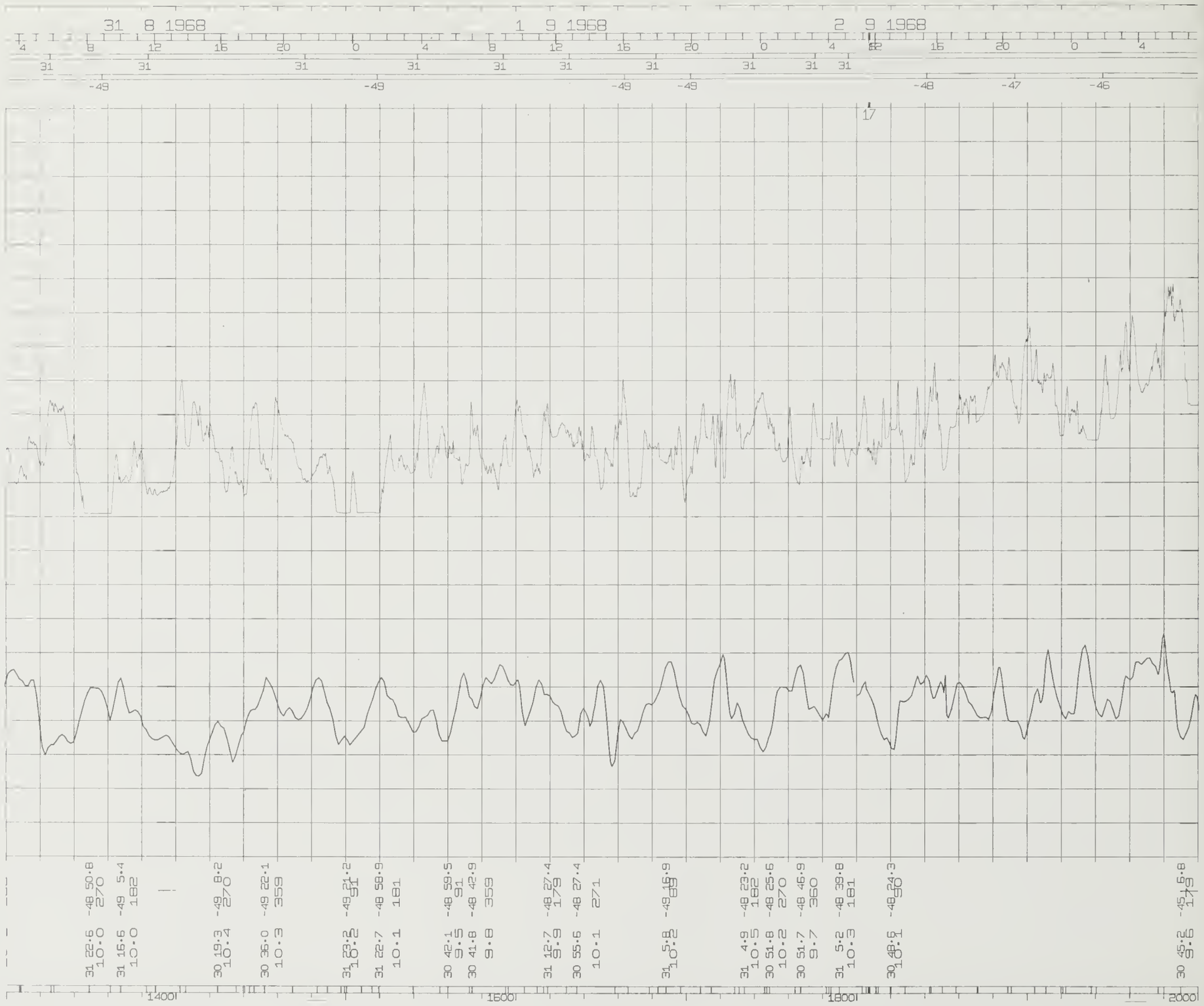

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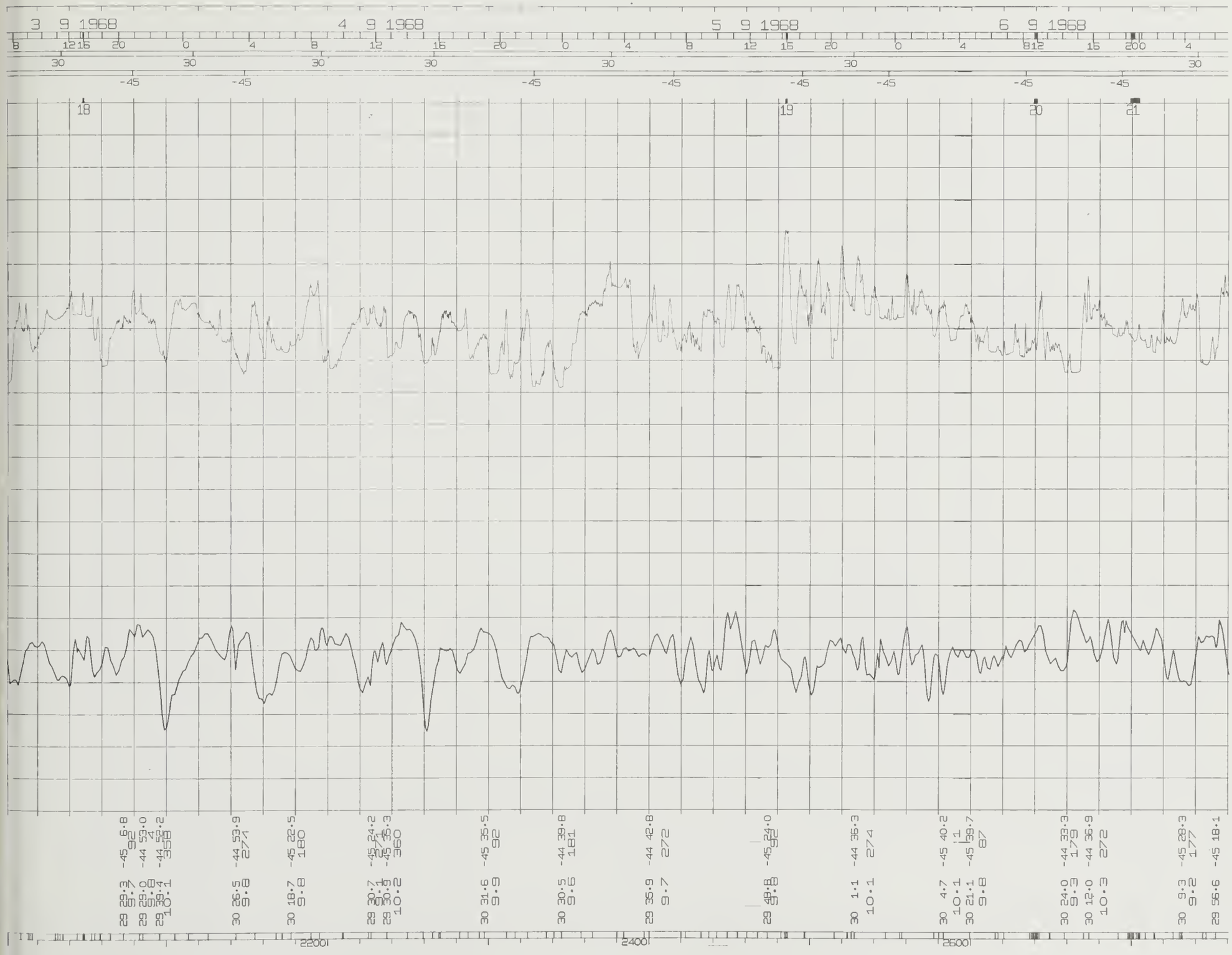

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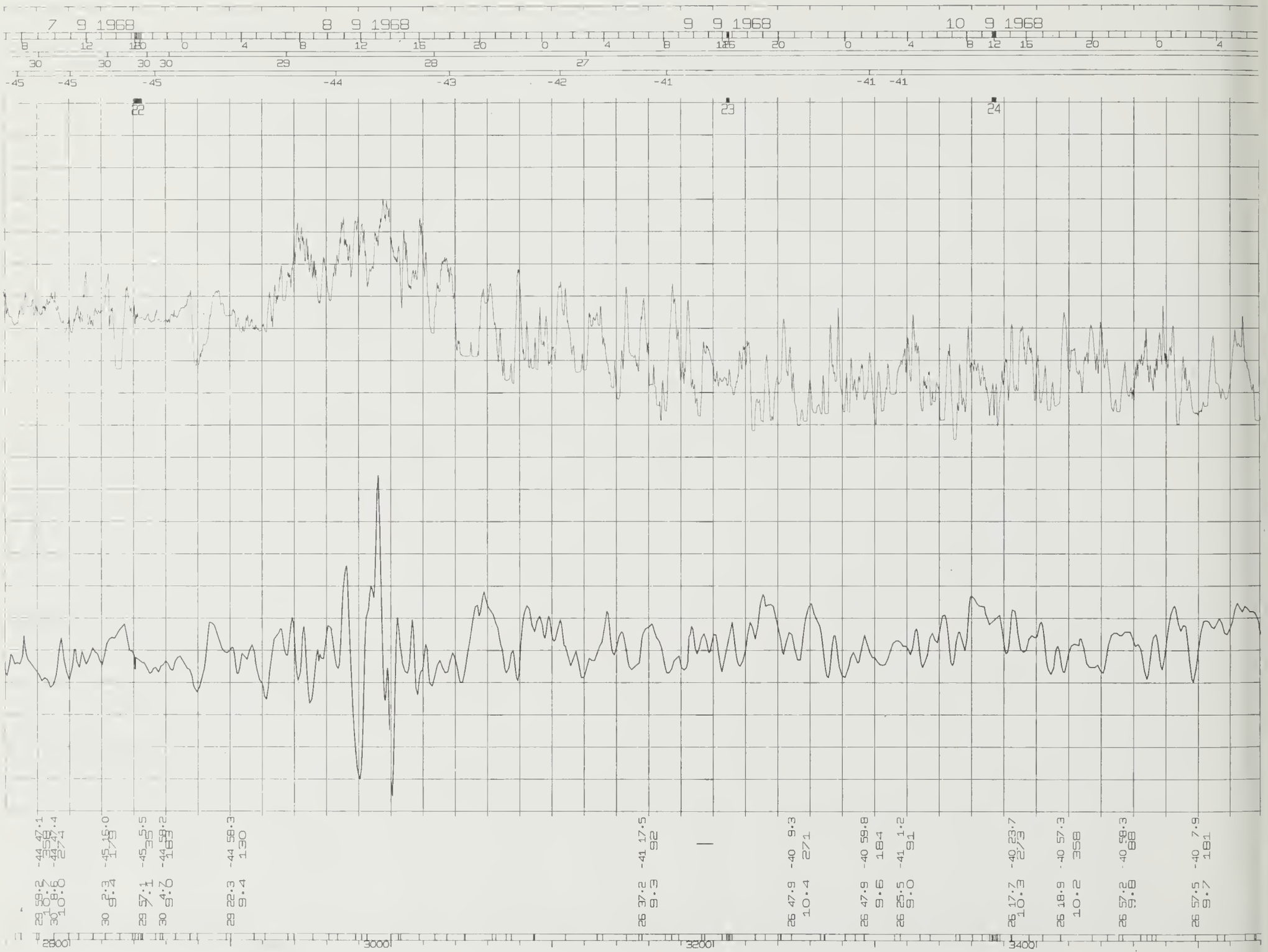

13 8 1968
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M
D
St.George

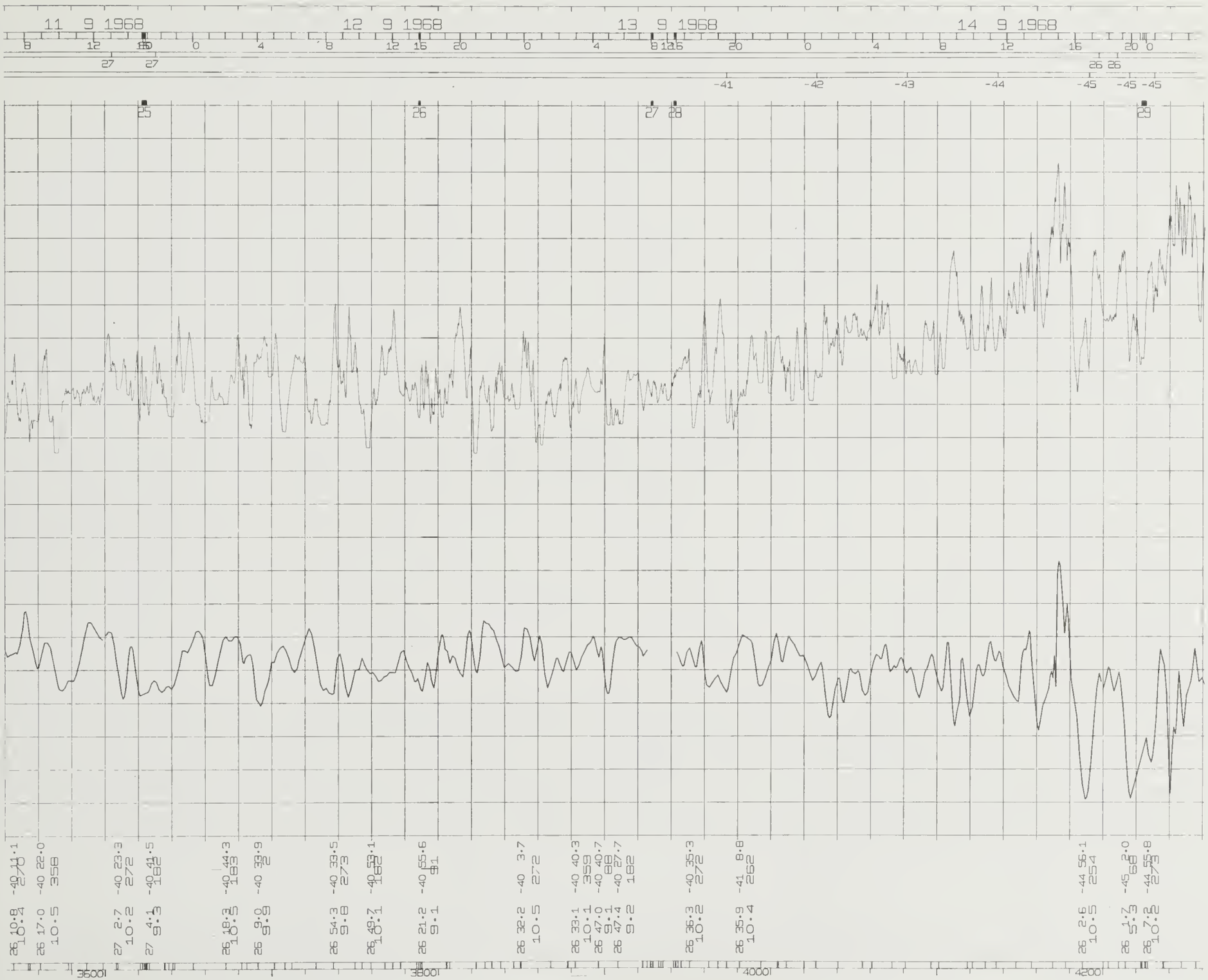

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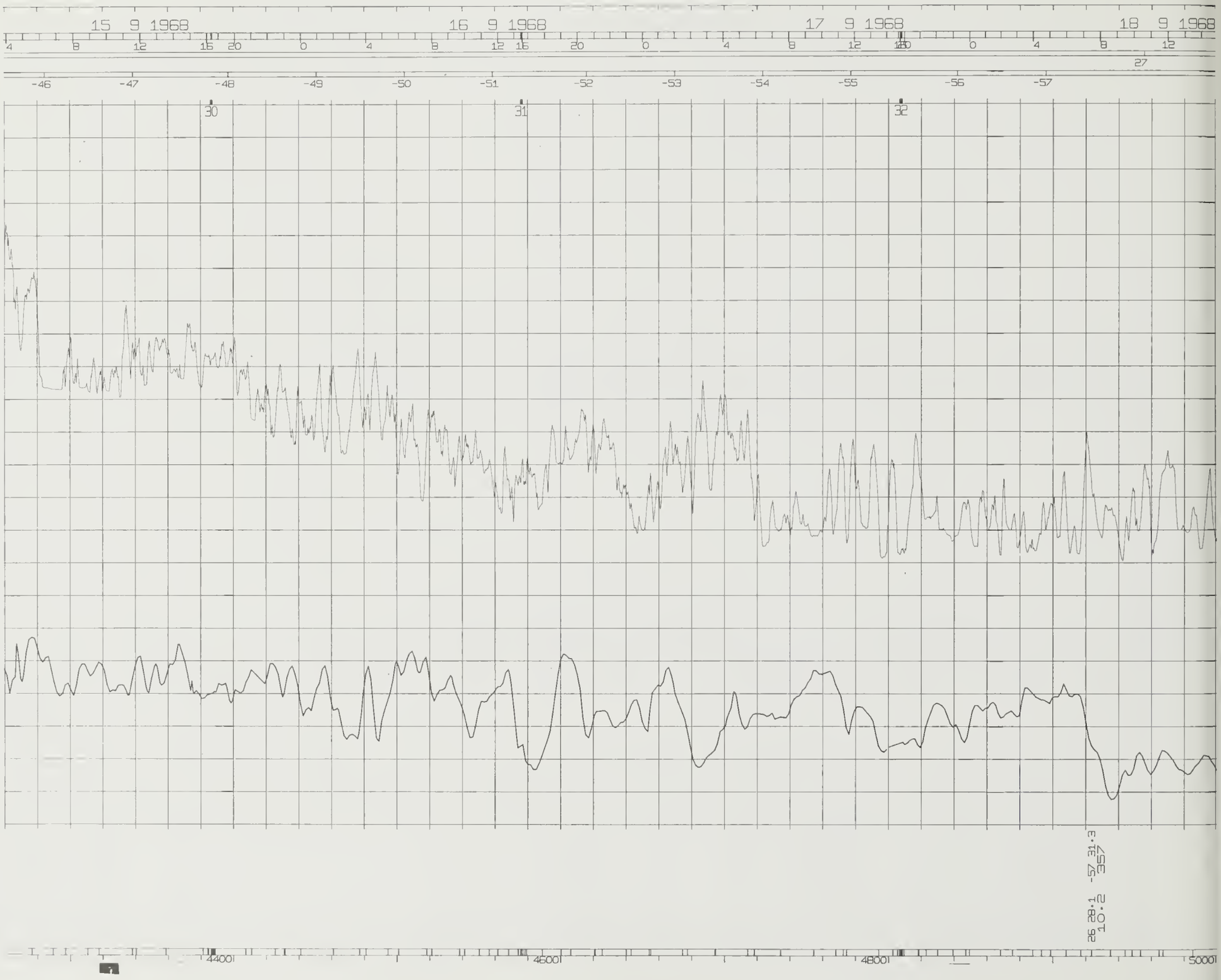

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31 17.1 -49 0.6 90 10.5
31 16.8 -48 18.3 180 10.0
31 1.5 -48 18.2 267 9.7
30 49.8 -49 23.2 92 10.2
30 35.7 -48 16.5 267 10.1
30 35.9 -49 8.4 274 10.1
30 25.5 -49 13.9 87 9.8
30 26.2 -48 35.6 93 10.0
30 44.8 -48 21.4 0 9.9
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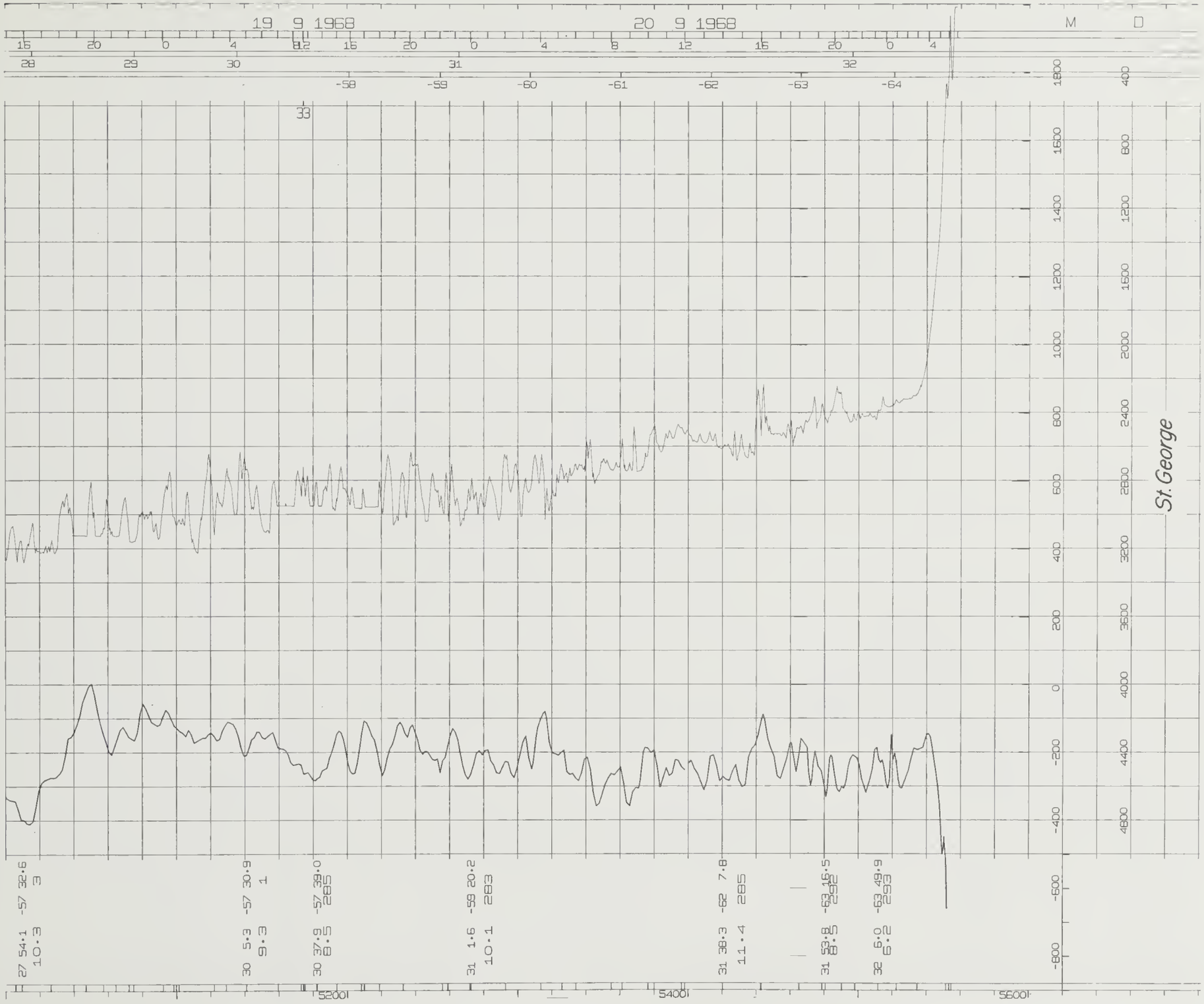

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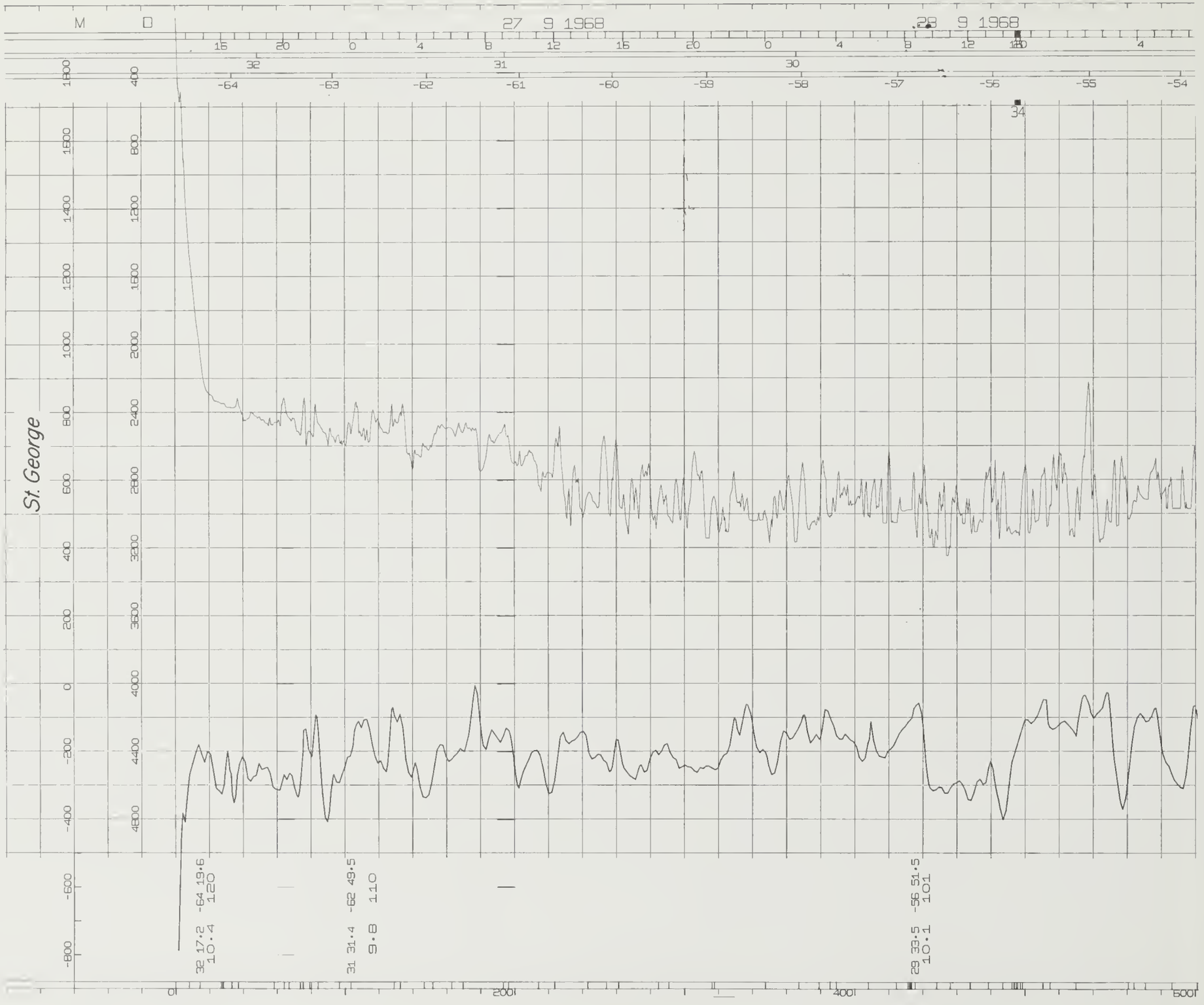

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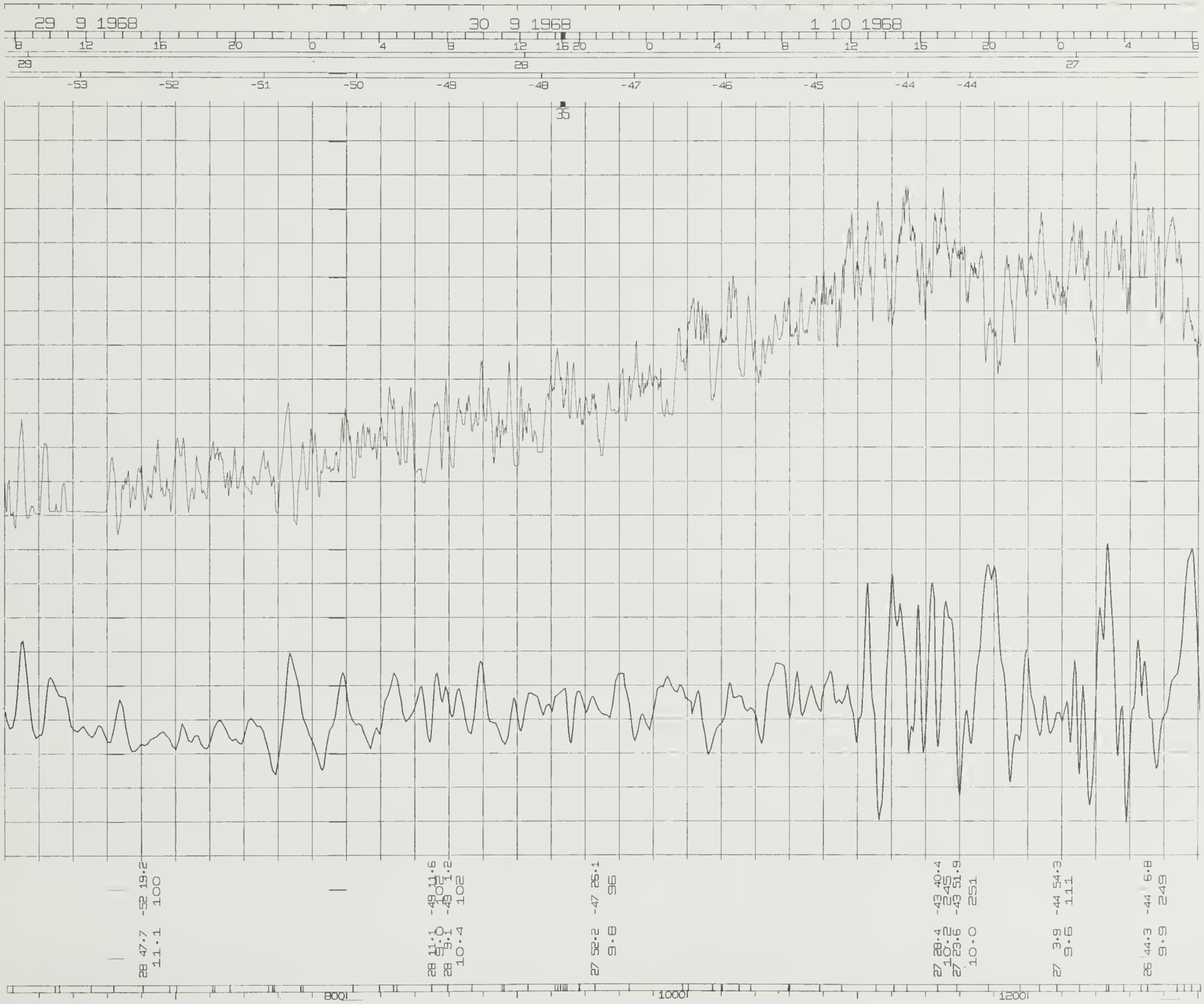

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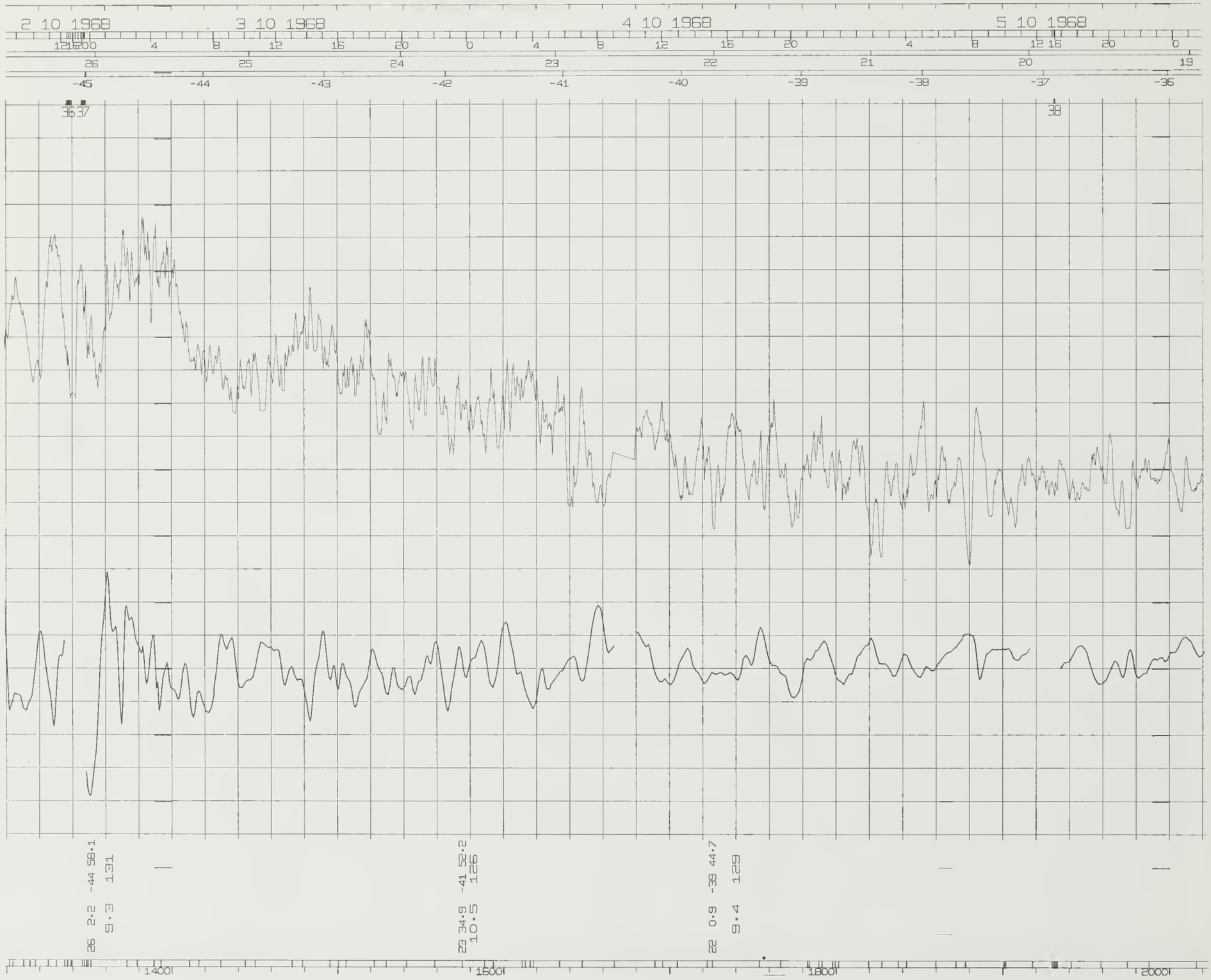

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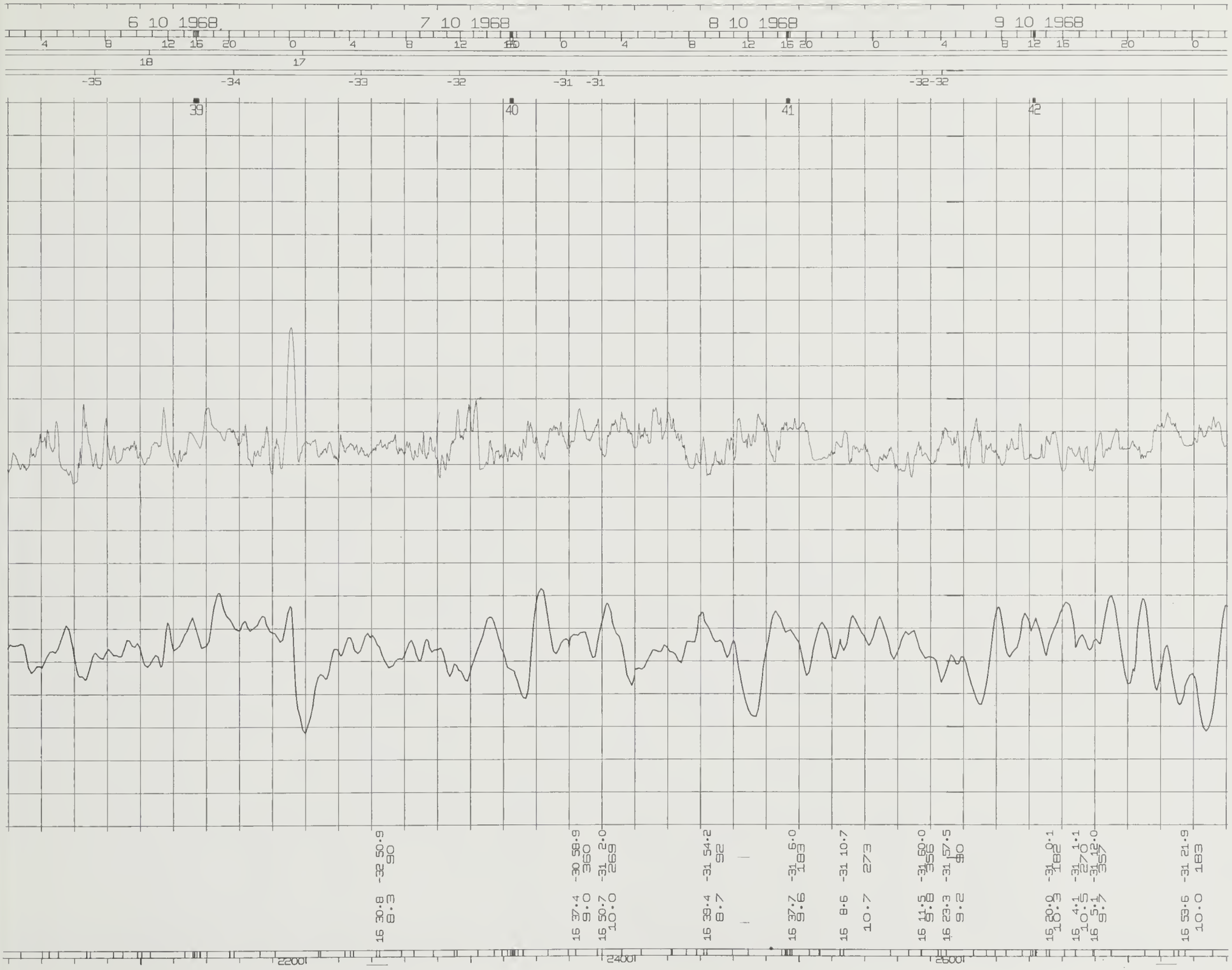

15 9 1968
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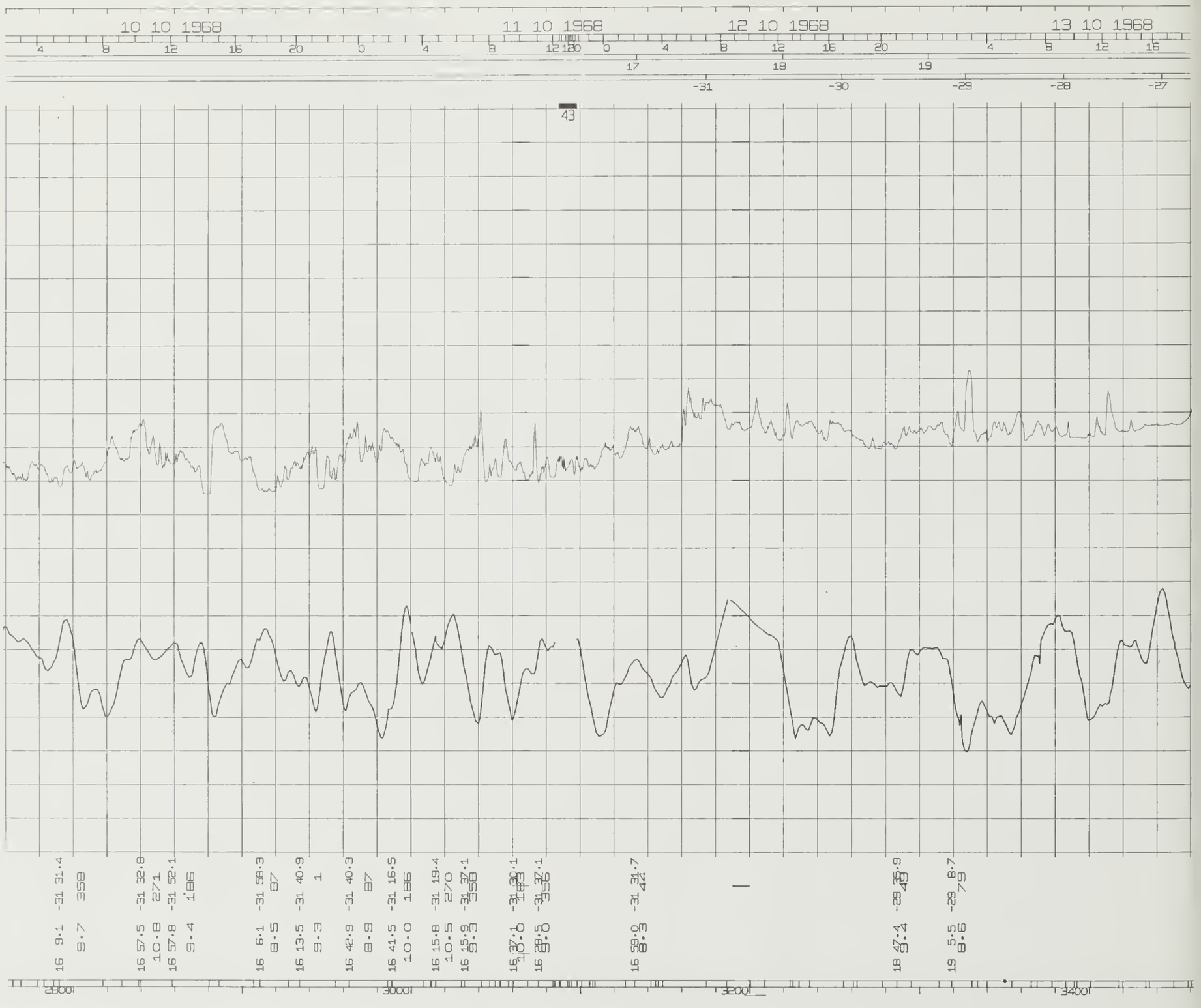

19 9 1968
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M
D
St. George

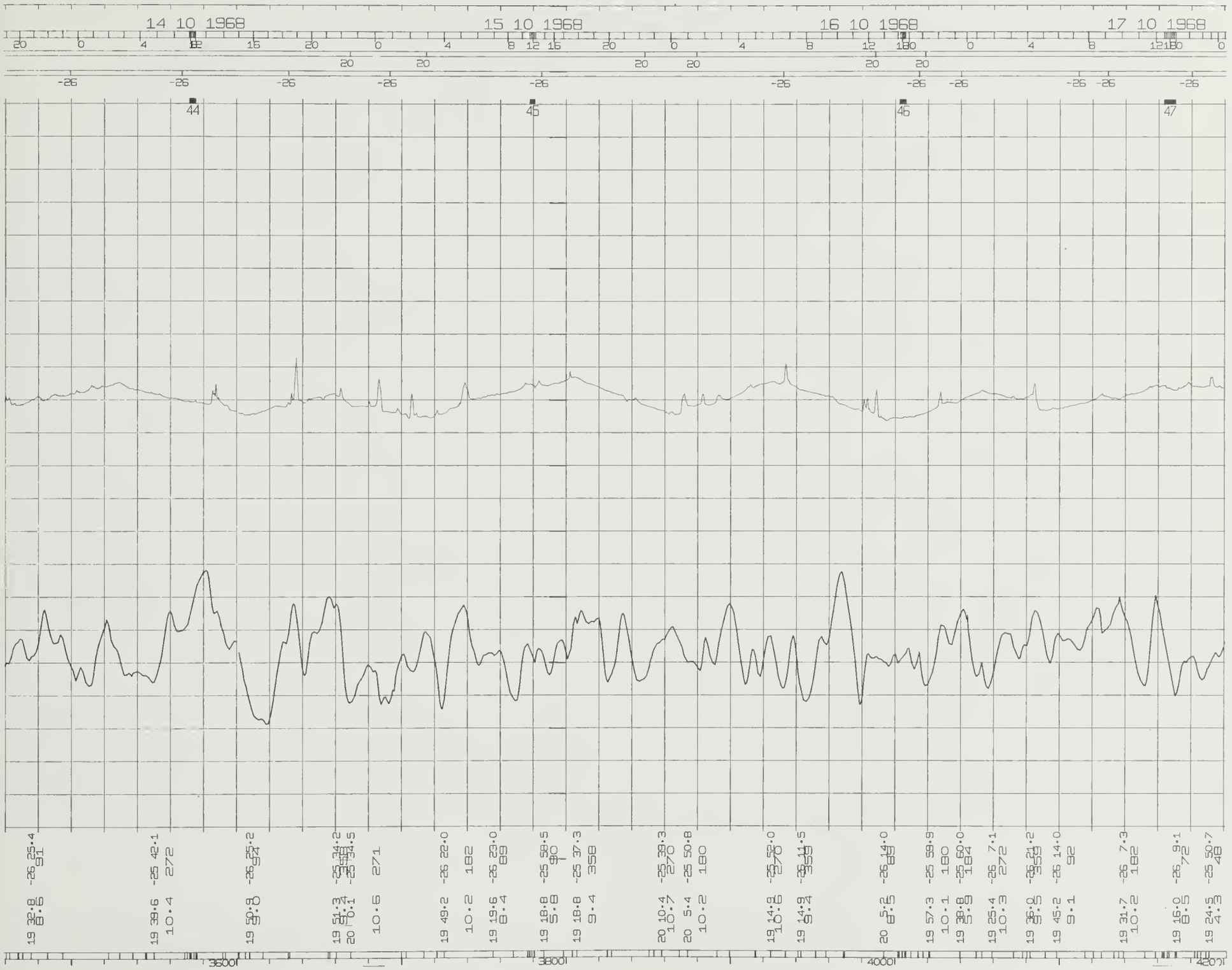

M D
27 9 1968
28 9 1968
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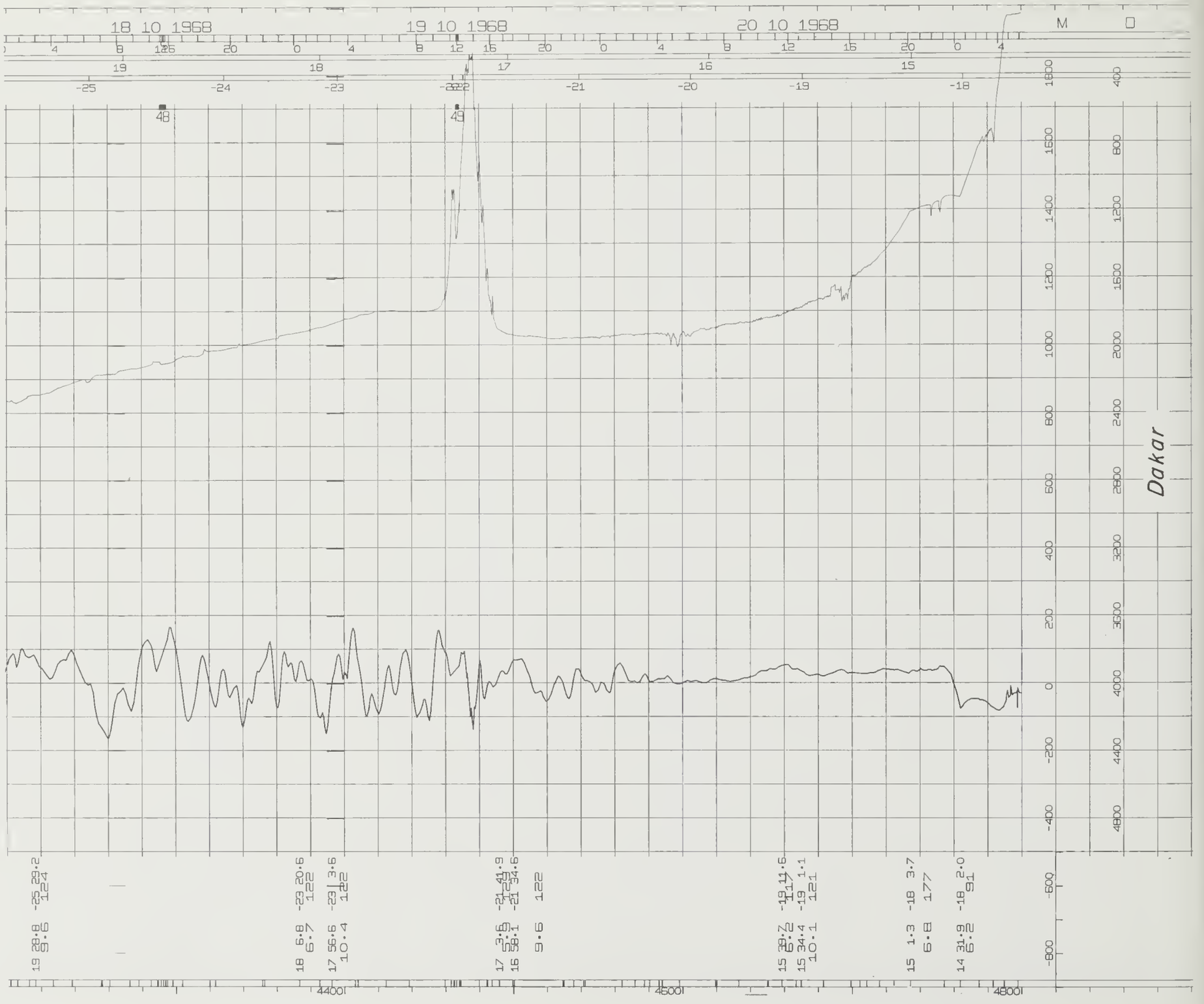

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35
28 47.7 -52 19.2
11.1 100
28 11.1 -49 11.6
9.0 102
28 9.1 -49 1.2
10.4 102
27 52.2 -47 26.1
9.8 96
27 28.4 -43 40.4
10.2 245
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10001
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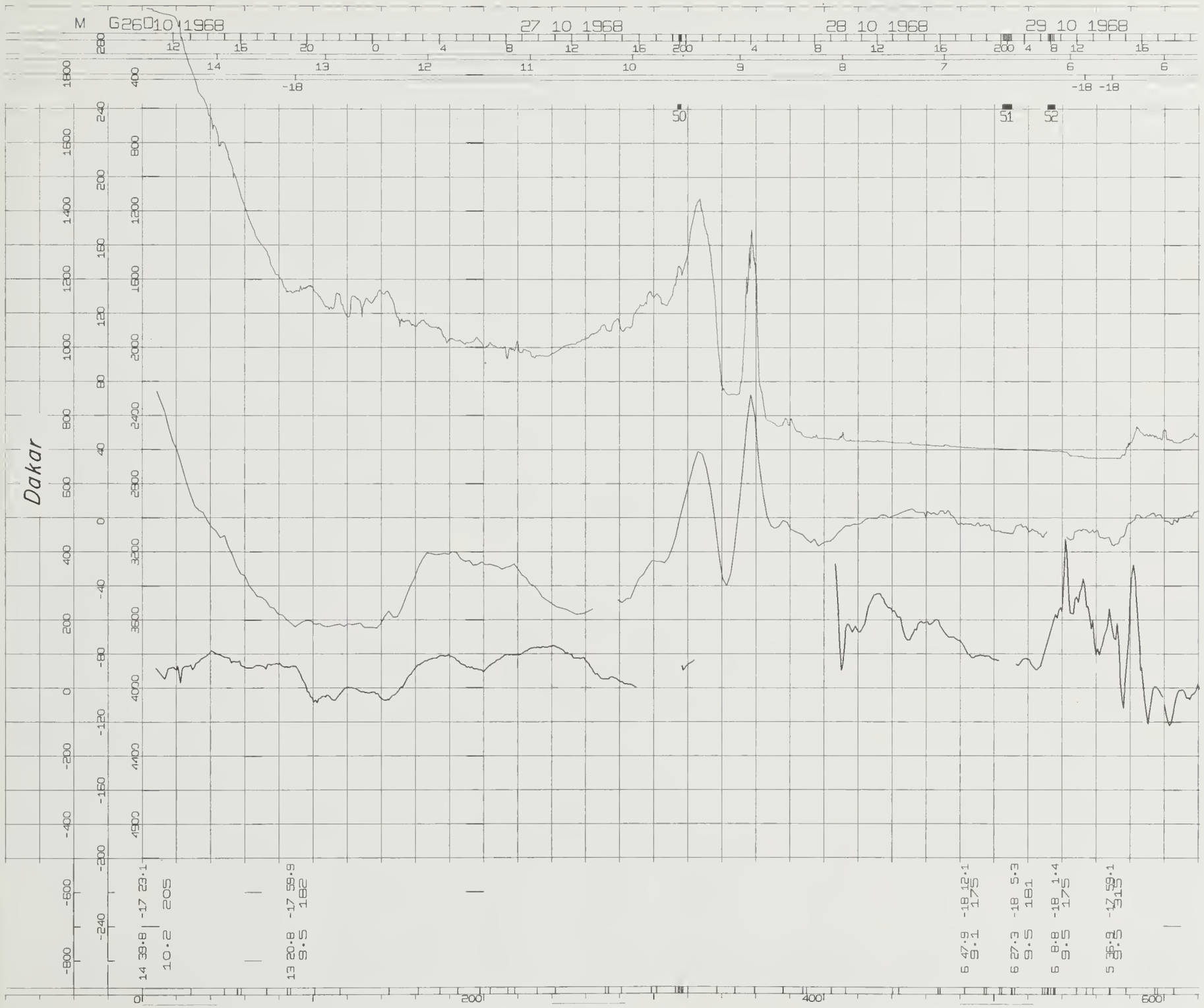

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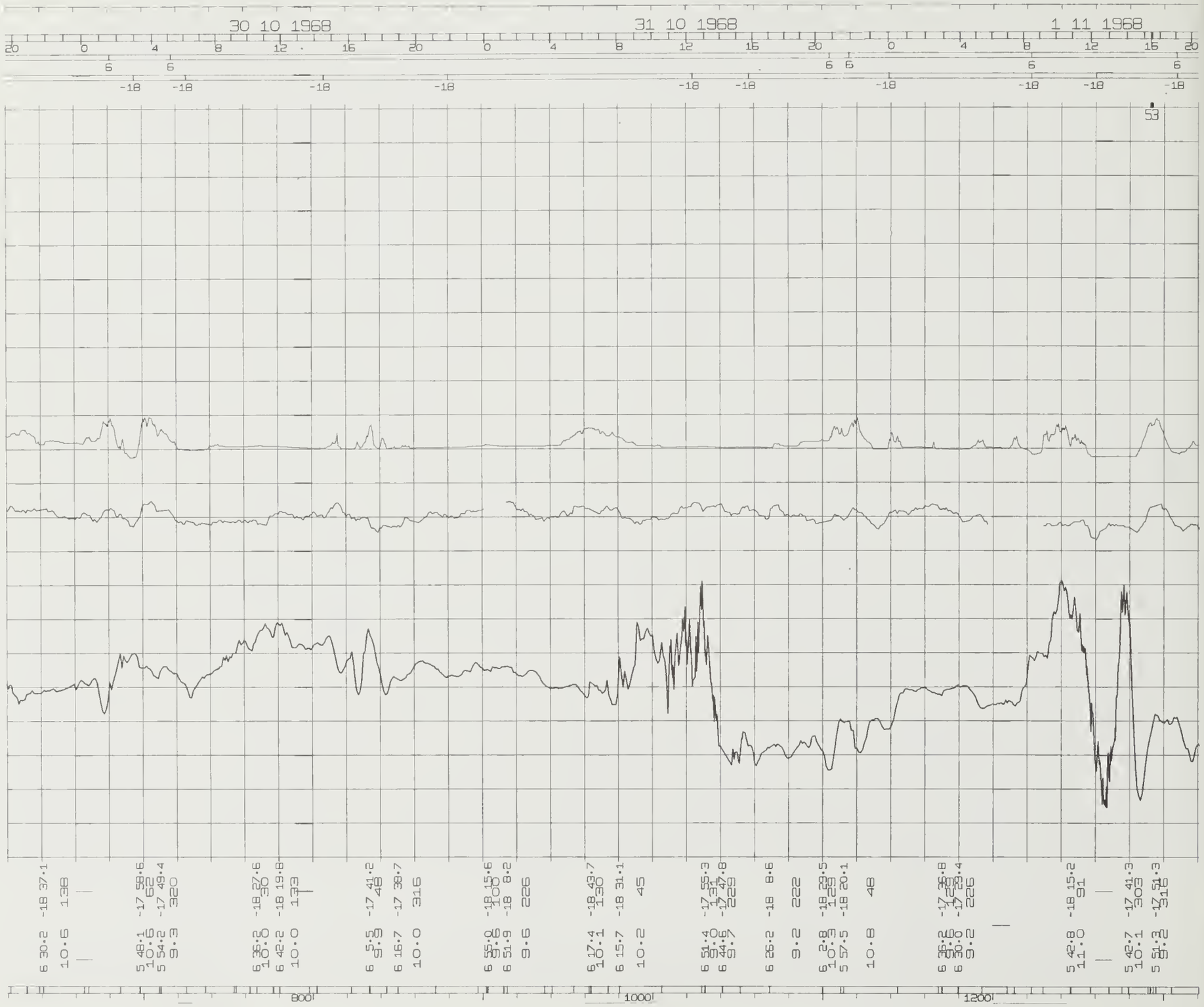

6 10 1968
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2200
2400
2600


10 10 1968
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13 10 1968
43

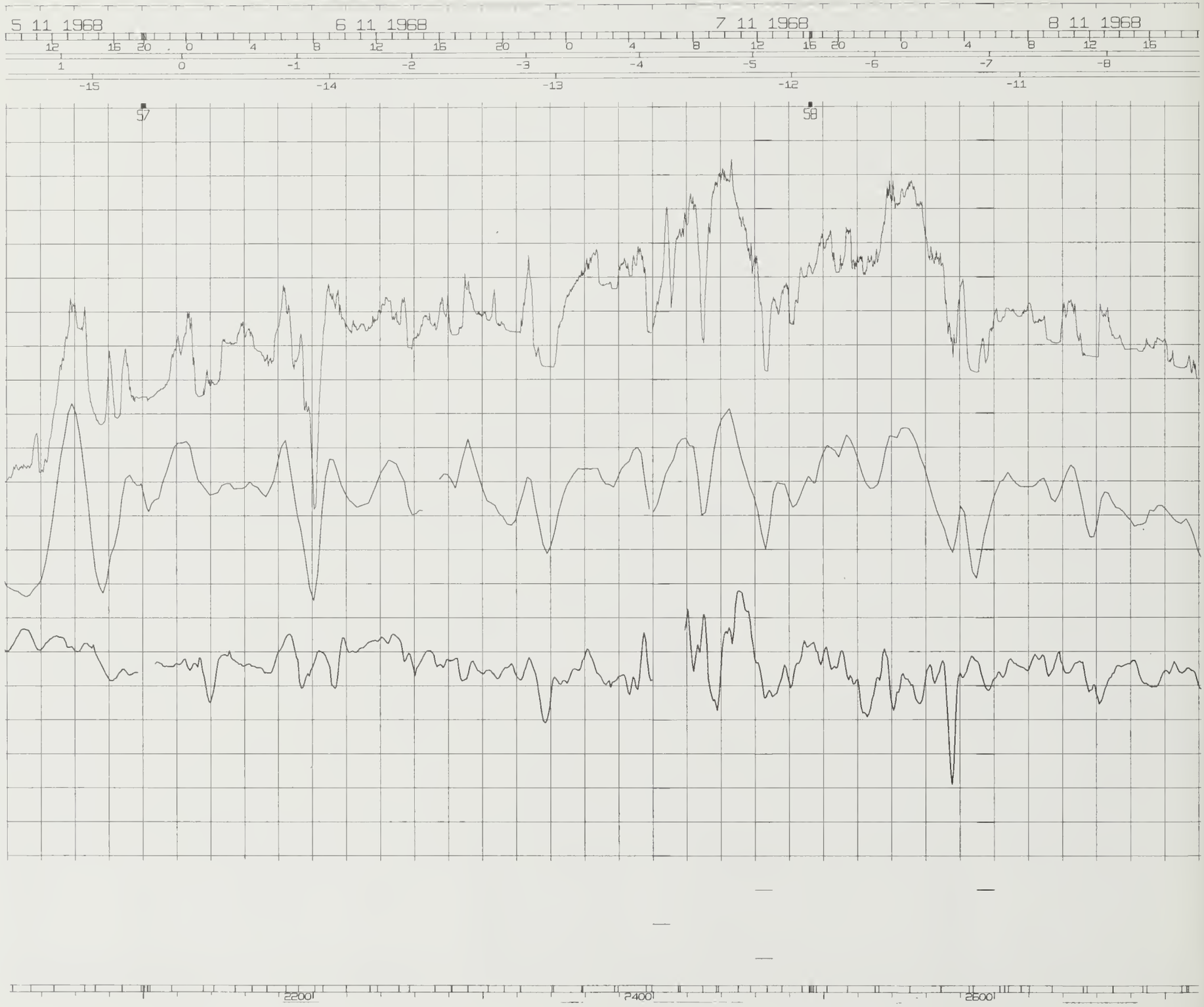

14 10 1968
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16 10 1968
17 10 1968
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45
46
47
3600
3800
4000
4200

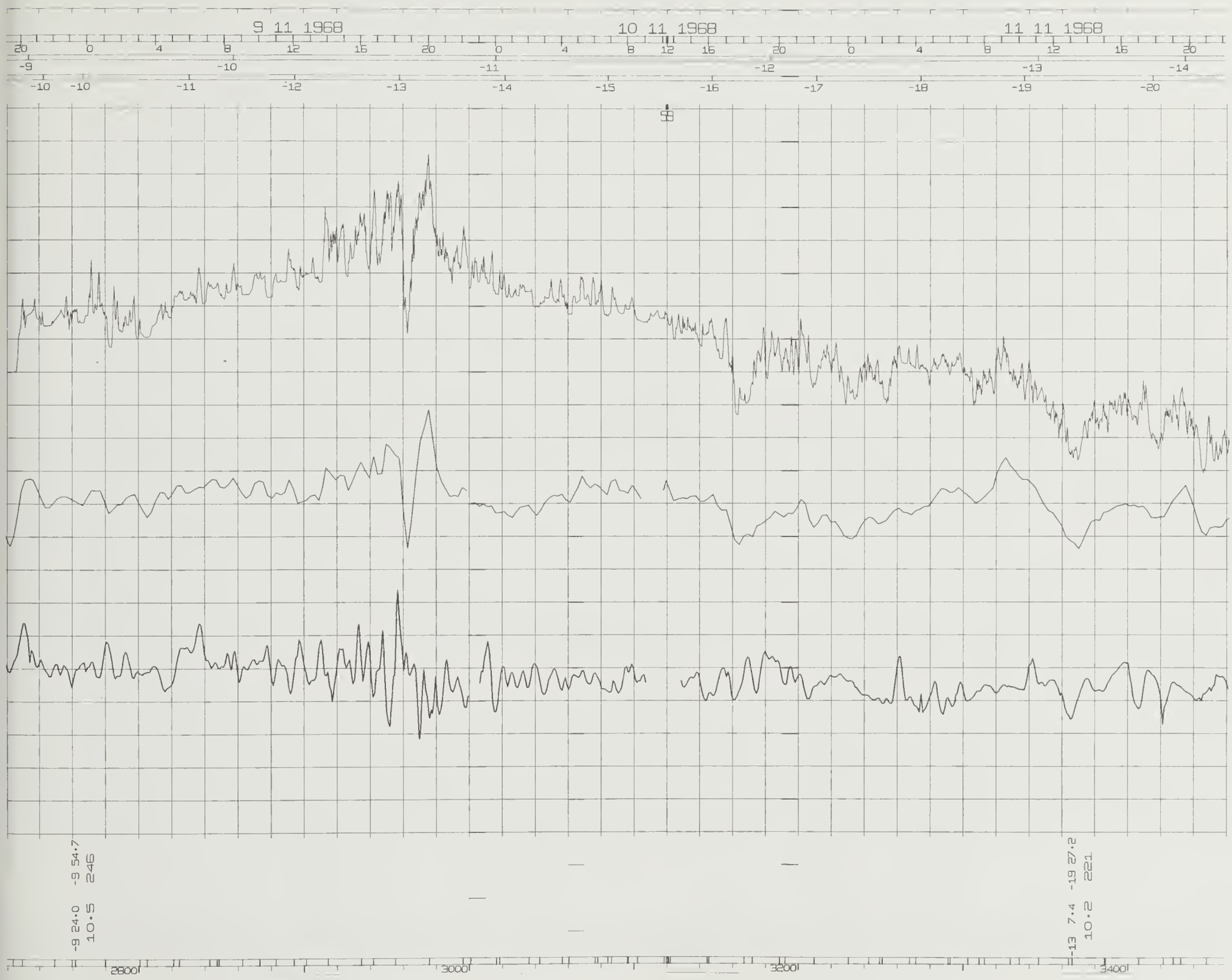

18 10 1968
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Dakar

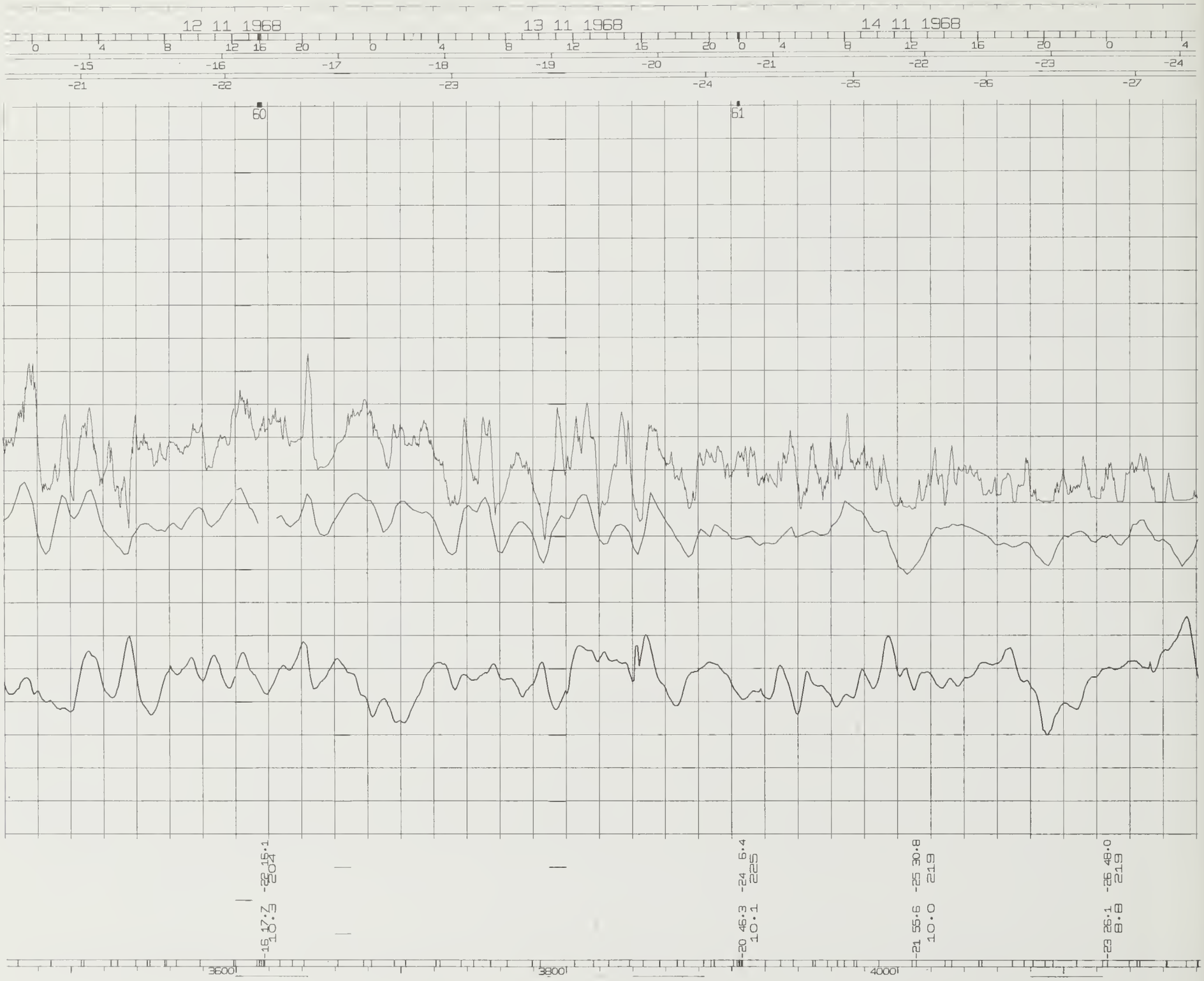

M G26
10 1968
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51
52
Dakar

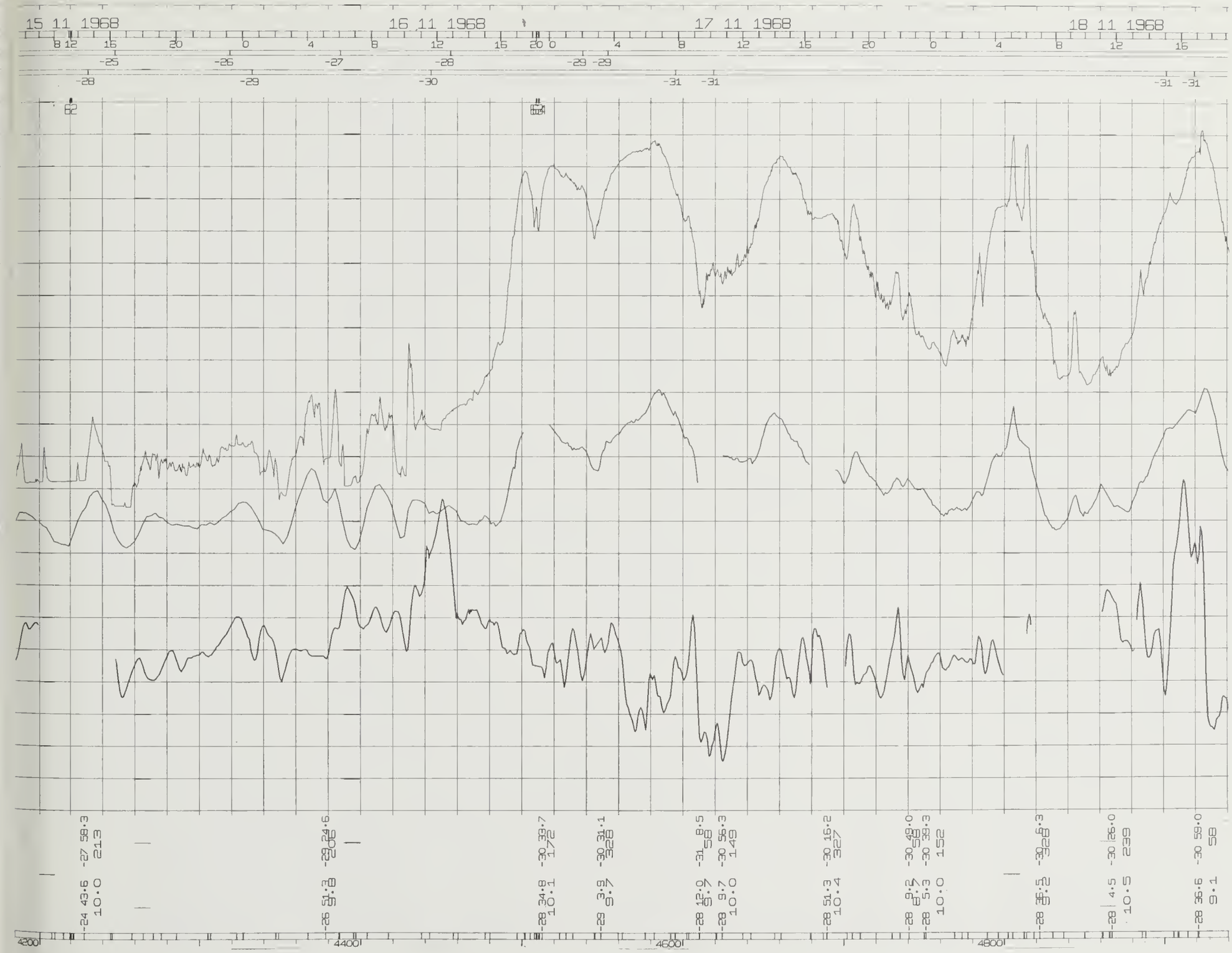

30 10 1968
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1 11 1968
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1000
1200

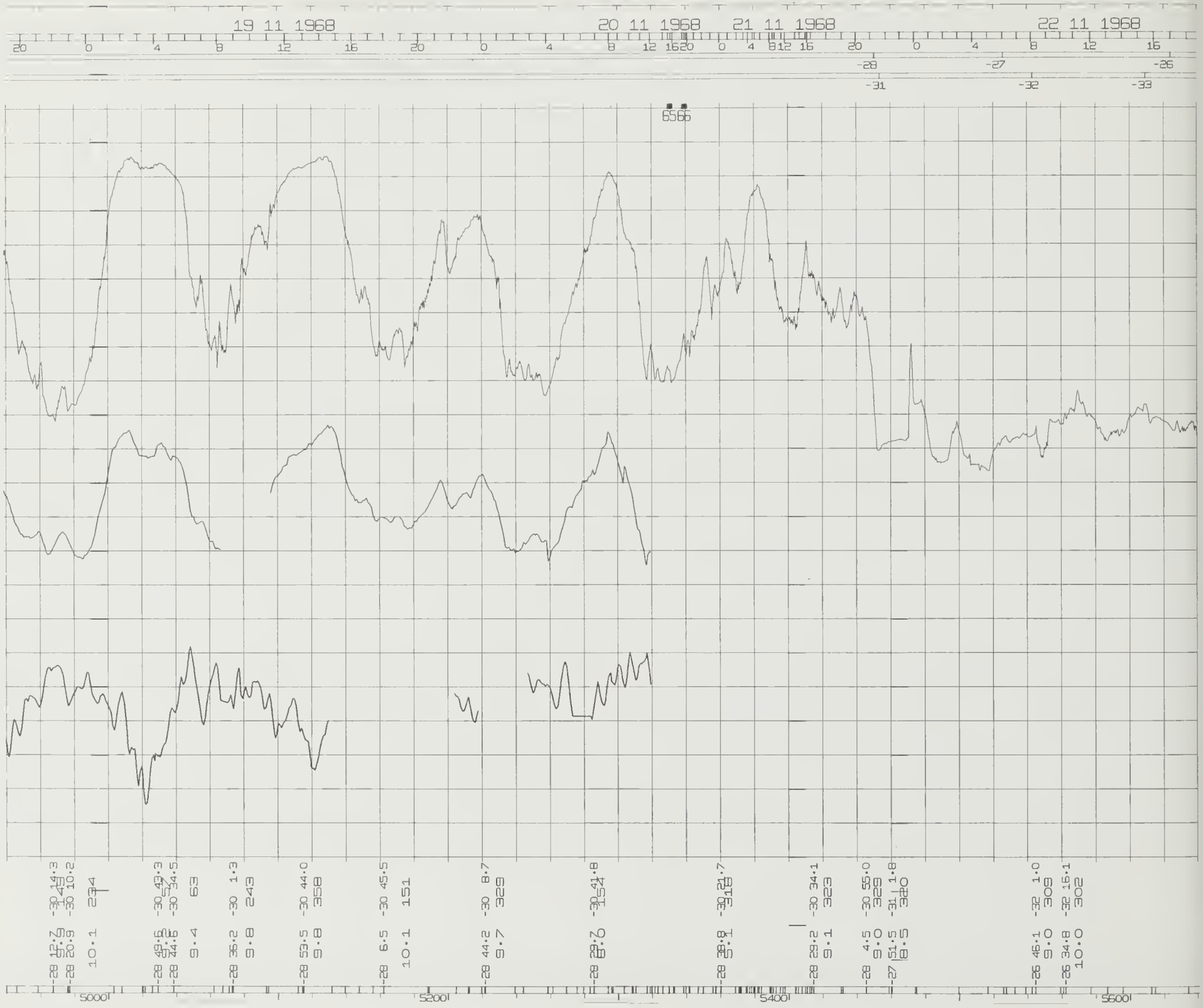

2 11 1968
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S4
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S6
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1600
2000


5 11 1968
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7 11 1968
8 11 1968
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58
2200
2400
2600

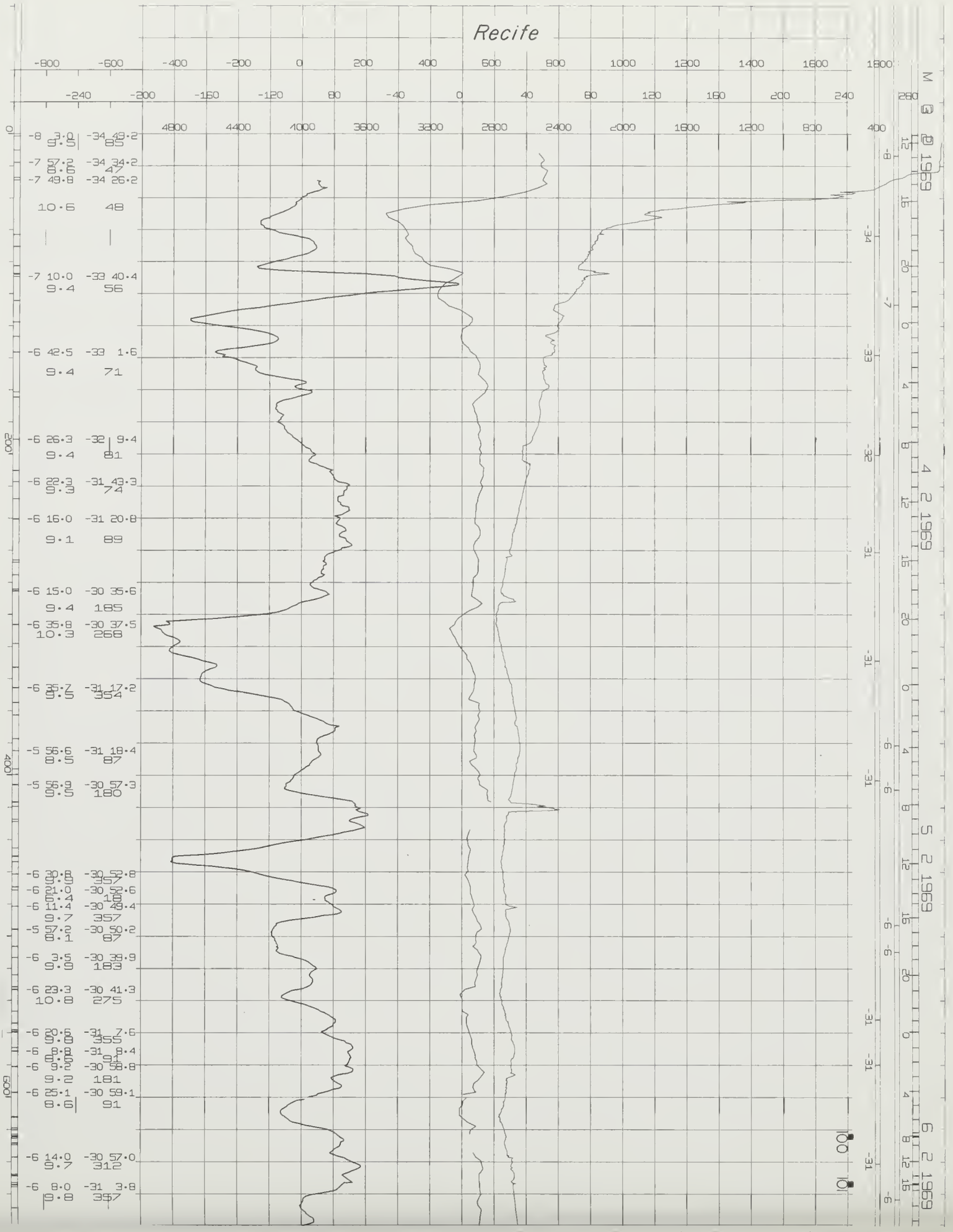

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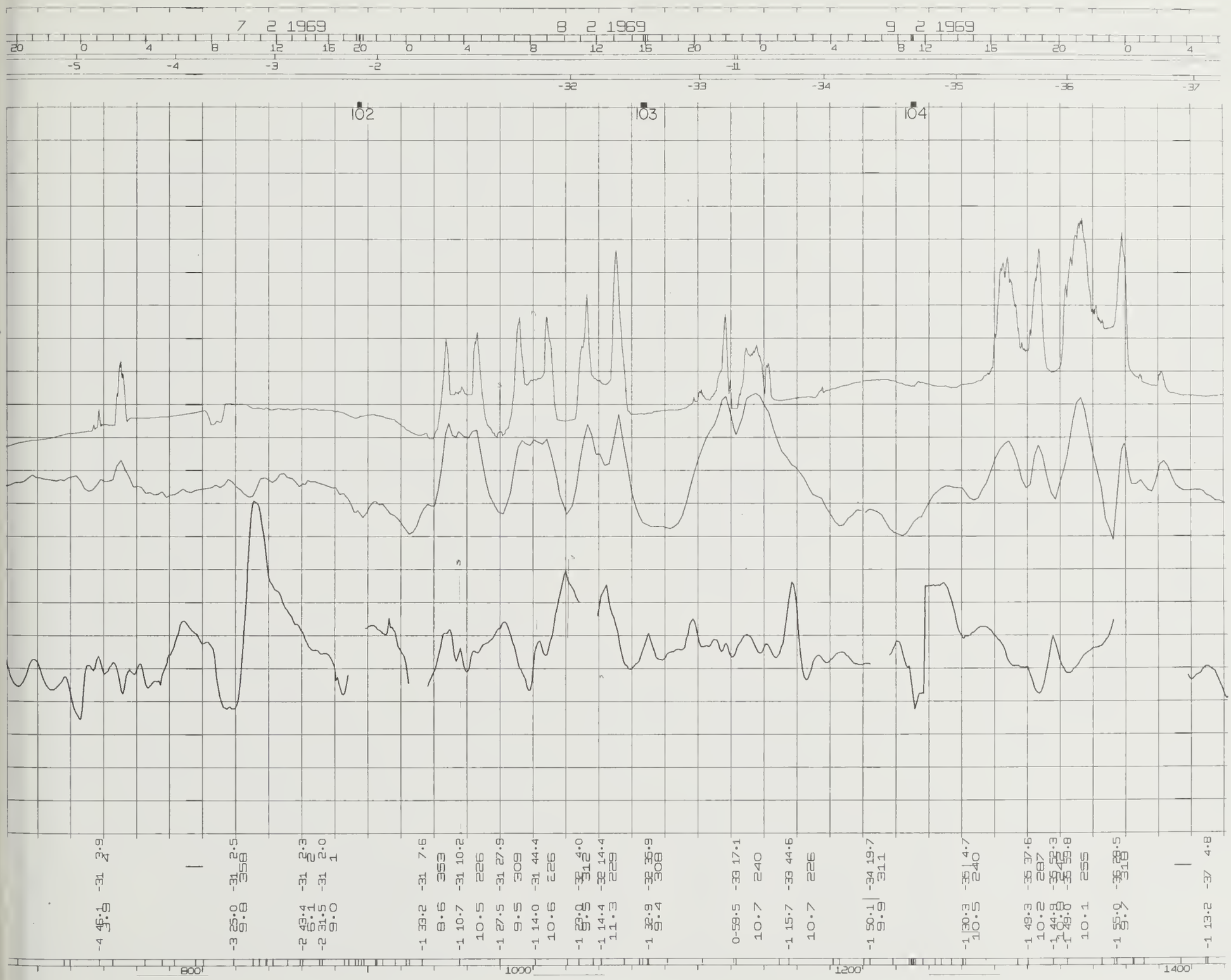

12 11 1968
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-22 15.1 204
-20 46.3 10.1
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-25 30.8 219
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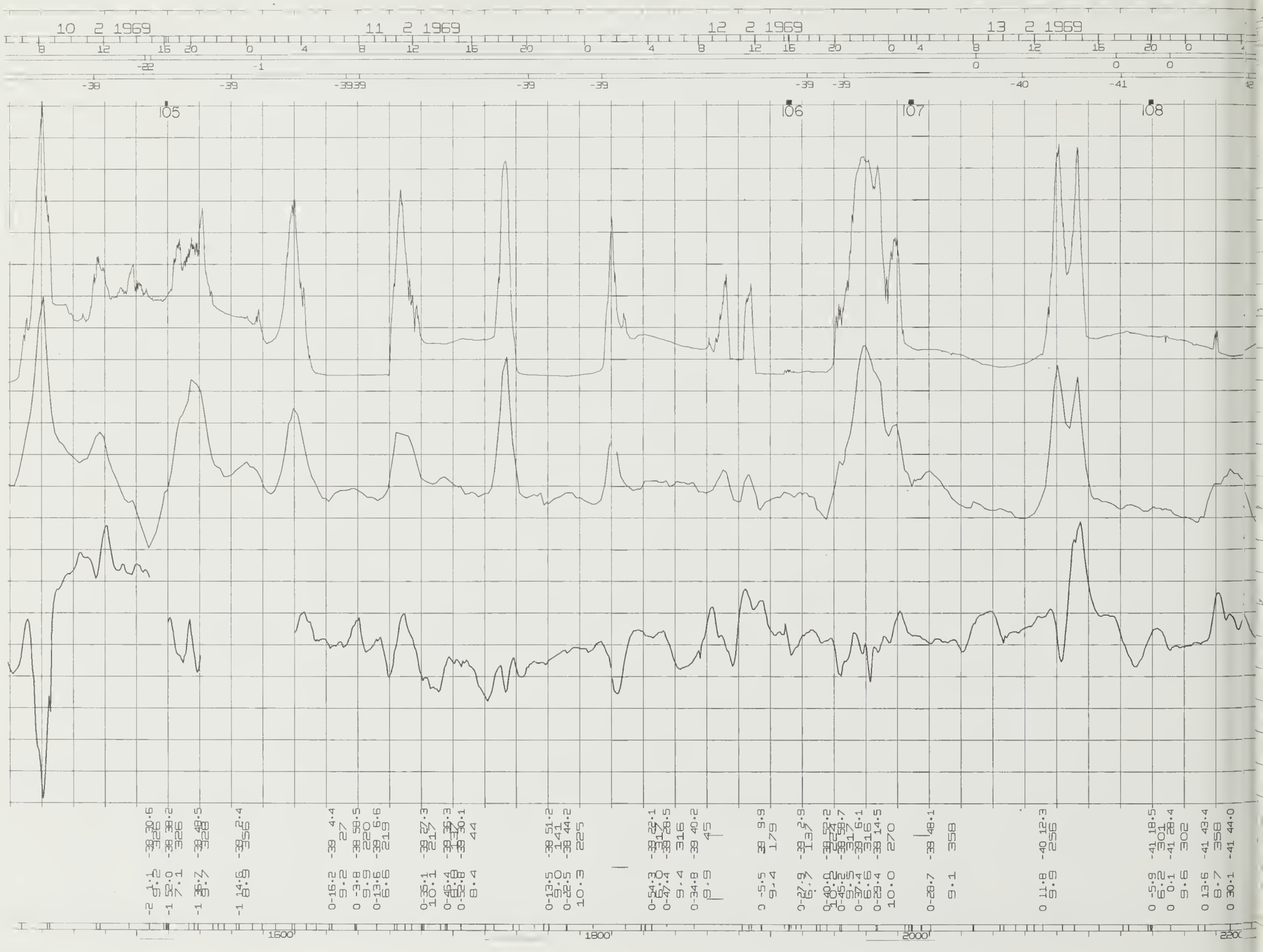

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17 11 1968
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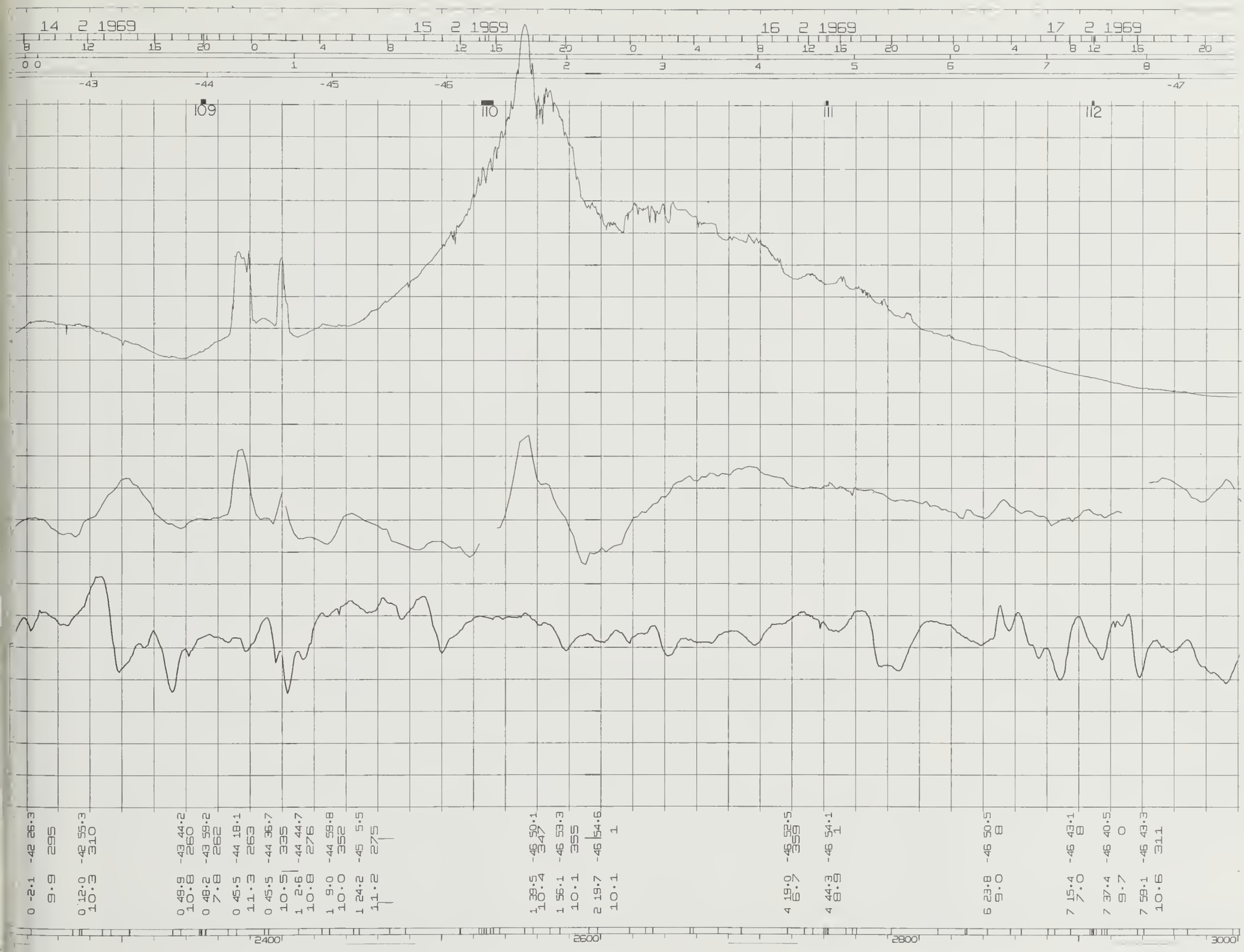

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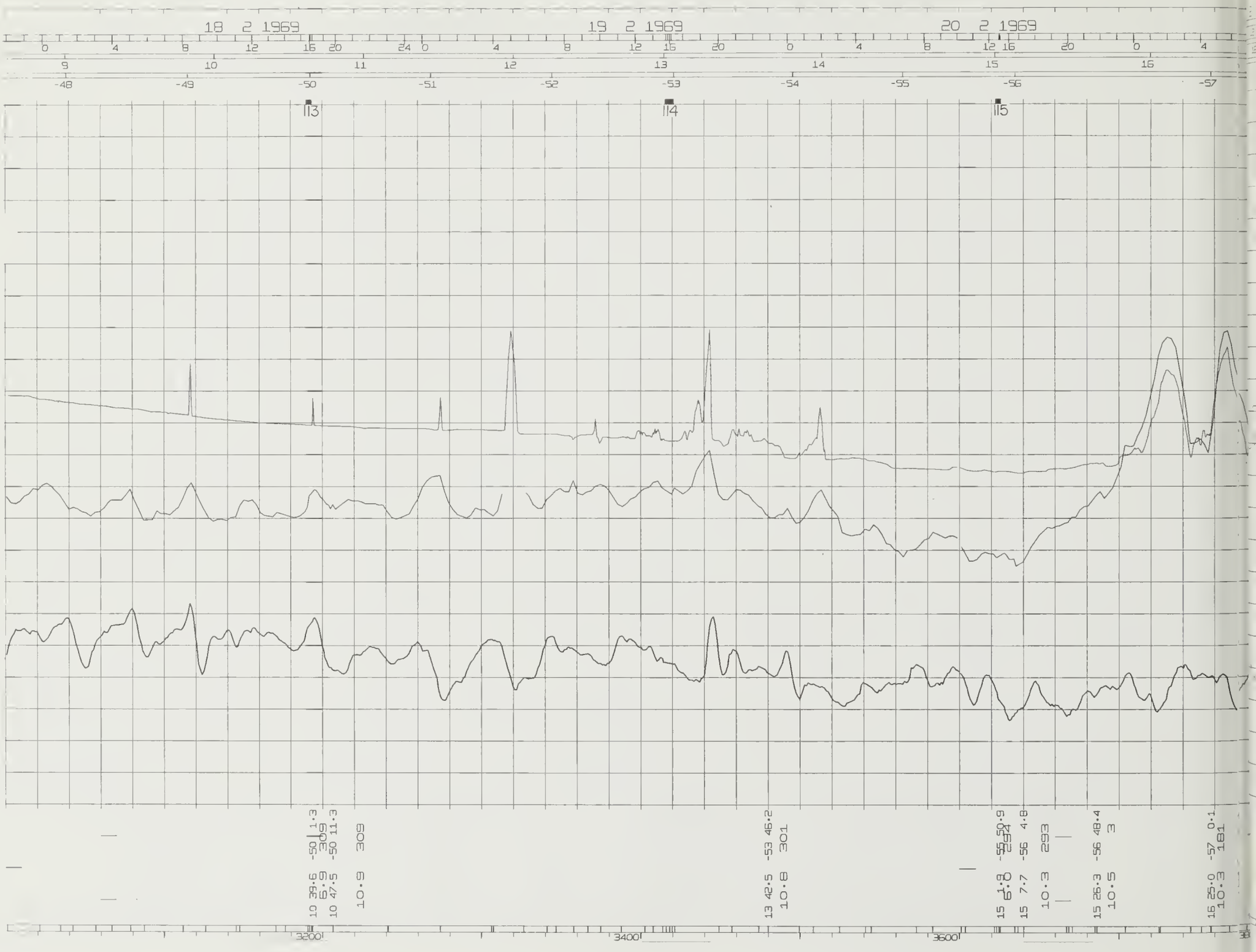
23 11 1968
24 11 1968
M G D
Rio de Janeiro


Recife
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-240 -200 -160 -120 80 -40 0 40 80 120 160 200 240
4800 4400 1000 3600 3200 2800 2400 2000 1600 1200 800 400
0
200
400
600
-8 3.0 -34 48.2
9.5 85
-7 57.2 -34 34.2
8.6 47
-7 49.8 -34 26.2
10.6 48
-7 10.0 -33 40.4
9.4 56
-6 42.5 -33 1.6
9.4 71
-6 26.3 -32 9.4
9.4 81
-6 22.3 -31 43.3
9.3 74
-6 16.0 -31 20.8
9.1 89
-6 15.0 -30 35.6
9.4 185
-6 35.8 -30 37.5
10.3 268
-6 35.7 -31 17.2
9.5 354
-5 56.6 -31 18.4
8.5 87
-5 56.9 -30 57.3
9.5 180
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9.9 357
-6 21.0 -30 52.6
6.4 18
-6 11.4 -30 49.4
9.7 357
-5 57.2 -30 50.2
8.1 87
-6 3.5 -30 39.9
9.9 183
-6 23.3 -30 41.3
10.8 275
-6 20.6 -31 7.6
9.8 355
-6 8.8 -31 8.4
8.5 91
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M 3 2 1969
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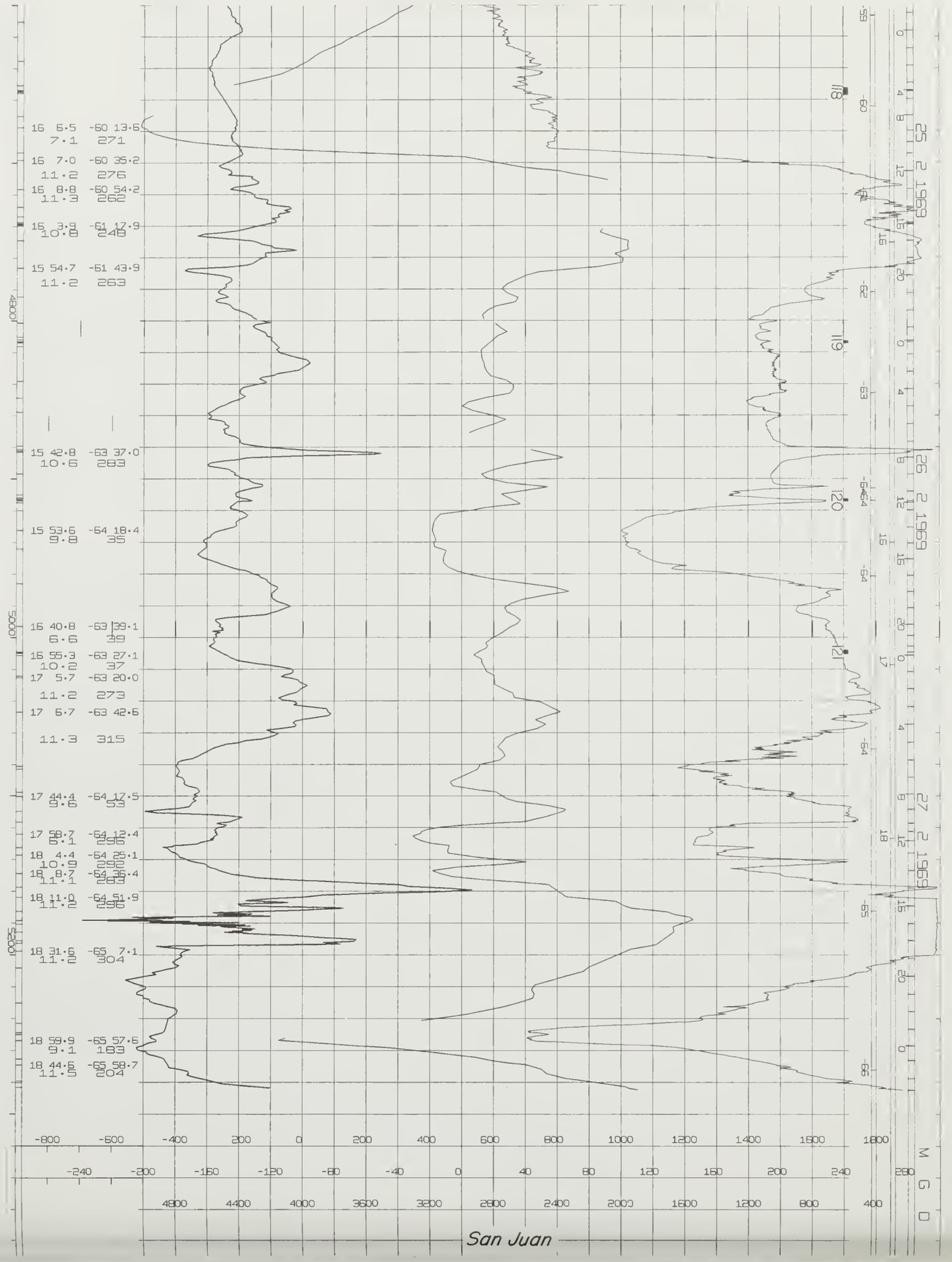

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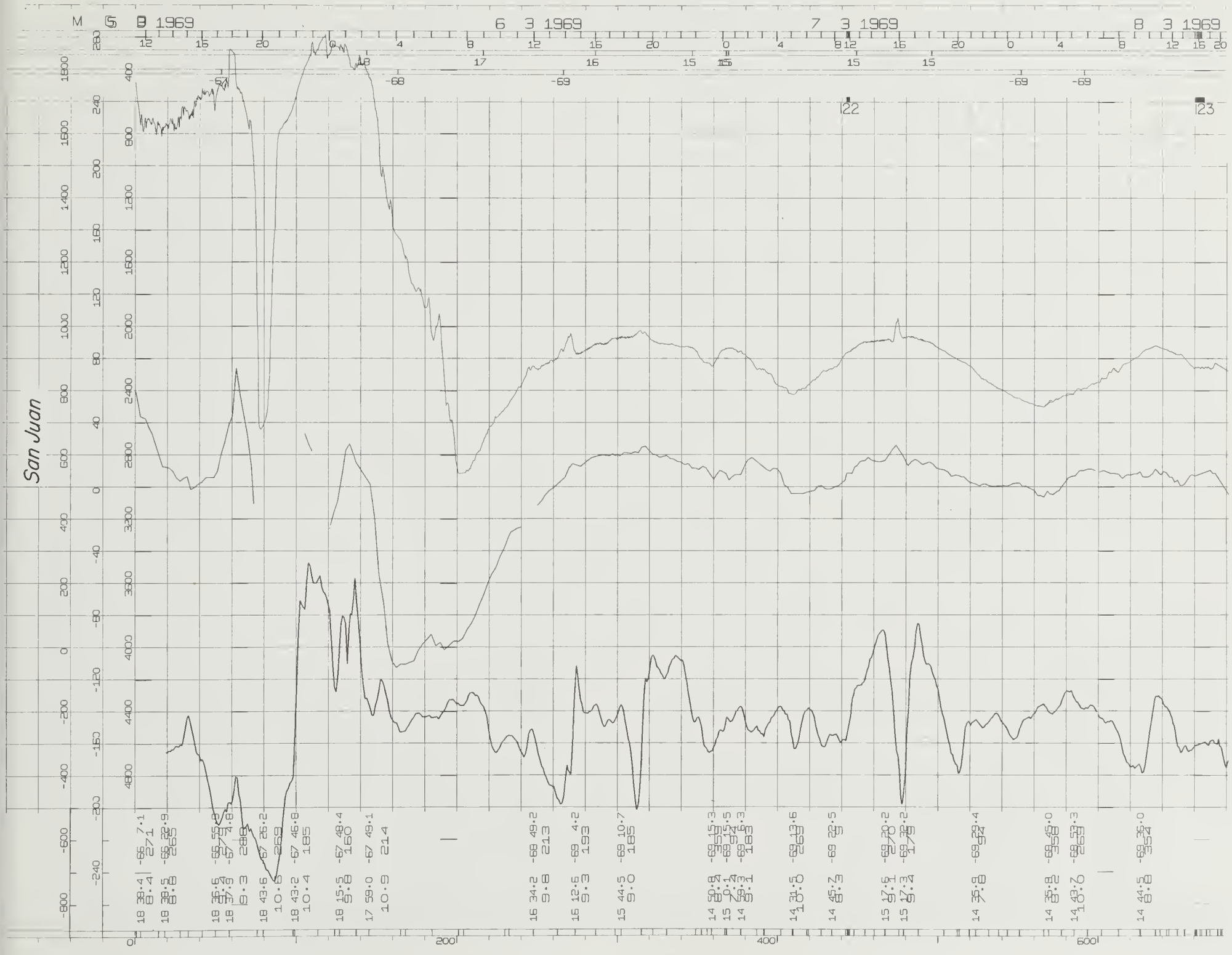

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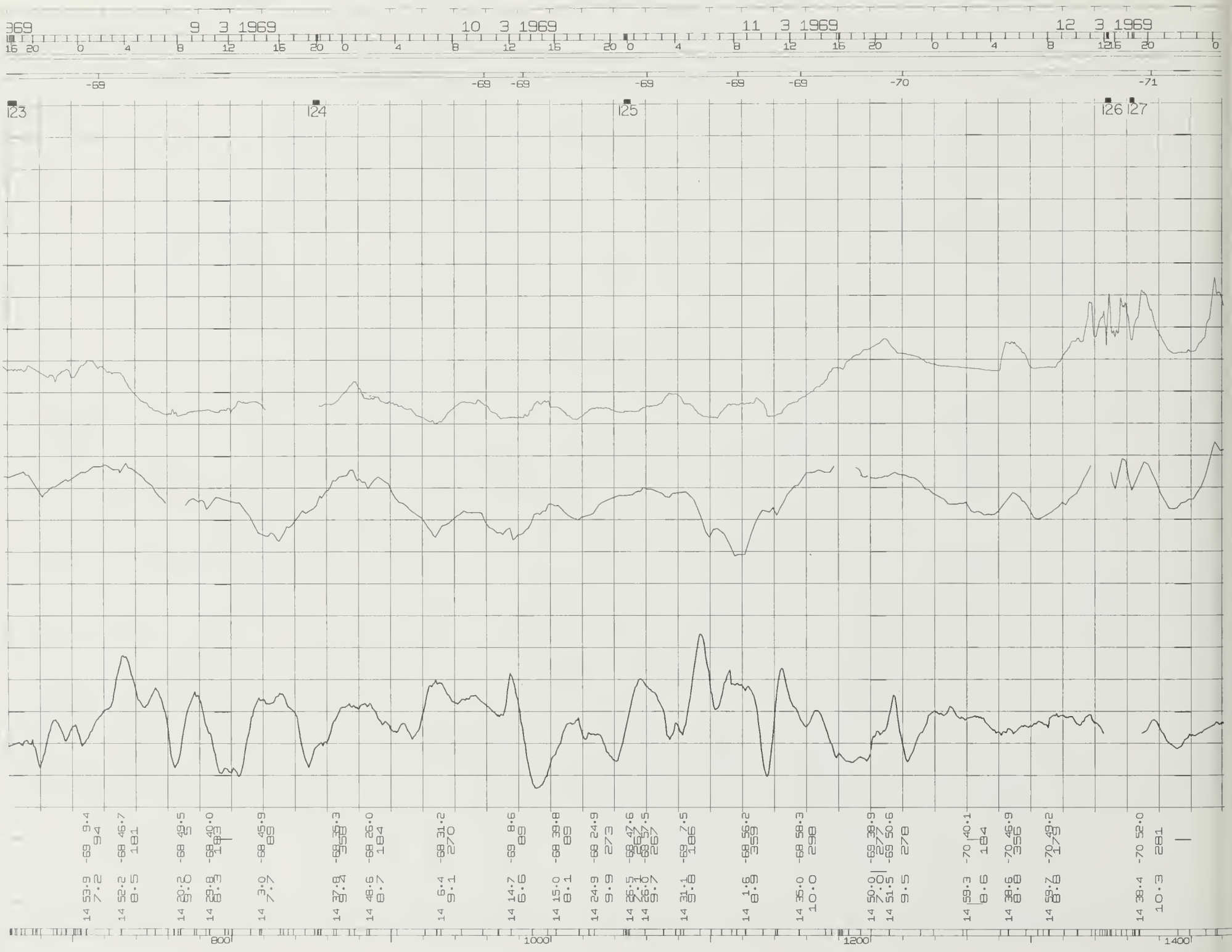

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2800
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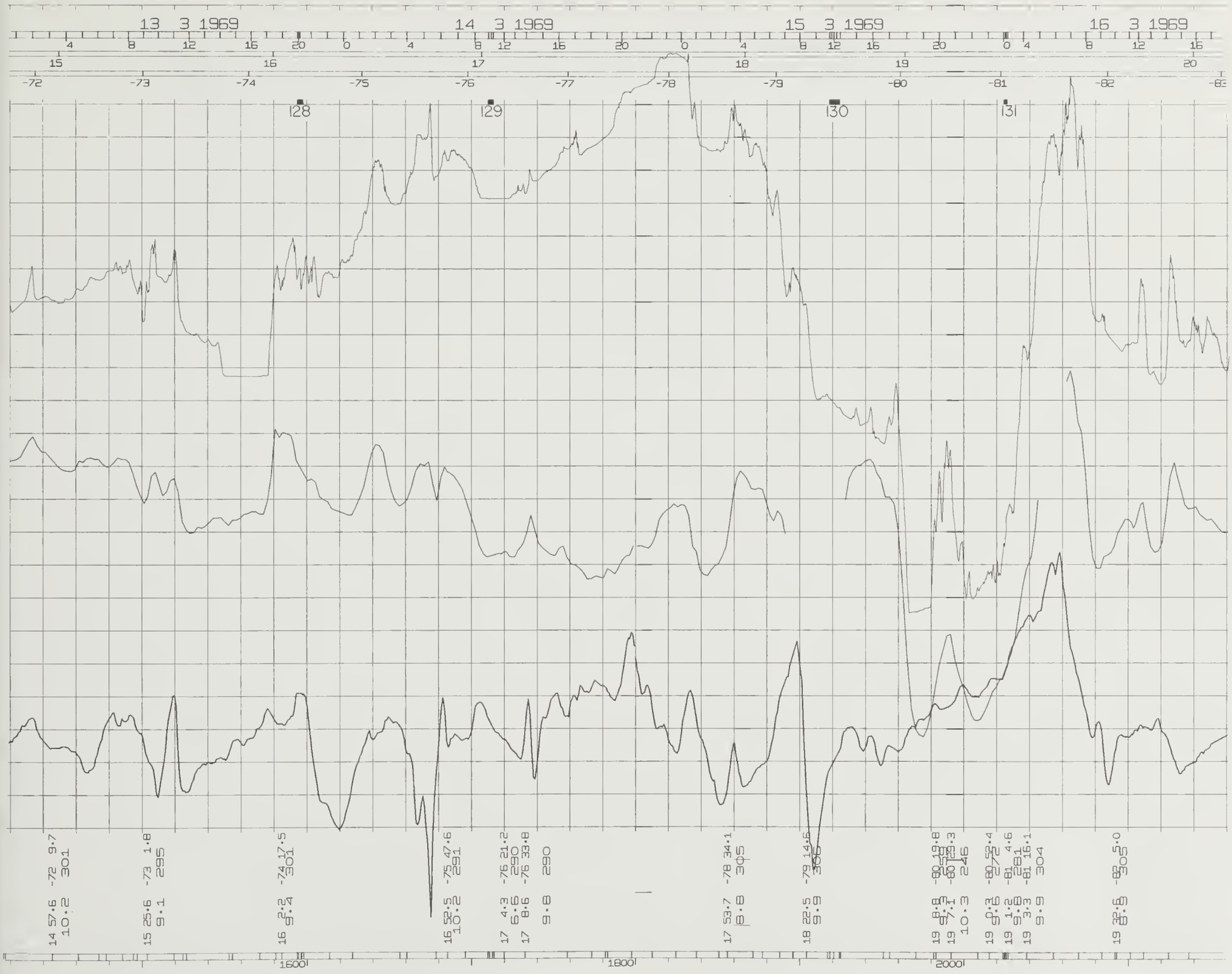

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9 10 11 12 13 14 15 16
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113
114
115
10 39·6 -50 1·3
10 47·5 -50 11·3
10·9 309
13 42·5 -53 46·2
10·8 301
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15 26·3 -56 48·4
10·5
16 25·0 -57 0·1
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3200
3400
3600

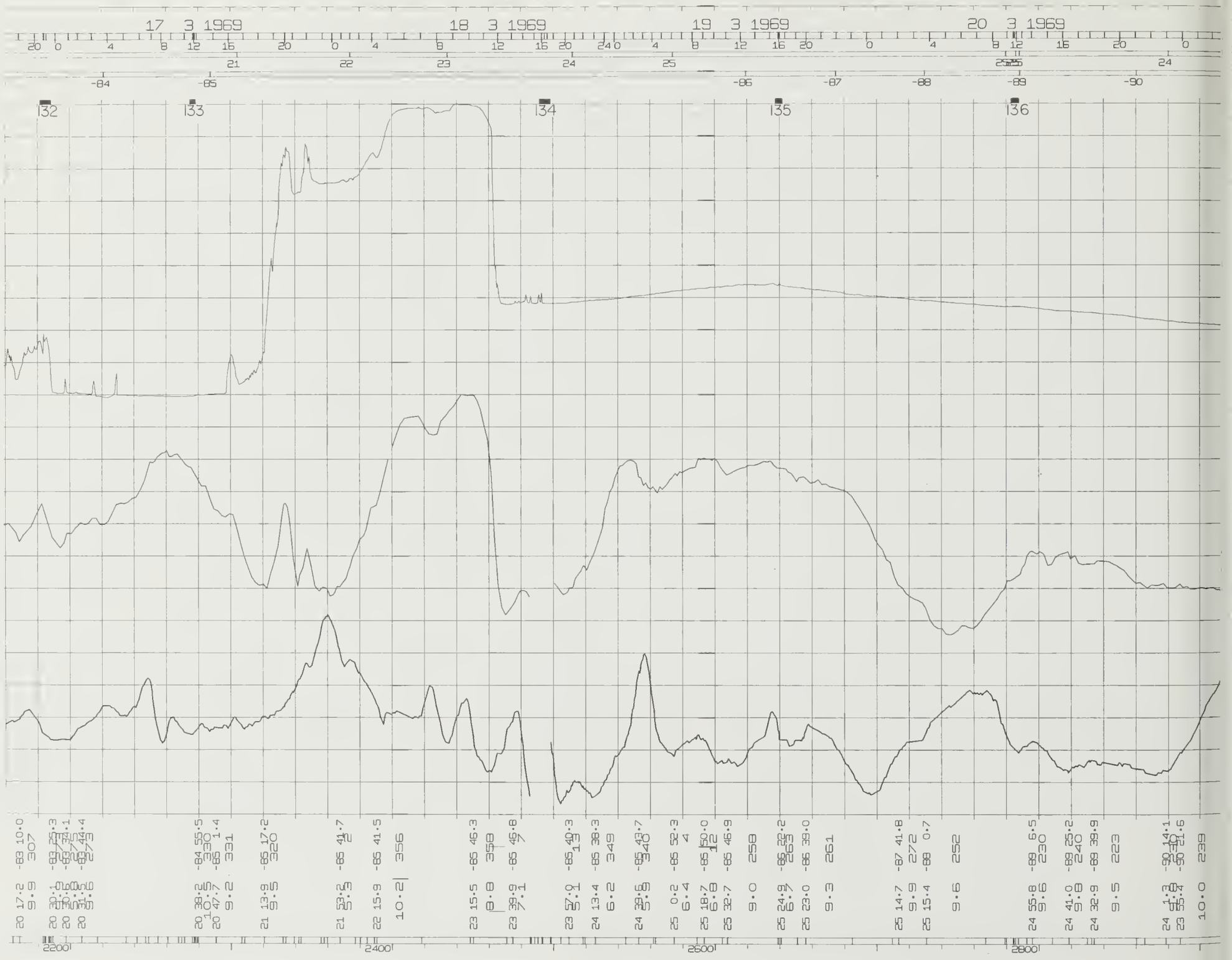

2 1969
22 2 1969
23 2 1969
24 2 1969
116
117
4000
4200
4400
4600


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16 7.0 -60 35.2
11.2 276
16 8.8 -60 54.2
11.3 282
16 3.9 -61 17.9
10.8 248
15 54.7 -61 43.9
11.2 263
15 42.8 -63 37.0
10.6 283
15 53.6 -64 18.4
9.8 35
16 40.8 -63 39.1
6.6 39
16 55.3 -63 27.1
10.2 37
17 5.7 -63 20.0
11.2 273
17 6.7 -63 42.6
11.3 315
17 44.4 -64 17.5
9.6 53
17 58.7 -64 12.4
8.1 296
18 4.4 -64 25.1
10.9 292
18 8.7 -64 36.4
11.1 283
18 11.0 -64 51.9
11.2 296
18 31.6 -65 7.1
11.2 304
18 59.9 -65 57.6
9.1 183
18 44.5 -65 58.7
11.5 204
4800
5000
5200
118
119
120
121
25 2 1969
26 2 1969
27 2 1969
-800 -600 -400 200 0 200 400 600 800 1000 1200 1400 1600 1800
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4800 4400 4000 3600 3200 2800 2400 2000 1600 1200 800 400
San Juan
M G D

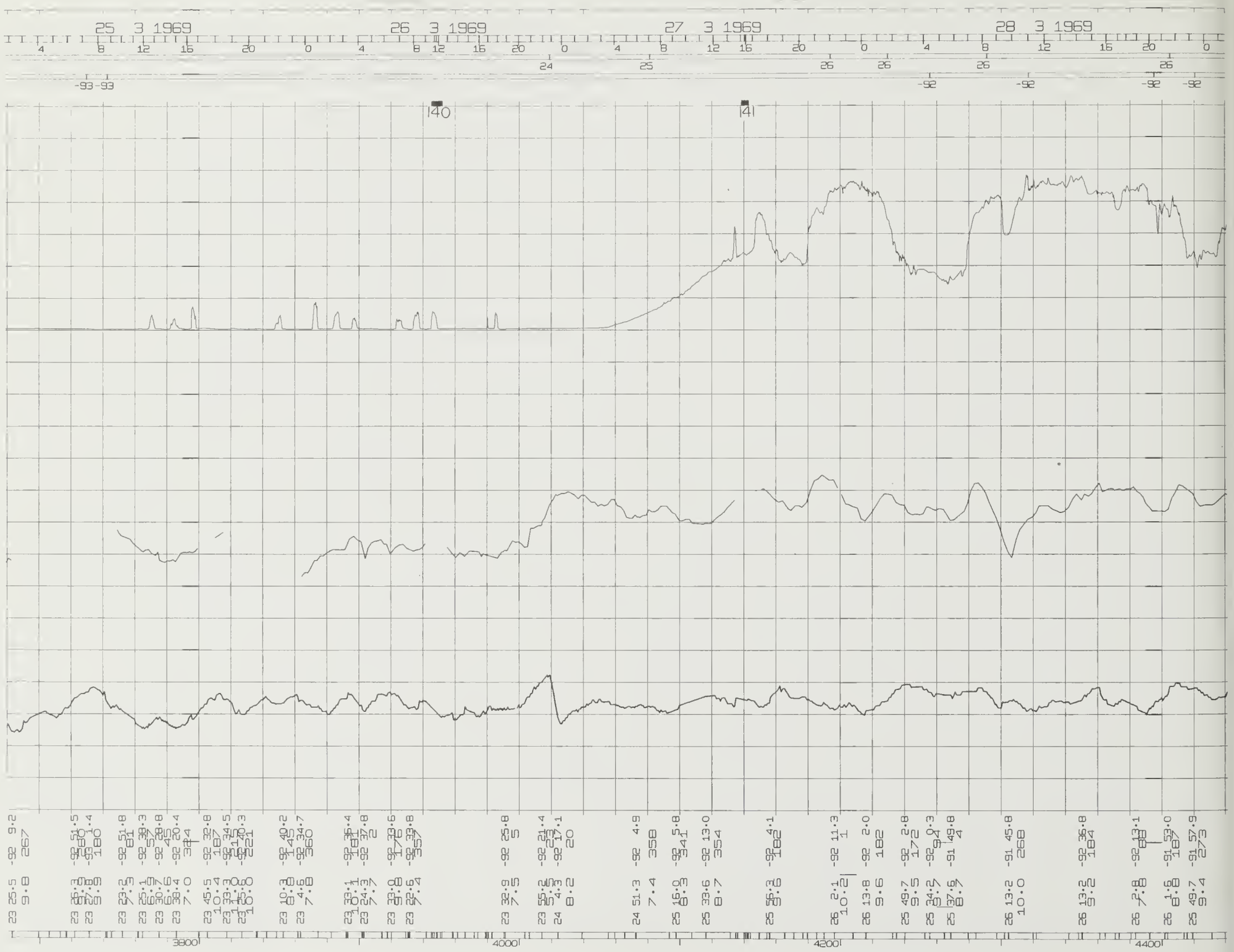

M 5 3 1969
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7 3 1969
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122
123
San Juan

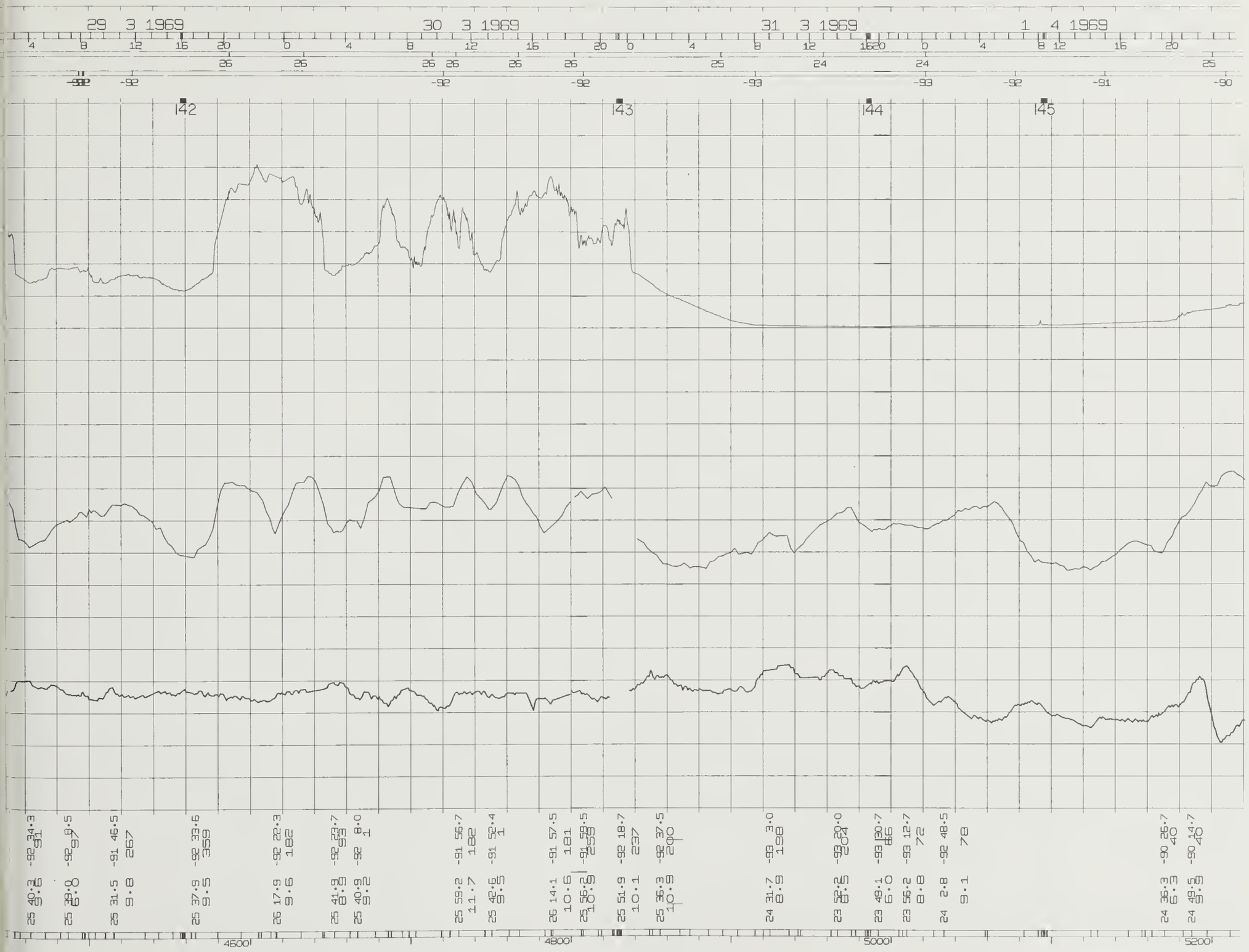

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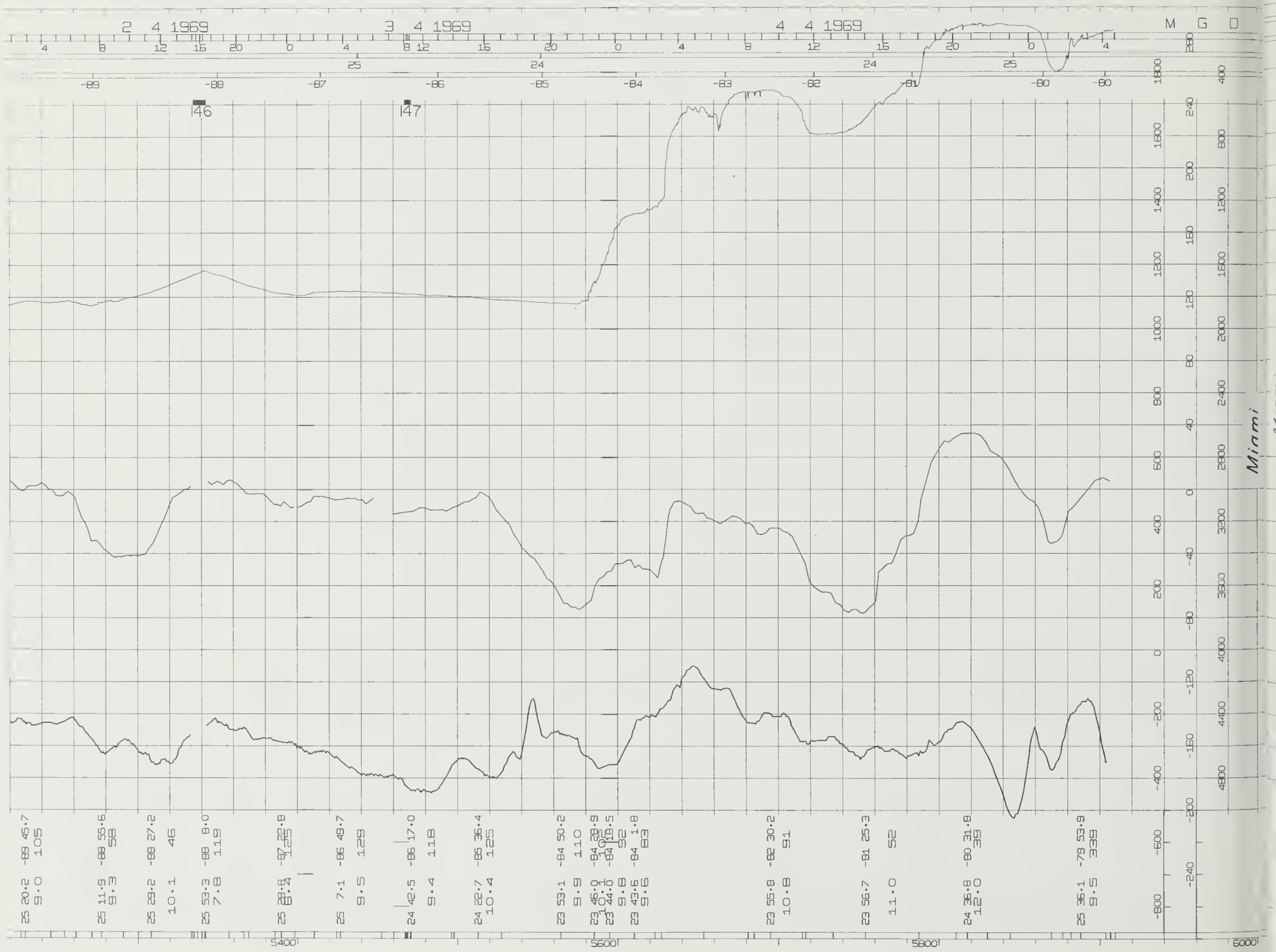

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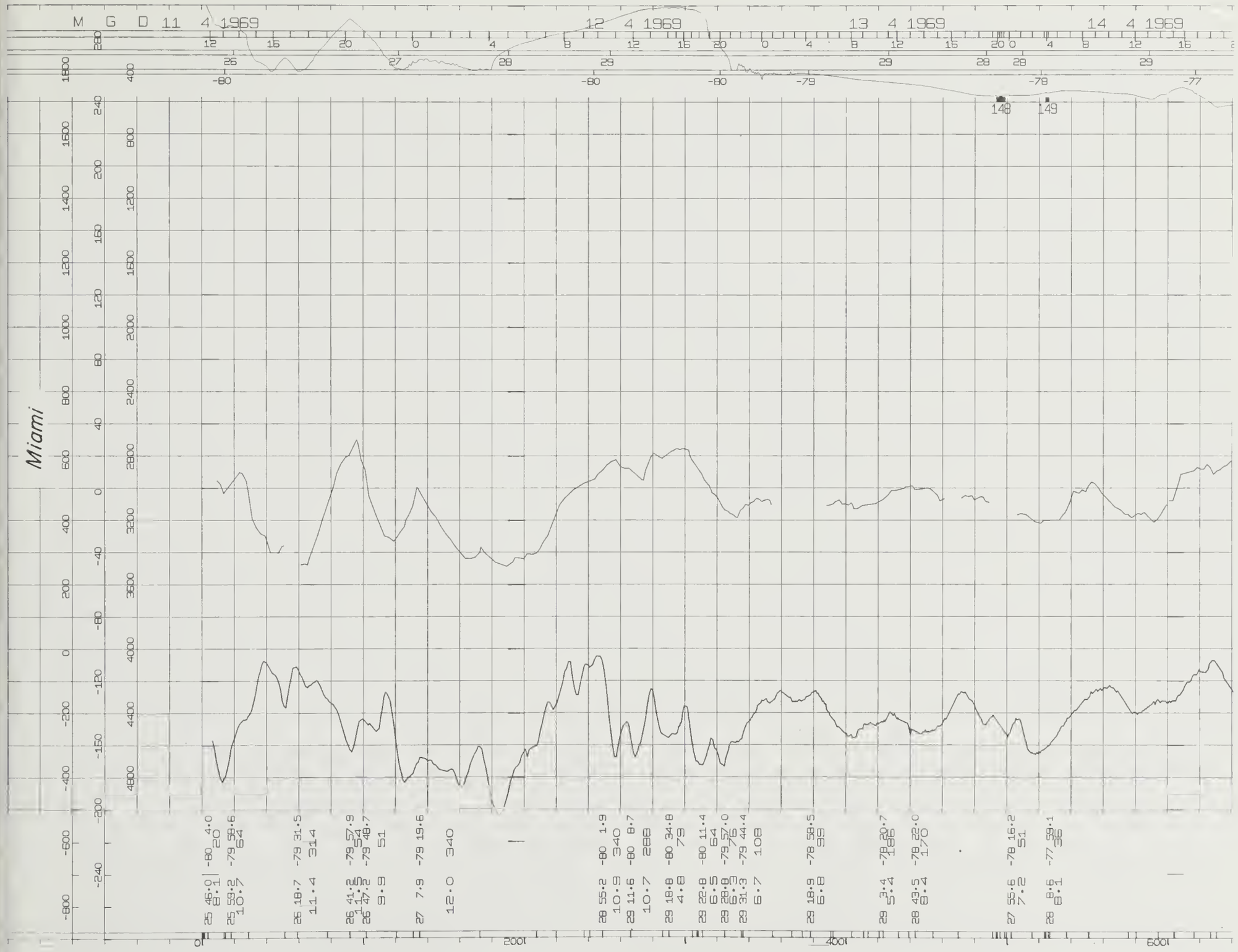

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136

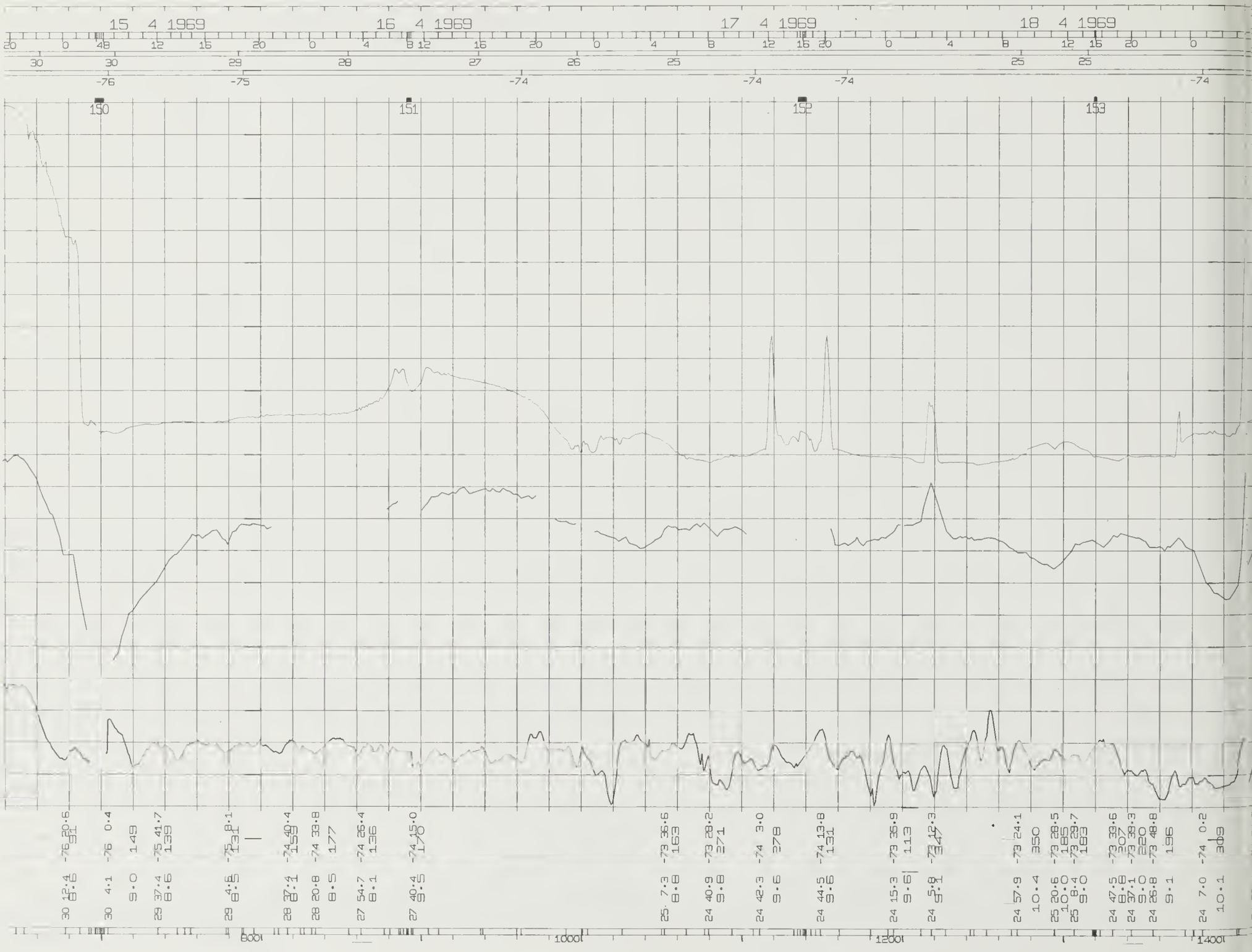

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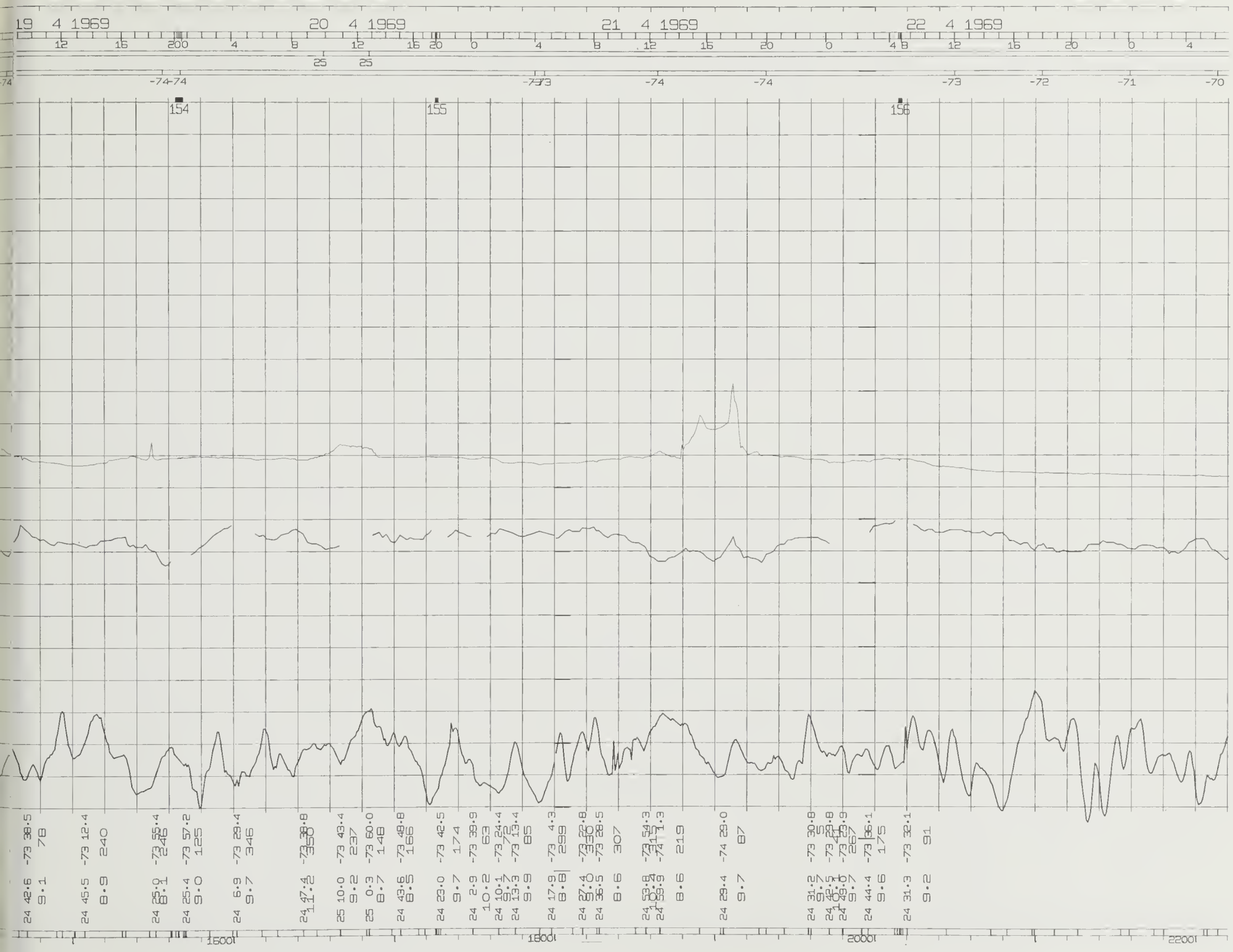

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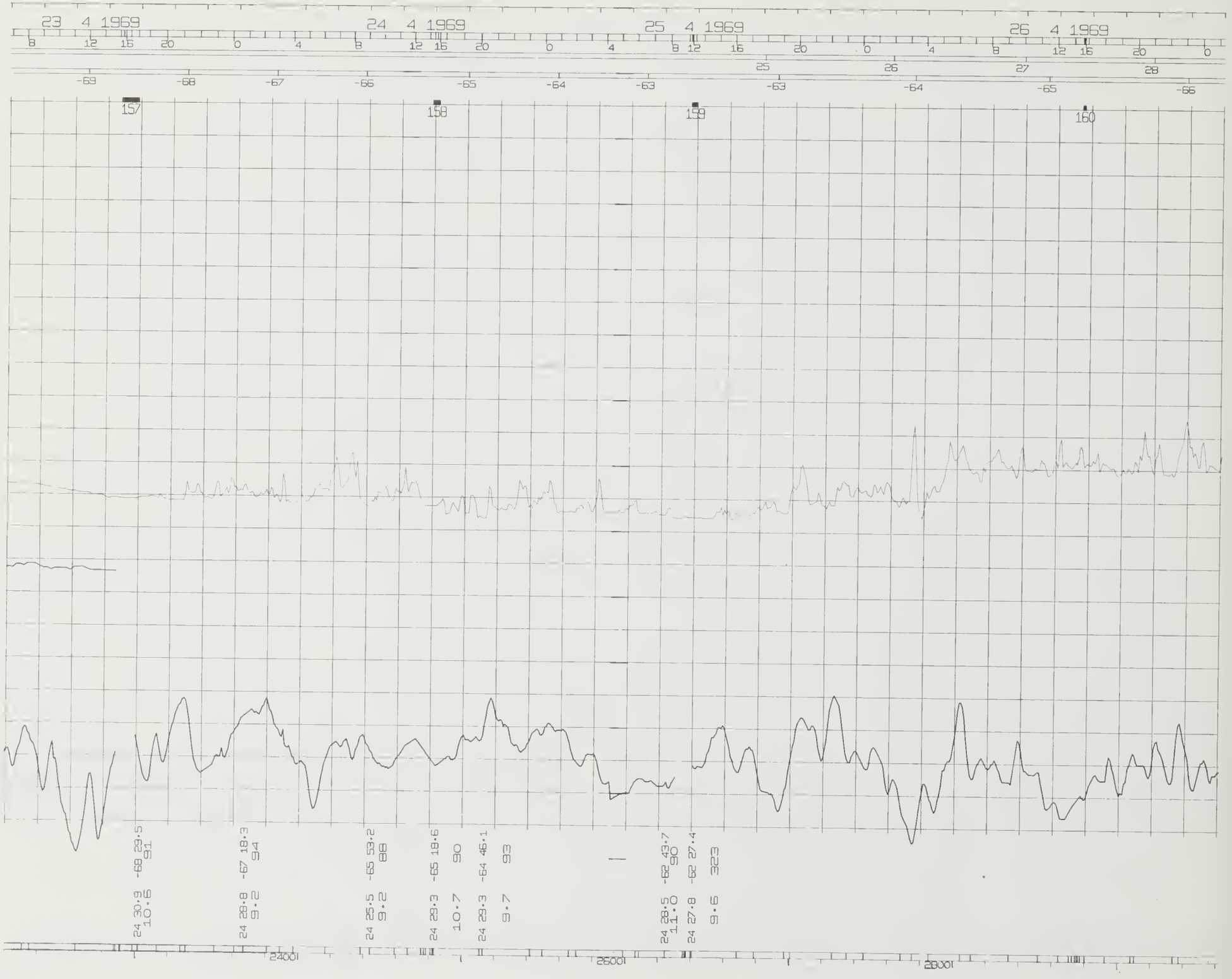

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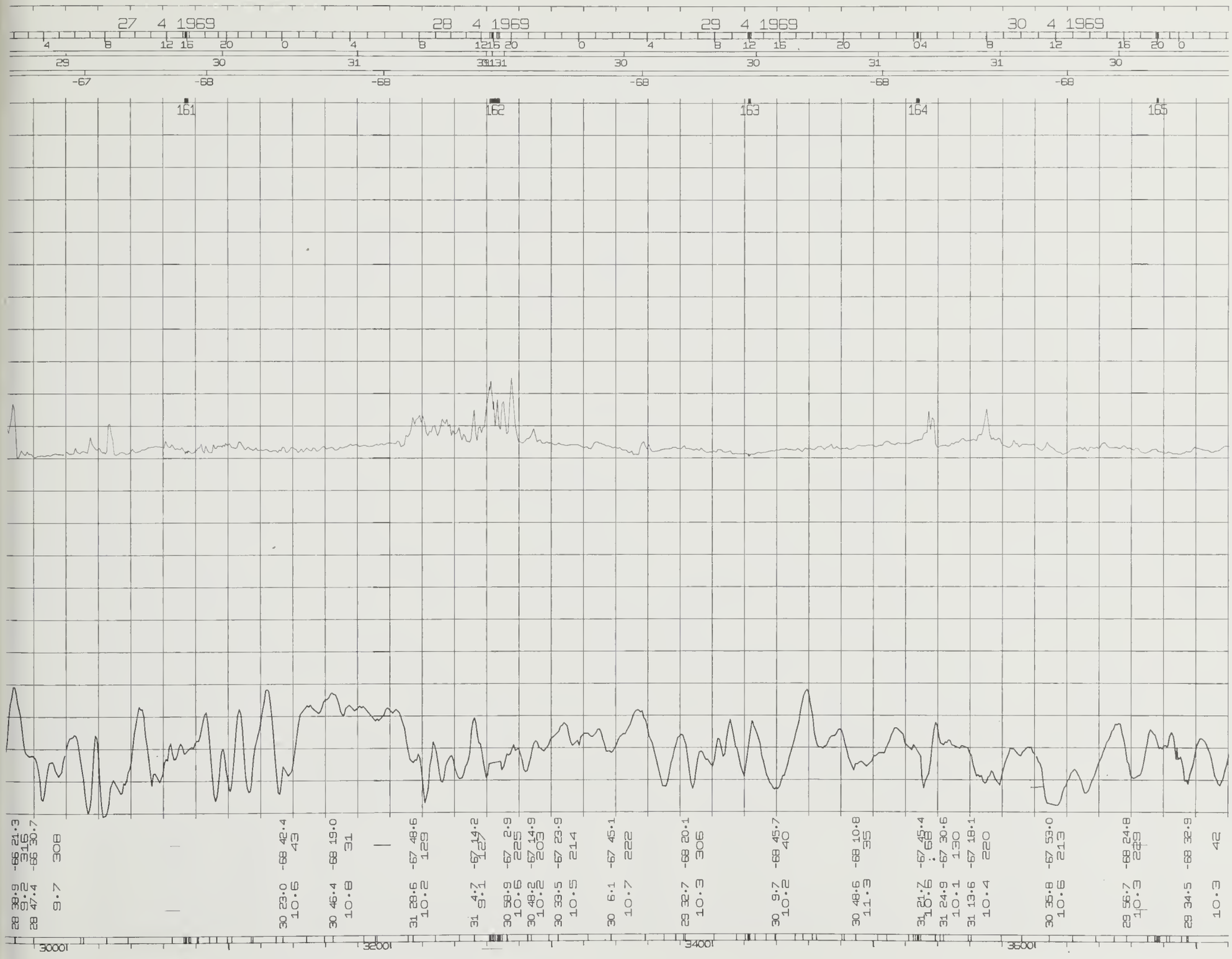

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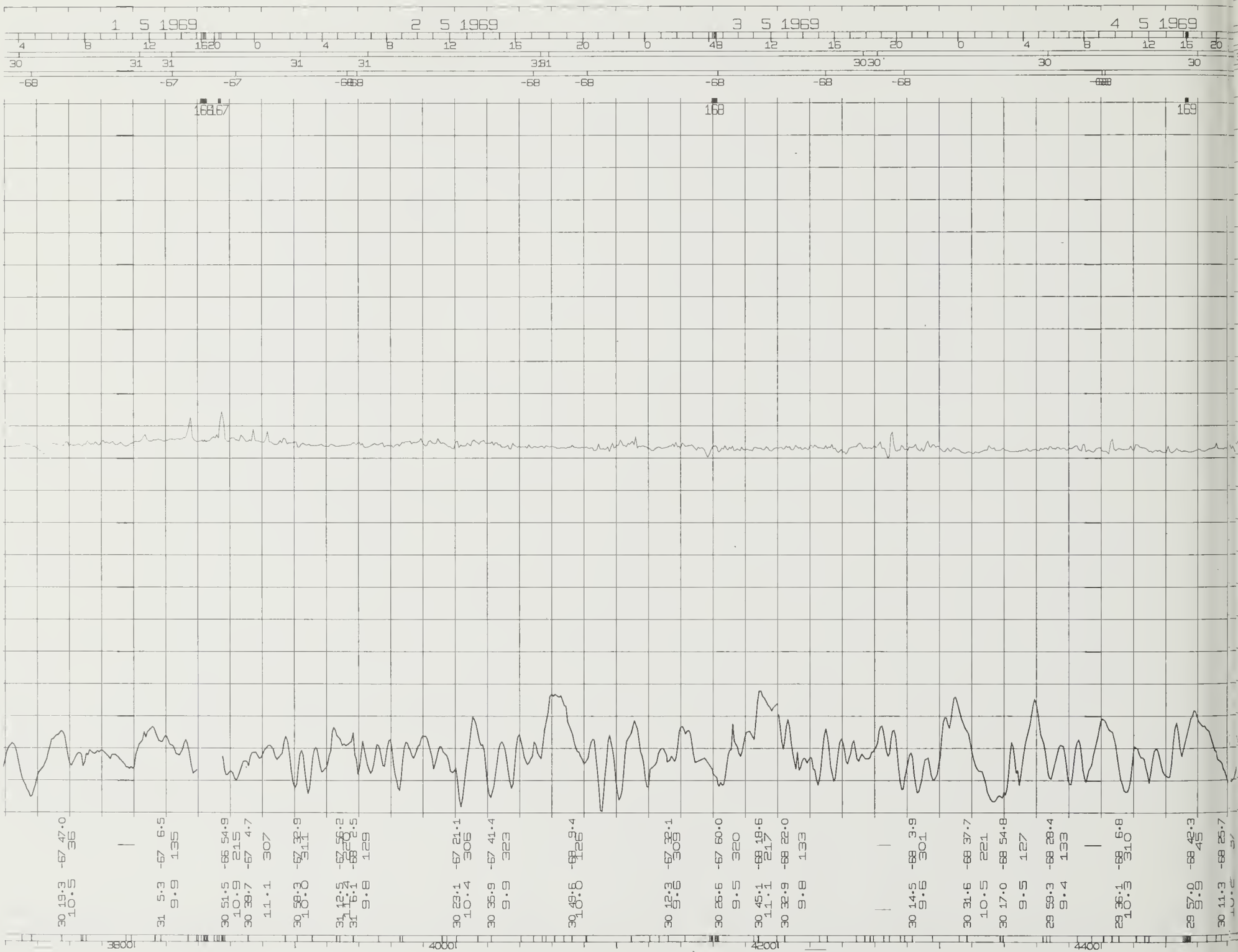

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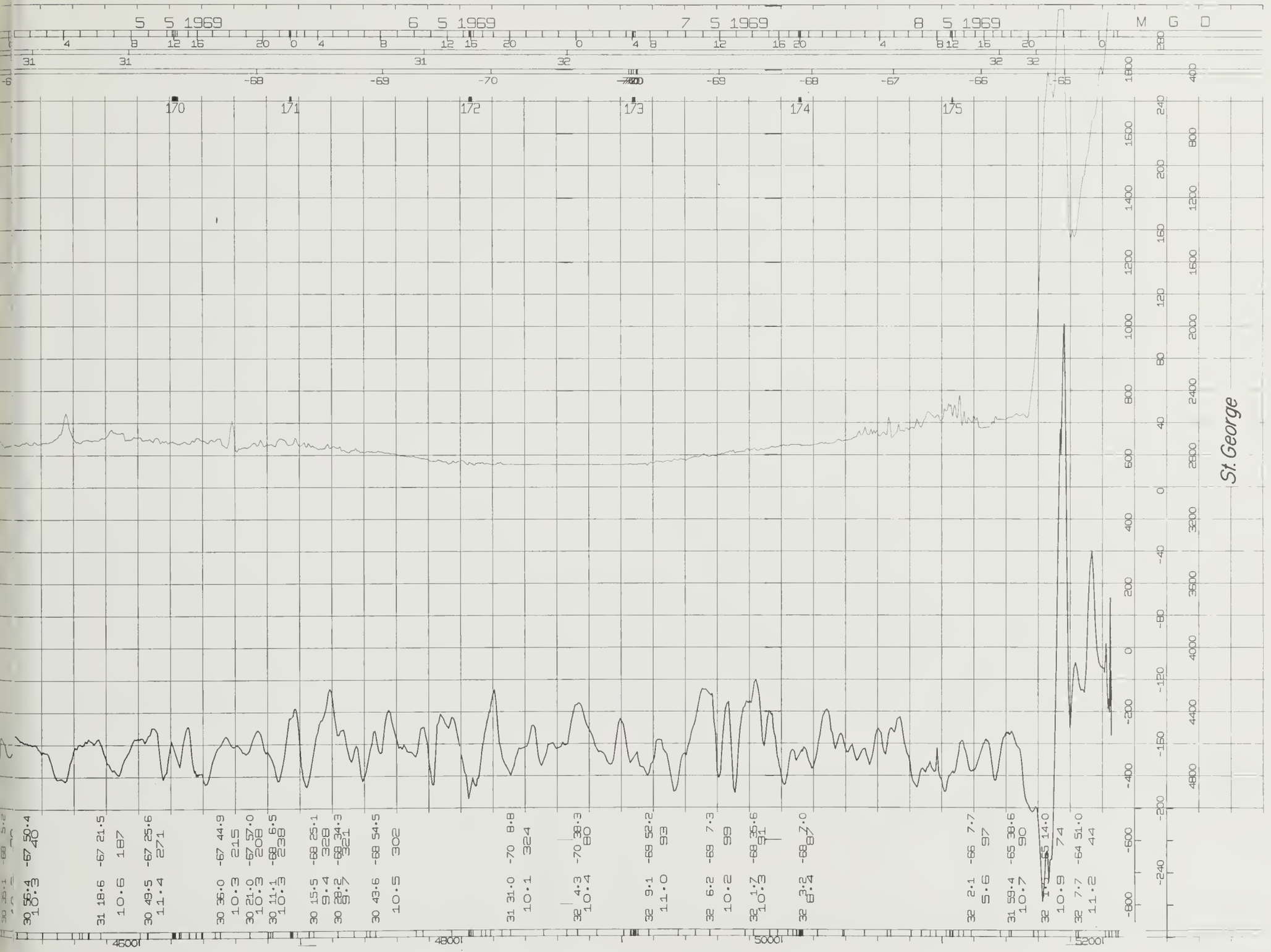

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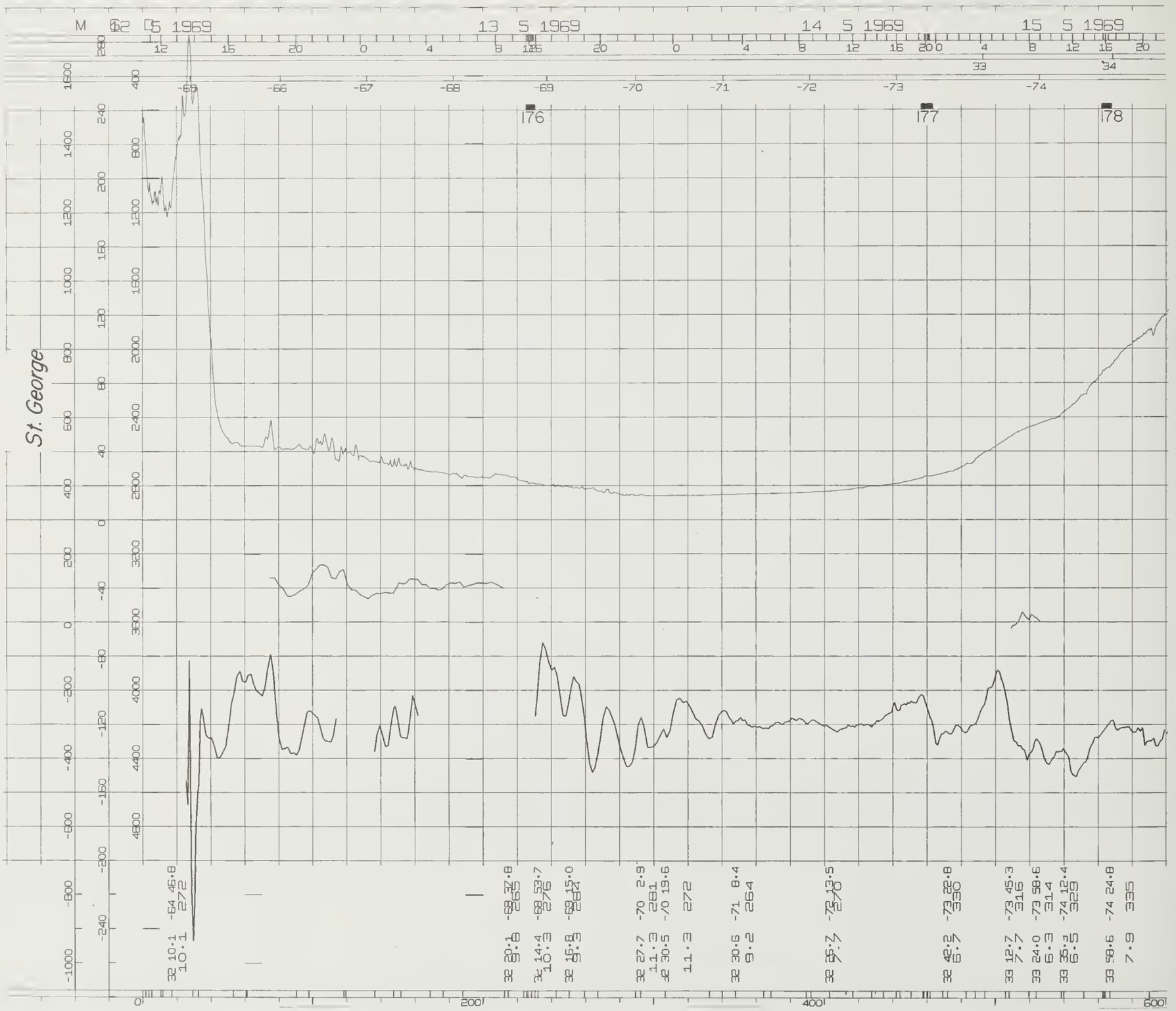

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